



# Nursing Research and Practice

WILEY

 **Forward**  
Series

## Research Article

# Development of a Symptom Self-Management Guide for Older Chinese Americans Kidney Receiving Replacement Therapy

Carolyn Sun <sup>1</sup>, Wing Cheung,<sup>2</sup> Kathryn Corpuz,<sup>1</sup> Jingjing Shang <sup>3</sup>  
 and Patricia W. Stone <sup>3</sup>

<sup>1</sup>Hunter College, Hunter-Bellevue School of Nursing, 425 E 25th St., New York, NY 10065, USA

<sup>2</sup>New York University, 726 Broadway, 4th Floor, Suite 403, New York, NY 10003, USA

<sup>3</sup>Columbia University School of Nursing, Center for Health Policy 560 W 168th St, New York, NY 10032, USA

Correspondence should be addressed to Carolyn Sun; carolyn.sun@hunter.cuny.edu

Received 9 November 2023; Revised 3 July 2024; Accepted 17 July 2024

Academic Editor: Johanna Elizabeth Maree

Copyright © 2024 Carolyn Sun et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Aim.** To assess the acceptability of a symptom self-management booklet among older Chinese Americans receiving kidney replacement therapy. **Background.** In previous work, we identified commonly occurring, bothersome symptoms and strategies used in this population to ameliorate symptoms. We used these data to develop a symptom self-management booklet in English, traditional, and simplified Chinese. **Introduction.** In the United States, the prevalence of kidney disease is 1.5 times higher in Asians compared to whites. With the many symptoms associated with this disease, self-management of symptoms would be particularly helpful. **Methods.** Seven older Chinese Americans receiving kidney replacement therapy and their caregivers were interviewed to assess the acceptability of the booklets. We reviewed participant feedback on content, graphics, and design, reading experience, suggestions for improvement, and health information sources using the inductive thematic method. **Results.** Overall, patients confirmed acceptability of these self-management booklets across all domains. **Discussion.** This study validated the booklet as a source of health information for older Chinese American patients with kidney disease, which some studies suggest are preferred to electronic materials or methods in this population. Health care providers can use the resultant booklets when caring for these patients to provide culturally sensitive information on self-management of symptoms. **Conclusion and Implications for Nursing.** These booklets provide a free resource tailored to an underserved population and may help nurses and nurse practitioners provide care with cultural humility. **Implications for Health Policy.** Embracing community-based participatory research, as was done in this study, can help create culturally appropriate patient education materials that empower patient symptom self-management and promote informative and culturally sensitive conversations between patients, families, and providers.

## 1. Background

Kidney failure related to chronic kidney disease (KFCKD) is the result of permanent kidney failure and is a progressive medical condition in which a person's life can be maintained only by long-term, intensive dialysis or kidney transplant, termed "kidney replacement therapy" (KRT). Patients with KFCKD are not only distressed physically and mentally by the burdensome treatment process but also by the many symptoms of the disease [1].

The prevalence of KFCKD in the Chinese American population is of special concern. The incidence of CKD is 1.5 times higher in the Asian American community

compared to the Caucasian community [2]. The growth of the Asian population was the fastest among all race groups in the U.S. from 2000 to 2019, at a rate of 82.2% [3]. The greatest proportion of the Asian population in the U.S. in 2019 was an estimated 5.3 million Chinese of Asian descent [3]. With the rapid growth of Chinese Americans, it is reasonable to expect that the number of Chinese Americans with CKD will continue to expand.

Medicare beneficiaries with KFCKD who choose to continue dialysis therapy are ineligible for Medicare-funded hospice care, creating barriers to accessing palliative service [4, 5]. This policy disadvantages older Chinese American patients who rely heavily on Medicare, making management

of symptoms a crucial skill; symptom self-management has been demonstrated to be an effect strategy for improving self-efficacy, medication adherence, and quality of life [6].

Conservative treatment (i.e., management of symptoms rather than initiating dialysis or opting for transplant) is considered a viable option that may increase quality of life in older patients that may not receive benefits that outweigh the burdensome nature of KRT [7]. However, this option frequently goes undiscussed as it can be perceived by patients as a failure to intervene [8]. The Individual and Family Self-Management Theory suggests that many factors influence whether a patient can practice self-management behaviors, including knowledge, cultural norms, and personal preferences. Those patients with beliefs consistent with the self-management behaviors as well as social support (including shared-decision making with their health care providers) are more likely to engage in recommended self-management behavior [9]. This idea of the provider and the patient discussing treatment plans and coming to an agreement resulting in improved patient medication and treatment taking behavior has been termed, “concordance” [10].

Chinese Americans are also disadvantaged because of language barriers. In the U.S., nearly 34% of Chinese Americans speak either Mandarin or Cantonese Chinese at home and 43% of foreign-born Asians had less than proficient English-speaking ability or did not speak English at all [11]. This limited English proficiency may result in low health literacy [12]. Compared to other racial/ethnic groups, Chinese with limited English proficiency reported the highest prevalence of low health literacy [13]. Low health literacy puts this group at a high risk for poor health outcomes [13]; for example, it may decrease adherence with self-management strategies [14]. Conversely, when using their native language to discuss health issues, Chinese Americans were found to have higher health literacy regardless of their English proficiency level [12].

To align with Healthy People 2030 (released in August 2020 by the U.S. Department of Health and Human Service (HHS)), strategies to promote health literacy in older Chinese Americans with KFCKD should be developed. According to Healthy People 2030, health literacy will be the central focus in the promotion of health and well-being of all in the next decade [15]. In addition to the prior national objectives for “eliminating health disparities, achieving health equity, and attaining health literacy to improve the health and well-being of all,” the new definition of health literacy used in Healthy People 2030 also emphasizes the importance of both personal and organizational health literacy to help individuals to “find, understand, and use information and services to inform health-related decisions and actions for themselves and others” at personal and organizational levels [15].

To promote health literacy in the older Chinese KFCKD population, one approach may be the use of printed health information materials, such as booklets, in their preferred language. According to a study investigating the preference of health information sources across various non-English speaking groups, brochures and emails were the preferred source of information [16]. When health education materials

are translated, they must take into consideration Chinese cultural contexts and practices and make them readily available for this population [12].

The aim of this study was to develop an educational booklet for patients with KFCKD with evidence-based, culturally sensitive information about self-symptom management strategies and to evaluate its acceptance among older Chinese Americans with KFCKD. Creating the booklet content was done in stages. First, we identified the bothersome symptoms commonly experienced by this population and the self-management strategies they used for symptom amelioration. Then, strategies were confirmed through an umbrella review and a panel of experts (including a Traditional Chinese Medicine doctor, a physician, palliative care and adult gerontology nurse practitioners, and nurses) in a previously published study [17].

Using the content identified from this study, we created and tested a booklet to guide the self-management of symptoms in older Chinese Americans with KFCKD and MCC. It was hypothesized that the booklet would be acceptable to these target patients and that the key messages in the booklet would help enhance their skills in managing their symptoms.

## 2. Methods

The study was conducted in New York City (NYC), one of the U.S. metropolitan areas with the highest Chinese population [18]. It was a 2-tier process: (a) development of an KFCKD self-help booklet and (b) evaluation of patient acceptance of the booklet using content analysis of interviews. It was granted approval from the organization’s Institute Review Board.

*2.1. Booklet Development.* The booklet built on a previous study that validated the effectiveness of the strategies identified by patients to alleviate commonly occurring bothersome symptoms as described above [17] and the examples of figures from the booklet are included as Figure 1 in this publication (the complete booklets are available by contacting the author).

After confirming the symptoms and strategies to be covered in the booklet, an adapted Suitability Assessment of Materials (SAM) checklist that captures domains of message content, text appearance/typography, visuals/graphics, and layout/design [19] was used to guide the booklet content presentation. The English version of the booklet was developed first and then translated into traditional Chinese and simplified Chinese by a Chinese-English translator. All three booklet versions, as well as this study, were approved by the Institutional Review Board for our study use.

The resultant booklet was an 11-page, 4-color, letter-sized, printed booklet entitled “Self-management Strategies For Older Chinese-American Patients with Chronic Kidney Disease (CKD)”. The booklet was compiled to cover 33 strategies to ameliorate 12 symptoms including physical fatigue, trouble sleeping, pain, weak or painful arms or

English.

## Constipation

- ⊕ Drink plenty of water.
- ⊕ Eat high-fiber foods, such as vegetables.
- ⊕ Medication: Oral or topical prescription drugs can be used.



Simplified Chinese.

## 便秘

- ⊕ 药物治疗：可使用口服或外用的处方药物。
- ⊕ 进食高纤食物，例如蔬菜。
- ⊕ 饮用足够水分。



Traditional Chinese.

## 便秘

- ⊕ 藥物治療：可使用口服或外用的處方藥物。
- ⊕ 進食高纖食物，例如蔬菜。
- ⊕ 飲用足夠水分。



FIGURE 1: Example of strategies presented in each version of the booklet: English, simplified Chinese, and traditional Chinese (pdfs of the booklets are available for free by contacting the authors).

shoulders, itching, dizziness, trouble breathing, poor appetite, nausea and vomiting, constipation, dry eyes, and blurred vision. For each symptom, there was at least one graphic or picture illustrating one of its corresponding strategies. The recommended strategies, suggested by participants and validated by an expert panel (described above), encompassed culturally accepted practices like Tai Chi, Qi Gong, acupuncture, and Western medical remedies.

### 2.2. Evaluation of Patient Acceptance

**2.2.1. Patient Recruitment.** We recruited patients from the pool of those who had participated in the development of the booklet and agreed to be contacted again for evaluation of the resultant booklet. The original participants were patients from a collaborative visiting nurse service provider in New York who were recruited using purposive sampling. The



inclusion criteria included (a) Chinese or Chinese American living in New York City; (b) Mandarin Chinese, Cantonese Chinese, or English speaking; (c) diagnosed with KFCKD and other chronic conditions; (d) noninstitutional; (e) negative cognitive screening [20]. The patient recruitment and eligibility screening were done via telephone by a Chinese (Cantonese/Mandarin)-English investigator, a nurse practitioner with practice caring for patients in Chinese-speaking countries, as well as in the U.S. both in clinic and via in-home care, who was fluent in English, Mandarin, and Cantonese. To minimize sampling bias and to test the readability of our booklet more thoroughly, we did not exclude those who reported that they were unable to read words but allowed them to read the booklet with a caregiver. Those with hearing or visual problems were excluded.

Participants were mailed our booklet and research information sheet written in the language preference they indicated. All participant interviews were scheduled about 2 weeks after the mailing to allow adequate reading time.

**3.2.2. Data Collection.** Data collection was done by the same investigator. In compliance with COVID-19 pandemic control measures, all data were collected over the phone. To encourage personal opinion and avoid any potential group thinking, one-to-one instead of focus group interviews were adopted. Each participant's informed verbal consent was obtained right before each interview. Also, the interviewer proceeded to interview only when the participants reported having completed reading the materials. The interviews were semistructured with a set of 4 open-ended questions including "What do you think about this booklet?", "Describe how you might improve the booklet", and "How would you use this booklet" by the nurse practitioner mentioned above.

**3.2.3. Data Analysis.** The interviews were transcribed and translated from Chinese into English by the interviewer. Then, the interviewer and two other researchers analyzed each transcript independently by the inductive thematic method [21]. Any inconsistencies in the analytic findings were discussed among the research team. All the resultant codes and themes were agreed upon by all team members.

### 3. Results

**3.1. Participant Characteristics.** Seven patients, ranging in age from 64 to 85 years old, participated in the interviews. Four participants were female and three were male. English was not their preferred language. Four participants chose the simplified Chinese booklet and the three chose the traditional Chinese version. Five interviews were conducted in Cantonese and the 2 others were in Mandarin.

**3.2. Data Analysis Findings.** Five themes about participants' acceptance of our booklet were identified: content, graphics and design, reading experience, suggestions on improvement, and health information source.

#### 3.2.1. Content

**(1) Readability.** The findings regarding booklet readability were mixed. Half of the participants found the content clear, and the provided booklet was written in their native reading language:

"I can read Chinese. I mean it's easy to understand."  
(Participant E, aged 82, Simplified Chinese)

Even though they were provided with a booklet in their preferred language, some participants still found it difficult to understand the content because of factors such as age-related cognitive decline, low education level, inadequate reading comprehension skills, and presence of unfamiliar words in the text:

"It isn't that she can't read the text. She can read it but, because of her old age, she forgets what she's just read easily. You need to keep reminding her of things. For example, you need to ask her to walk and exercise a bit more, or get adequate rest as suggested here. That's all because of her old age. She can't remember things that you told her a long time ago. . . She's in her 80s already and there is no way she can understand all the content."  
(Participant C's daughter, participant aged 80, Simplified Chinese)

Participants seemed to comprehend the content better when they were guided to read it aloud:

"It's (the booklet) about symptoms of kidney disease. . .It tells what is good to do and what isn't."  
(Participant A, aged 81, Traditional Chinese)

**3.2.2. Length and Coverage.** There was no information reported to be missing in the booklet. Participants who had no problems in understanding the content were generally satisfied with the booklet coverage and the length of time they needed to complete reading the booklet. However, those with difficulty in understanding the content thought the booklet provided too much information for them to process. One participant specified his desired length of booklet:

*Participant:* "There's a little bit too many (words) but it's still acceptable." *Interviewer:* "How many pages do you think would make it easier for you?" *Participant:* "5 pages would be fine."  
(Participant G, aged 73, Simplified Chinese)

**(1) Legibility.** The font size of the text was appropriate to most participants, and they were able to read the text clearly:

"I can read (the text) clearly. . .I even don't need wearing eyeglasses (to read)."  
(Participant B, aged 68, Simplified Chinese)

3.2.3. *Acceptance.* A number of participants agreed that the content of the booklet was highly relevant to them.

“It’s about my own problems! . . . Everything written here is about my illness.” (Participant F, aged 85, Traditional Chinese)

“I’ve got similar symptoms!” (Participant B, aged 68, Simplified Chinese)

High perceived relevance could help predict higher acceptability and practicability of the health advice given in the booklet:

Participant: “Yes! Yes! It’s (the content) useful.” *Interviewer:* “Is there any new information about self-management skills that you feel interested in but don’t know how to implement?” *Participant:* “Basically none.” (Participant B, aged 68, Simplified Chinese)

However, the extent to which the advice was accepted also varied by factors such as participants’ personal habits, physical condition, self-perceived competence, and perceived usefulness of the advice. Some of the participants reported the booklet helped certain symptoms, while others found the advice superficial:

*Participant:* “I think it (the content) may be more able to address (the problems of) ordinary people. It’s not quite applicable to kidney transplant patients like me. . . . I mean it works for those usual people but not quite for those who have undergone renal dialysis and have upper and lower limb disability. For example, I have problem with my legs, while other people can walk unaided. I need to use my walking stick, you know? You haven’t seen my condition:”

*Interviewer:* “That means you find the advice on exercise not really relevant to you?”

*Participant:* “Yes! Yes! . . . The arm for dialysis couldn’t be touched or moved. Half of the (hand) function has been lost already. . . . It’s (the advice on exercise) not suitable to me. The only thing I can do is to take great care of myself and be careful in everything, that’s it!” (Participant D, aged 64, Traditional Chinese)

“I can’t say the things (symptom self-management recommendation) are practically too simple. . . . I have kidney problem and I should avoid night food. However, I just can’t do that. I’m used to have frequent, small meals even in nighttime. What suggested here is just different from my daily habits.” (Participant B, aged 68, Simplified Chinese)

(1) *Graphics and Design.* Overall, participants thought it was a good idea to add pictures in the booklet (examples in Figure 1).

While there were exceptions, most of the pictures could be understood by the participants and help text comprehension:

“(It can help me to) understand (the content).” (Participant E, aged 82, Simplified Chinese) 5-3

“What’s the picture of eyes about? I don’t understand.” (Participant G, aged 73, Simplified Chinese)

Similarly, the color use was well accepted by the participants except a participant’s family who held a different view on it:

“That might be better if it’s black and white printing. . . . She’ll feel tired easily if it’s too colorful.” (Participant C’s daughter, participant aged 80, Simplified Chinese)

(2) *Reading Experience.* The extent of reading motivation varied among participants. Overall, most participants tended to reuse the booklet and perceived it as a good tool for reminding them of the key symptom management strategies. Also, the reading itself did not cause more physical discomforts to them:

“I’d read it again if there’s something unclear. My memory isn’t good. . . . I’m not that old as the other people but my memory is worse than them, just like having dementia! I do think so! . . . With this booklet, I can read the information anytime and thus understand it better. You know, my memory isn’t very good.” (Participant D, aged 64, Traditional Chinese)

“The more times I read, the more I can remember.” (Participant F, aged 85, Traditional Chinese)

On the other hand, some participants seemed to consider reading the booklet as a task only and did not show interest. For them, reading was a burden, resulting in their relatively low reading motivation:

“(I feel) quite tired (after reading the booklet).” (Participant G, aged 73, Simplified Chinese)

“It’s only practical if I read the booklet to her. Otherwise, she’ll feel it’s very difficult.” (Participant C’s daughter, participant aged 80, Simplified Chinese)

(3) *Suggestions for Improvement.* When being invited to provide suggestions for improving the booklet, most participants gave no specific comment or failed to articulate their views on it, except for a participant who expressed a desire for more tailor-made contents:

*Interviewer:* “In general, what areas in the booklet do you think are needed to improve?” P: “No, there’s none!” (Participant B, aged 68, Simplified Chinese)

*Interviewer:* “You mean it’d be better if the booklet can give more feasible exercise advice to people with physical conditions like yours, right?”

*Participant:* “Yes! Yes! That’s it!” (Participant D, aged 64, Traditional Chinese)

(4) *Health Information Source Preference.* In general, participants did not have comments on using the booklet as their source of health information. When it came to other information formats, their responses were similar:

“(I have) no comments (on using the booklet to get information about symptom management skills).” (Participant A, aged 81, Traditional Chinese)

However, some participants reported that they got the health information they needed by other means:

“The (dialysis) clinic does let us review our reports and know the foods to avoid. I just simply follow their advice.” (Participant D, aged 64, Traditional Chinese)

#### 4. Discussion

This study validated the booklet as a useful source of health information in the older Chinese American KFCKD patient population. Researchers initially decided to host the one-on-one interviews using an online video conference platform, but not all the participants had the basic knowledge needed to join virtual meetings. Therefore, the traditional telephone interview method was adopted instead. From this, we deduce that currently, for our target population, the use of printed health education materials is appropriate for health information transmission in today’s digital era. Because of aging- and disease-associated cognitive decline, older people, especially those with relatively low education levels, may struggle with technology application. Such technology illiteracy hinders them from accessing web-based information effectively [22]. Additionally, older people can refer to health information more easily if they have a printed booklet in hand. Even with increasing digital education formats among seniors, cultural and literacy barriers may make it so that health education booklets are likely to remain acceptable among the older in the near future [22]. Given the recommendations regarding the booklet’s length and caregiver feedback on participants’ memory retention, providers should emphasize to patients that the booklets are designed as reference materials. They are not meant to be read in one sitting and can be consulted as needed.

Overall, the booklet was deemed readable and relevant by most of the participants, and few suggestions were given for improvement. This is not surprising since the contents were developed in conjunction with the participants. Nevertheless, they appreciated the booklet and reported using it to refresh their symptom self-management skills. Although the target patients of the current study were all residing in New York City where access to healthcare facilities with Chinese-speaking providers was relatively high compared to other states in the U.S., they still may not always have effective physician-patient communication. Chinese American patients are inclined not to share decision-making with

their healthcare providers even if given the opportunity because of their culturally based belief to not be burdensome to others, especially amongst authority figures such as physicians and nurses [12]. Additionally, older patients’ decreased attention span and memory decline further impose challenges to physician-patient interaction when the medical consultation time is limited. Therefore, we suggest making our booklet available to this patient group via nephrology healthcare providers who may have additional time with patients (such as during dialysis treatments), to empower patients with better self-management skills. By providing a booklet, patients can repeatedly read the content and adjust their reading pace to their preference. Also, healthcare providers may incorporate this booklet into patient encounters, prompting patient’s interest in reading the booklet, which in turn promotes more effective physician-patient interaction within the limited time of a clinical visit. This could improve the shared decision-making process and encourage the use of conservative management for KFCKD.

Even though the usefulness of our booklet was perceived as minimal by some participants, the value of this booklet in promoting the well-being of patients, even those who have trouble reading because of their physical limitations, should not be underestimated. While the current study aimed at exploring our target population’s acceptance of the booklet, the role of patients’ family members and caregivers in the booklet use should also be considered. Some participants needed their family members or caregivers to assist them in reading the booklet for the purposes of the interview. To a certain degree, this reflects how the booklet will be used by the target population in real situations. Readers of the booklet are not only the patients but also their family members and caregivers. While a great number of the target population are first-generation immigrants, their family members may be native-born and native in English rather than Chinese. To promote fuller use of the booklet, the language preference of the family members and caregivers should be considered during booklet distribution. An English version booklet has been developed to serve this purpose.

The credibility of health education materials is important. According to a study by Lu, Liu, and Yuan [23], Chinese people highly regard interpersonal sources such as doctors and family and friends as their health information source. This emphasizes the importance of having the health care practitioner distribute these types of materials to this population. Although our booklet was based on collective data from our pilot patient interviews, expert opinions, and current literature, some participants questioned its usefulness. To improve readers’ perceived usefulness of the booklet, future iterations could include case studies or the experiences of other patients with similar symptoms.

Notably, some of the self-help strategies that were reported effective by some participants in the first phase of booklet development were rejected for the final version because they conflicted with current evidence, or their safety was unconfirmed. For example, some traditional Chinese medicines and over-the-counter Chinese herbal products, such as “Po Sum On” for dyspnea, that participants

recommended did not have a sufficient evidence base, so they were not included. The deep-rooted cultural health belief of limiting moderate physical exercise in old age [24, 25] was also recommended by several participants in early phases of the study; this belief was excluded because it is counter to current evidence-based practice [26, 27]. This exclusion may have made the booklet seem not culturally relevant from the reader's perspective. Explanations of harmful or non-evidence-based treatments were excluded to maintain the booklet's clarity and brevity.

**4.1. Limitations.** Sampling bias limits the generalizability of our findings to all patients in the target population. Patients who had difficulty joining phone interviews because of hearing deficits were not included in our study. These patients generally experience even more health inequity than others in our target population because their hearing problems may hinder them from communicating effectively with their healthcare providers and caregivers. This communication barrier may also limit their sources of health information because information in audio formats. In such cases, printed materials such as booklet may be the only feasible source for obtaining information about self-symptom management skills. As hearing was the second most reported disability in older patients with chronic kidney disease stages 3 and 4 [28], their perception of this booklet should not be disregarded. In-person patient interviews may help in gathering additional opinions of the booklet.

The use of phone interviews in data collection was another limitation of our study. Originally, face-to-face interviews were planned, but because of the COVID-19 pandemic, the study was confined to telephone interviews. Face-to-face interviews would have been preferable to allow the researcher the opportunity to interpret participants' facial expressions and nonverbal cues during data collection. Face-to-face interviews also allow more efficient researcher-participant interaction.

Currently, the different language versions are separate. Future iterations could include a version that combines all three texts (English, simplified Chinese, and traditional Chinese). Furthermore, it was outside the scope of this study to evaluate the caregiver response to the booklet, but this could be considered in future studies.

Finally, investigating the degree to which a patient accepts the booklet in a research setting was itself a limitation. Participants might feel embarrassed about critiquing the booklet during formal interviews. Such feelings of embarrassment might be amplified in the Chinese population where many people are accustomed to accepting without questioning. This phenomenon is particularly true in the physician-patient relationship: Chinese immigrants tend not to be involved in their health decision-making [12], thus giving up their right to express their opinion even when given opportunities.

**4.2. Implications for Nursing and Health Policy.** Improving cross-cultural interactions should be a goal for nurses and nurse managers as patient diversity continues to increase. Previous work has demonstrated the effectiveness

of equity-based healthcare in improving patient outcomes for marginalized groups. In a longitudinal study, Ford-Gilboe et al. [29] found that patients who received such care reported feeling more confident in their care and ability to manage symptoms. By providing them with this booklet and adapting to patients' preferences in their preferred language, providers may have improved concordance with patients and older Chinese American KFCKD patients may feel more confident in their ability to manage common symptoms at home.

As previously discussed, the cultural tendency of these patients to avoid being burdensome makes it especially important to provide them with the tools to self-manage their symptoms. Because we created this symptom management booklet as a general guideline for all patients, presenting the booklet without further instruction would be insufficient in a clinical setting. For example, while the booklet says, "increase fluid intake," the provider should give instructions on the daily goal for fluid intake in accordance with the patient's current health diagnoses and symptoms. Clinicians using this booklet should be certain to personalize the booklet and provide specific details in reference to the patient's situation. Policies regarding patient education should incorporate culturally sensitive materials in formats acceptable to those with limited English-language or technological literacy.

## 5. Conclusions

This study demonstrated the general acceptance of the printed booklet by older Chinese American KFCKD patients. We suggest using the booklet as supplementary health education material in clinical settings, including use among patients' family members and caregivers to maximize its effectiveness in helping the target population handle troublesome symptoms in the home setting. To improve the cultural sensitivity of the booklet, further studies of patient health behavior in this population are needed to incorporate cultural practices into evidence-based materials.

## Data Availability

Data from the original surveys were uploaded and may be accessed through the cdRNS at <https://cdrns.nih.gov>. Due to the personalized nature of the interviews that would make them impossible to deidentify, interview data are not available. The completed booklets can be obtained by emailing the corresponding author.

## Ethical Approval

This study was approved by the Institutional Review Boards of Weill Cornell Medicine (1320859-6), Columbia University (IRB-AAAR9142), and the Visiting Nurse Service of New York (1320859-6).

## Conflicts of Interest

The authors declare that they have no conflicts of interest.

## Authors' Contributions

Study design was performed by CS, PS, and JS. Data collection was done by WC. Data analysis was done by CS. Study supervision was done by CS. Manuscript writing was done by CS and KC. Critical revisions for important intellectual content were done by CS, PS, JS, and KC.

## Acknowledgments

We gratefully acknowledge Maureen George for giving guidance on qualitative aspects of the study and Marilyn Fox for editing assistance. This study was funded by the National Institute of Nursing Research (Center for Improving Palliative Care for Vulnerable Adults with MCC (CIPC), PI: Stone, P20NR018072).

## References

- [1] G. A. A. Antari and D. M. Widyantari, "Symptom burden and health-related quality of life in hemodialysis patients," *Enfermería Clínica*, vol. 30, pp. 117–120, 2020.
- [2] National Institute of Diabetes and Digestive and Kidney Diseases, "Kidney disease statistics for the United States: Fast facts on kidney disease," 2021, <https://www.niddk.nih.gov/health-information/health-statistics/kidney-disease>.
- [3] United States Census Bureau, "Asian American and Pacific Islander heritage month: May 2021," 2021, <https://www.census.gov/newsroom/facts-for-features/2021/asian-american-pacific-islander.html>.
- [4] V. Grubbs, "ESRD and hospice care in the United States: are dialysis patients welcome?" *American Journal of Kidney Diseases*, vol. 72, no. 3, pp. 429–432, 2018.
- [5] M. Kurella Tamura, A. M. O'Hare, E. Lin, L. M. Holdsworth, E. Malcolm, and A. H. Moss, "Palliative care disincentives in CKD: changing policy to improve CKD care," *American Journal of Kidney Diseases*, vol. 71, no. 6, pp. 866–873, 2018.
- [6] E. Bağrıaçık and B. T. Dikmen, "Self management training in patients with chronic kidney disease undergoing hemodialysis: a systematic review," *Seminars in Dialysis*, vol. 37, no. 2, pp. 91–100, 2024.
- [7] H. Alston and A. Burns, "Conservative care of the patient with end-stage renal disease," *Clinical Medicine*, vol. 15, no. 6, pp. 567–570, 2015.
- [8] C. K. Liu and M. Kurella Tamura, "Conservative care for kidney failure—the other side of the coin," *JAMA Network Open*, vol. 5, no. 3, Article ID e222252, 2022.
- [9] P. Ryan and K. J. Sawin, "The Individual and Family Self-Management Theory: background and perspectives on context, process, and outcomes," *Nursing Outlook*, vol. 57, no. 4, 2009.
- [10] S. Chakrabarti, "What's in a name? Compliance, adherence and concordance in chronic psychiatric disorders," *World Journal of Psychiatry*, vol. 4, no. 2, pp. 30–36, 2014.
- [11] A. Budiman and N. Ruiz, *Key Facts About ASIAN Americans, A Diverse and Growing Population*, Pew Research Center, Washington, DC, USA, 2021.
- [12] G. A. A. Antari and D. M. Widyantari, "Symptom burden and health-related quality of life in hemodialysis patients," *Enfermería Clínica*, vol. 30, pp. 117–120, 2020.
- [13] T. Sentell and K. L. Braun, "Low health literacy, limited English proficiency, and health status in Asians, Latinos, and other racial/ethnic groups in California," *Journal of Health Communication*, vol. 17, no. sup3, pp. 82–99, 2012.
- [14] M. van der Gaag, M. Heijmans, C. Spoiala, and J. Rademakers, "The importance of health literacy for self-management: a scoping review of reviews," *Chronic Illness*, vol. 18, no. 2, pp. 234–254, 2022.
- [15] United States Department of Health and Human Services Office of Disease Prevention and Health Promotion, "Health literacy in Healthy people 2030," 2020, <https://health.gov/our-work/healthy-people/healthy-people-2030/health-literacy-healthy-people-2030>.
- [16] E. C. Khoong, G. Le, M. Hoskote, N. Rivadeneira, R. A. Hiatt, and U. Sarkar, "Health information-seeking behaviors and preferences of a diverse, multilingual urban cohort," *Medical Care*, vol. 57, no. Suppl 2, pp. S176–S183, 2019.
- [17] N. Levy, W. Cheung, H. McDonald et al., "Symptom management in Chinese adults with end stage renal disease (ESRD)," *Applied Nursing Research*, vol. 64, Article ID 151549, 2022.
- [18] Pew Research Center, "Top 10 U.S. metropolitan areas by Chinese population, 2015," 2017, <https://www.pewresearch.org/social-trends/chart/top-u-s-metro-areas-chinese-population/>.
- [19] D. S. Tuot, E. Davis, A. Velasquez, T. Banerjee, and N. R. Powe, "Assessment of printed patient-educational materials for chronic kidney disease," *American Journal of Nephrology*, vol. 38, no. 3, pp. 184–194, 2013.
- [20] C. M. Callahan, F. W. Unverzagt, S. L. Hui, A. J. Perkins, and H. C. Hendrie, "Six-item screener to identify cognitive impairment among potential subjects for clinical research," *Medical Care*, vol. 40, no. 9, pp. 771–781, 2002.
- [21] R. E. Boyatzis, *Transforming Qualitative Information: Thematic Analysis and Code Development*, Sage, New York, NY, USA, 1998.
- [22] R. Marimuthu, S. Gupta, L. Stapleton, D. Duncan, and B. Pasik-Duncan, "Challenging the digital divide: factors affecting the availability, adoption, and acceptance of future technology in elderly user communities," *Computer (Long Beach, Calif.)*, vol. 55, no. 7, pp. 56–66, 2022.
- [23] L. Lu, J. Liu, and Y. C. Yuan, "Health information seeking behaviors and source preferences between Chinese and US populations," *Journal of Health Communication*, vol. 25, no. 6, pp. 490–500, 2020.
- [24] M.-L. Chen and J. Hu, "Health disparities in Chinese Americans with hypertension: a review," *International Journal of Nursing Science*, vol. 1, no. 3, pp. 318–322, 2014.
- [25] W.-W. Li, A. L. Stewart, N. Stotts, and E. S. Froelicher, "Cultural factors associated with antihypertensive medication adherence in Chinese immigrants," *Journal of Cardiovascular Nursing*, vol. 21, no. 5, pp. 354–362, 2006.
- [26] U. G. Bronas, H. Puzantian, and M. Hannan, "Cognitive impairment in chronic kidney disease: vascular milieu and the potential therapeutic role of exercise," *BioMed Research International*, vol. 2017, pp. 1–10, 2017.
- [27] S. G. Sazlina, "Exercise for older," *Malaysian Family Physician*, vol. 16, p. 9, 2021.
- [28] Centers for Disease Control and Prevention, "Chronic kidney disease basics," 2022, <https://www.cdc.gov/kidneydisease/basics.html>.
- [29] M. Ford-Gilboe, C. N. Wathen, C. Varcoe et al., "How equity oriented health care affects health: key mechanisms and implications for primary health care practice and policy," *The Milbank Quarterly*, vol. 96, no. 4, pp. 635–671, 2018.

## Research Article

# Measuring Cardiovascular Disease Risk Perception: Translation and Validation of the Indonesian ABCD Risk Questionnaire

Septa Meriana Lumbantoruan <sup>1</sup>, Deby Kristiani Uligriff <sup>2</sup>,  
and Eva Berthy Tallutondok <sup>1</sup>

<sup>1</sup>Faculty of Nursing, Universitas Pelita Harapan, Tangerang, Indonesia

<sup>2</sup>Department of Nursing, Tarumanagara Institute, Jakarta, Indonesia

Correspondence should be addressed to Septa Meriana Lumbantoruan; [septa.lumbantoruan@uph.edu](mailto:septa.lumbantoruan@uph.edu)

Received 19 January 2024; Revised 2 July 2024; Accepted 20 August 2024

Academic Editor: Santo Imanuel Tonapa

Copyright © 2024 Septa Meriana Lumbantoruan et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Background.** Cardiovascular diseases (CVDs) are still increasing worldwide contributing to increasing death worldwide. To test CVDs' awareness, the Attitude and Belief about Cardiovascular Disease (ABCD) questionnaire was developed. However, this questionnaire is not available in Indonesia language. **Methods.** The original questionnaire was translated in both directions forward and backward. The process is then continued with a content validity index created by three experts. The exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) then determine the factors that support the translated questionnaire. The splitting sample method was applied in both factor analyses. Internal consistency testing of 18 items was performed on 236 samples. **Result.** The validity of the entire questionnaire subscale was satisfactory. Three retained factors were supported by the EFA and CFA, namely, risk perception, perceived benefit, and healthy eating intention. The internal consistency was acceptable based on Cronbach alpha and ordinal alpha. The Indonesian version of ABCD questionnaire was statistically valid and reliable to be used. **Conclusion.** The Indonesian version of the ABCD questionnaire is a valid questionnaire to access the attitude and belief of CVDs in Indonesia.

## 1. Introduction

Globally, 17.9 million people died in 2019 due to cardiovascular diseases (CVDs) [1]. This number rose to 19.1 million by 2020 and will continue to increase annually [2]. The number of CVDs is highest in Asia and Africa, with disability-adjusted life years (DALYs) ranging from 6.154 to 20.998 per 100,000 people [3]. A similar number of DALYs are present in Indonesia [3]. Low- and middle-income countries account for about 75% of all cardiovascular disease cases worldwide [1]. In 2018, 4.2 million people in Indonesia, a low- and middle-income country, were diagnosed with CVDs [4]. The rising prevalence of cardiovascular disease makes it the leading cause of death worldwide [1].

A growing number of CVDs are caused by risk factors [3]. High blood pressure, dietary risk, high LDL, tobacco, high body mass index, high blood glucose, kidney

dysfunction, and many other risk factors lead to CVDs [3]. Reducing risk factors is essential to prevent CVDs [5]. Health behaviors that minimize risk factors include increasing physical exercise, eating a healthy diet, maintaining a healthy body mass index, quitting smoking, and managing stress [5]. Health beliefs affect health behavior based on someone's knowledge and perception [6]. Sufficient knowledge of CVDs motivates people to seek healthy behaviors [7].

Instruments to measure the knowledge of CVDs are still lacking. A narrative review reported there were twelve instruments to measure the knowledge of cardiovascular risk; however, only four of them measure specifically about CVDs [8]. The National Health Service of the United Kingdom previously developed the Attitude and Beliefs about Cardiovascular Disease (ABCD) Risk Questionnaire to measure attitudes and beliefs about cardiovascular disease [9]. This

questionnaire has been translated into many different languages around the world [10–14]. A reliable and valid questionnaire is critical to measuring knowledge and perceptions of CVDs. Indonesia, as a major Southeast Asian country, contributes to a high incidence of CVDs [15]. Therefore, it is necessary to translate the ABCD questionnaire into the Indonesian version.

## 2. Materials and Methods

**2.1. Study Design and Period of the Study.** This study was an instrumental questionnaire validation study which conducted in Indonesia from May 2023 to June 2023.

**2.2. Study Setting and Study Populations.** The internet platform was utilized to recruit samples via convenience sampling. Information about this study was distributed through social media platforms such as Facebook, Instagram, and WhatsApp because these platforms are popular and commonly used in Indonesia.

**2.3. Eligibility.** An inclusion criterion was being an adult (>18 years old) based on the law of Indonesia and being able to communicate well in Indonesian language. People with mental disorders are an exclusion criterion.

**2.4. Sample Size Determination and the Sampling Procedure.** The sample size's power was determined using *G* power post hoc analysis. The power was 99% for an exact test with two tails and a correlation bivariate normal model (alpha error was 0.05 and sample size is 236). This study included a total sampling of respondents. The splitting sample method was utilized in factor analysis [16], with 118 samples in exploratory factor analysis and 118 samples in confirmatory factor analysis. The previous recommendation said that at least 50 samples are required to do factor analysis [17].

**2.5. Data Collection Tool.** A self-administered tool was utilized to collect information from the respondents. The tools include demographic data, smoking habits, body weight and height, exercise activities, and an ABCD questionnaire.

### 2.6. Instruments

**2.6.1. The Original ABCD Questionnaire.** In 2017, an ABCD questionnaire was developed to assess individuals' knowledge, perceived risks, and benefits of CVDs [9]. It consists of 26 items divided into the following four dimensions: knowledge (8 items), perceived risk of heart attack/stroke (8 items), perceived benefits and intentions to change (7 items), and healthy eating intentions (3 items). The first dimension is on a Guttman scale, while the others are on the Likert scale (1–4). Exception in scoring will be applied to the following four items: item number 8, 15, 21, and 28. Item number 8 will be scored "1" if the respondents choose "wrong;" furthermore, items number 15, 21, and 26 required unfavorable

answer to get a higher score. The minimum score was 18, and the maximum score was 80 for the overall scale. The higher the score on the ABCD Risk Questionnaire, the greater the health belief in CVDs' perception [9].

**2.7. Data Collection Procedure.** From May 2023 to June 2023, information about this study was disseminated via social media platforms such as Facebook, Instagram, and WhatsApp. Four research assistants were employed in this study to collect the data. They were nursing students in their four-year study and had been taught about research courses. The explanation of the study, respondent recruitment, informed consent, and data collection were given to the research assistant. For the respondents, it took 15 minutes to fill in the questionnaire.

**2.8. Data Analysis.** Internal validity was analyzed using the content validity index (CVI), and a value of 0.78 or higher is considered excellent content validity [18]. Statistical analysis was done with statistical software for data science (STATA) version 18. The structural analysis of the questionnaire was assessed using factor analysis. EFA was employed to identify the latent construct underlining a set of the ABCD's variables. The EFA assumptions were tested (sample size, distribution, collinearity, and linearity) [17, 19], and the including the data were continuous variables, sample size was over than 100, and the data were in normal distribution ( $p > 0.05$ ) based on Kolmogorov–Smirnov and Shapiro–Wilk tests. The multicollinearity was checked using variance inflation factor (VIF), which ranges from 1 to 6 (items 10 and 11 have VIF score 6). If the VIF is less than 10, no multicollinearity. The linearity was observed using Q–Q plot and, the data show a linear relationship between observed variables, with no outliers. The methods of extraction used in this study was principal axis factoring due to the data was not distributed normally using Kolmogorov–Smirnov and Shapiro–Wilk test ( $p < 0.05$ ). For the rotation methods, we use orthogonal, especially varimax rotation to minimize cross loading. The selection criteria of number of factors to be retained is based on the eigenvalue >1 rule, scree plot, variance extracted, and Barlett's chi-square test [20]. CFA was done to prove the structure of ABCD Risk Questionnaire using the new data from Indonesia. The model fit of the CFA model was assessed including  $X^2/df$ , comparative fit index (CFI), Tucker–Lewis's index (TLI), and root mean square error of approximation (RMSEA) and standardized root mean squared error (SRMR) [21]. The reliability of the ABCD questionnaire was analyzed by test-retest reliability and internal consistency coefficient using Cronbach's alpha and Ordinal alpha. All variables were described in a univariate analysis.

**2.9. Ethical Consideration.** The ethical approval was acquired from the Research Ethics Committee of Sekolah Tinggi Ilmu Kesehatan Bani Saleh under the number EC.228/KEPK/STKBS/XI/20di22. Respondents who participated in this study were willing to provide informed consent



via an online form. Respondents were asked for their initials without being asked for their email addresses to maintain anonymity and confidentiality. Furthermore, only the principal investigator accessed the link to the questionnaire.

### 3. Results

**3.1. Translation and Adaptation of the Indonesian ABCD Questionnaire.** Mrs. Woringer, the original author, granted permission to use the ABCD Risk Questionnaire. The World Health Organization (WHO) translation process was used, which included forward translation, reverse translation, an expert panel, pretesting, and the final version [22]. Forward translation was accomplished by a medical professional with over 15 years of experience pursuing a doctoral degree at the University of Auckland. A medical specialist translator did the backward translation with a doctoral degree from the University of North Texas and is currently working as a postdoctoral scholar at the Carol Nese College of Nursing at Pennsylvania State University. The expert panel had three experts, namely, a cardiologist from a government hospital, a nursing professor with a doctoral degree and an interest in cardiovascular research, and a nurse with nine years of hospital experience and three years of experience in the intensive coronary care unit. Following the discussion, a comprehensive ABCD questionnaire in Indonesia was developed. A pretest was carried out on 40 respondents to assess validity and reliability. The final step was analyzed and changed before the Indonesian version was obtained.

**3.2. Sociodemographic Characteristics.** The analysis was conducted with data from 236 samples who responded to the adapted and translated questionnaire. The respondents ranged from 18 to 44 years old, with a mean of 26.41 (SD 5.252). The respondents were predominantly female ( $n = 145$ , 61.4%). More than half of the respondents attended university ( $n = 160$ , 67.8%), followed by high school and secondary education (31.8% and 0.4%). The highest number of respondents are Christian protestants ( $n = 137$ , 58.1%), followed by Muslims ( $n = 75$ , 31.8%), Catholics ( $n = 17$ , 7.2%), Buddhas ( $n = 5$ , 2.1%), and Confucians ( $n = 2$ , 0.8%). Almost half of the total respondents are working for private companies ( $n = 116$ , 49.2%), followed by students ( $n = 54$ , 22.9%), unemployed (including full-time moms,  $n = 22$ , 9.3%), self-employed ( $n = 17$ , 7.2%), government employees ( $n = 16$ , 6.8%), and freelancers ( $n = 11$ , 4.7%). The distribution of monthly income showed that 35.2% ( $n = 83$ ) of the respondents earned more than IDR 5.000.000, 25% ( $n = 59$ ) had no income because they were students, 18.2% ( $n = 43$ ) earned IDR 3.000.000–5.000.000, 14.4% ( $n = 34$ ) earned IDR 1.000.000–3.000.000, and 7.2% ( $n = 17$ ) earned less than IDR 1.000.000. The sociodemographic characteristics of respondents are listed in Table 1. Furthermore, the overall result of ABCD-I revealed that the scores ranged from 34 to 76 (the maximum score is 80) with a mean of 55.24 (SD = 5.837). All domains (knowledge, perceived risks, perceived benefits, and intention to change) exhibited more than 50% of the total marks in each band (Table 1).

### 3.3. The Validity of the ABCD-Indonesian Version

**3.3.1. Content Validity.** As the World Health Organization suggested, the forward-backward translation was conducted before translating the ABCD Risk Questionnaire into the Indonesian language-translated version (hereafter ABCD-I) without compromising reliability and validity. The items were distributed into the following four domains: knowledge (8 items), perceived risk (8 items), perceived benefits (7 items), and intention to change (3 items). After getting the questionnaire translated, the expert panel process was conducted. Moreover, the expert panelists analyzed item by item and suggested revisions to make the item concise and understandable. The expert and team made revisions by considering several slight changes, such as adding prefixes and suffixes, to create sense-making sentences in the Indonesian language version.

Three experts were invited to evaluate the CVI of the ABCD-I Risk Questionnaire. The CVI was evaluated with the item content validity index (I-CVI), Scale CVI (S-CVI)/Ave, and S-CVI/UA. The I-CVI score was between 0.67 and 1.00, whereas the SCI/Ave and S-CVI/UA were 0.94 and 0.81, respectively. A CVI of  $\geq 0.80$  is recommended to prove that the determined item and questionnaire are clear, homogenous, and relevant. The expert agreed that all the items translated from the original questionnaire were preserved because they were considered essential, appropriate, and interlinked.

**3.3.2. Structural Validity.** The structural validity of the ABCD Risk Questionnaire was evaluated to reflect the dimensionality of the items [23]. In the present study, EFA was utilized to investigate the underlying factors, whereas CFA was employed to verify the variable's factor structure. Both EFA and CFA were effective statistical procedures for ensuring the validity of the ABCD Risk Questionnaire. Before undertaking EFA and CFA, we evaluated the monotonicity and scalability of items using a Mokken scaling analysis (MSA). The result of both data showed  $H \geq 0.4$  reflects a moderate coefficient of scalability (H). All items in the ABCD-I questionnaire in EFA data were considered to be scalable (ranged between 0.485 and 0.872), and in CFA data, they also reflected to be scalable (ranged between 0.409 and 0.910).

The EFA is needed to explore the factorial structure of the ABCD Risk Questionnaire (Indonesia language version). The EFA was conducted using the principal axis factoring method of extraction with the varimax rotation method. Collected data deemed suitable to proceed into factor analysis based on the (1) Kaiser–Meyer–Olkin (KMO) measure, which indicated the compactness of correlation patterns to build distinct and reliable factors, and (2) Bartlett's test of sphericity, which represented whether the correlation matrix is significantly different from an identity matrix. The result of KMO (0.794) and Bartlett's  $\chi^2$  value (2620.061,  $p < 0.001$ ) in this study met the conditions for continuing the exploratory factor analysis (EFA). The diagonal of the antiimage correlation matrix is over 0.5.

TABLE 1: Sociodemographic characteristics of the respondents ( $N = 236$ ).

Variables	<i>n</i> (%)	Mean (SD)	Range
Age		26.41 (5.252)	18–44
Gender			
Male	91 (38.6)		
Female	145 (61.4)		
Education			
Secondary	1 (0.4)		
High school	75 (31.8)		
University	160 (67.8)		
Religion			
Muslim	75 (31.8)		
Christian Protestant	137 (58.1)		
Catholic	17 (7.2)		
Buddha	5 (2.1)		
Confucian	2 (0.8)		
Occupation			
Unemployed, fulltime mom	22 (9.3)		
Student	54 (22.9)		
Freelance	11 (4.7)		
Government	16 (6.8)		
Private	116 (49.2)		
Self-employed	17 (7.2)		
Income			
No income	59 (25.0)		
<IDR 1.000.000	17 (7.2)		
IDR 1.000.000–3.000.000	34 (14.4)		
IDR 3.000.000–5.000.000	43 (18.2)		
>IDR 5.000.000	83 (35.2)		
Smoking habit			
Smoking	45 (19.1)	Length (in month(s))	Length (in month(s))
Not smoking	191 (80.9)	14.82 (42.24)	1–240
Body Mass Index classification			
Underweight	19 (8.1)		
Normal	76 (32.2)		
Overweight	38 (16.1)		
Obesity 1	64 (27.1)		
Obesity 2	34 (14.4)		
Daily activities			
No exercise	64 (27.1)		
Mild exercise	13 (5.5)		
Moderate exercise	108 (45.8)		
Heavy exercise	51 (21.6)		
Awareness (80 marks)		55.24 (5.837)	34–76
Knowledge (8 marks)		6.89 (1.159)	2–8
Perceived risk (32 marks)		17.29 (4.621)	8–32
Perceived benefits (28 marks)		22.27 (2.878)	10–28
Intention to change (12 marks)		8.80 (1.408)	5–12

There were three factors retained based on the eigenvalue >1 rule, and the same numbers of factors are also shown based on scree plot. The principal axis factoring was used, and the initial eigenvalues showed 86.72% of the total cumulative variance. The first factor is 38.68%, the second is 32.16%, and the third is 15.88%. The factor-loading matrix for the final is presented in Table 2. Most items corresponded with the original subscale, except for perceived benefit 5. Based on the factor analysis calculation, three factors emerged from the data set and had eigenvalues over Kaiser's criterion of 1.

The confirmation of sufficient factors was determined from the Scree plot and a parallel analysis (PA) (see Figure 1). PA was based on the calculation of randomly generated multiple data matrices, which have the same number of variables and cases as the original raw data set. Subsequently, differences between randomly and empirically generated eigenvalues are tested, and a significantly higher random dataset eigenvalue indicates the cutoff point for true factor numbers. After conducting PA (principal axis/common factor analysis, 95%), we retained three factors emerging through EFA, as shown in

TABLE 2: Factor loadings (FLs) of EFA.

Nos.	Item	Factors			Communality	Uniqueness
		1	2	3		
1	Perceived risk 1	0.84			0.72	0.28
2	Perceived risk 2	0.83			0.74	0.26
3	Perceived risk 3	0.85			0.79	0.21
4	Perceived risk 4	0.80			0.69	0.31
5	Perceived risk 5	0.79			0.66	0.34
6	Perceived risk 6	0.75			0.61	0.39
7	Perceived risk 7	0.10			0.09	0.91
8	Perceived risk 8	0.41			0.20	0.80
9	Perceived benefit 1		0.81		0.72	0.28
10	Perceived benefit 2		0.77		0.71	0.29
11	Perceived benefit 3		0.76		0.66	0.34
12	Perceived benefit 4		0.68		0.50	0.50
13	Perceived benefit 5			0.56	0.36	0.64
14	Perceived benefit 6		0.48		0.28	0.72
15	Perceived benefit 7		0.77		0.64	0.36
16	Intention to change 1			-0.54	0.62	0.38
17	Intention to change 2			-0.58	0.69	0.31
18	Intention to change 3			-0.34	0.23	0.77

Note. The “minimum residual” extraction method was used in combination with “Varimax” rotation; the hidden loadings were below 0.3.

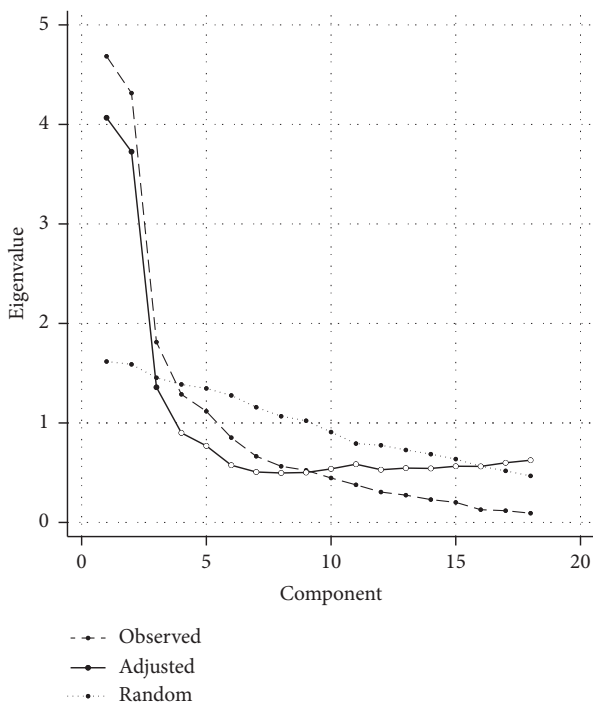


FIGURE 1: The comparison of scree plot and simulated parallel analysis within 95%.

the PA result (Figure 1). However, item 5 of perceived benefit dimension was not in the same factor as the originals.

The difficulty index of the overall knowledge subscale was 0.856. Most of the items were easy for respondents to answer. The most difficult items were Knowledge 8, and the easiest was Knowledge 2 (Table 3).

The CFA was done to prove the structure using the new data from Indonesia. We tested two models of CFA; the first

TABLE 3: Item statistics of knowledge subscale of ABCD.

Nos.	Item	Difficulty index
1	Knowledge 1	0.915
2	Knowledge 2	0.970
3	Knowledge 3	0.936
4	Knowledge 4	0.831
5	Knowledge 5	0.983
6	Knowledge 6	0.890
7	Knowledge 7	0.852
8	Knowledge 8	0.492

model included 18 items of ABCD Risk Questionnaire (Figure 2), whereas the second model included only 16 items (item numbers 21 and 26 were taken out) (Figure 3). The internal loading of the first model showed reliability ranging from 0.05 to 0.96. The goodness of fit result indicated from first CFA was not good ( $\chi^2 = 424.74$ ,  $df = 132$ ,  $p < 0.001$ ,  $SRMR = 0.102$ ,  $RMSEA = 0.138$ ,  $CFI = 0.792$ , and  $TLI = 0.759$ ). On the other hand, the internal loading of the second model showed reliability ranging 0.11–0.96, whereas the goodness model of fit was acceptable good ( $\chi^2 = 333.81$ ,  $df = 101$ ,  $p < 0.001$ ,  $SRMR = 0.081$ ,  $RMSEA = 0.140$ ,  $CFI = 0.827$ , and  $TLI = 0.795$ ).

3.4. The Reliability of the ABCD-Indonesian Version. Cronbach’s alpha ( $\alpha$ ) is commonly used to evaluate a questionnaire’s internal consistency/reliability. This study showed that the Cronbach’s ( $\alpha$ ) of the entire questionnaire was 0.737; for each domain sequentially, it was 0.462, 0.873, 0.787, and 0.431. In consideration of the ordinal scales used in the instrument (question 9 to question 26), we also calculated the ordinal alpha [24, 25]. The result showed that the ordinal alpha of the entire questionnaire was 0.638, whereas each factor sequentially showed the ordinal alpha of 0.859, 0.828, and 0.676 (Table 4).

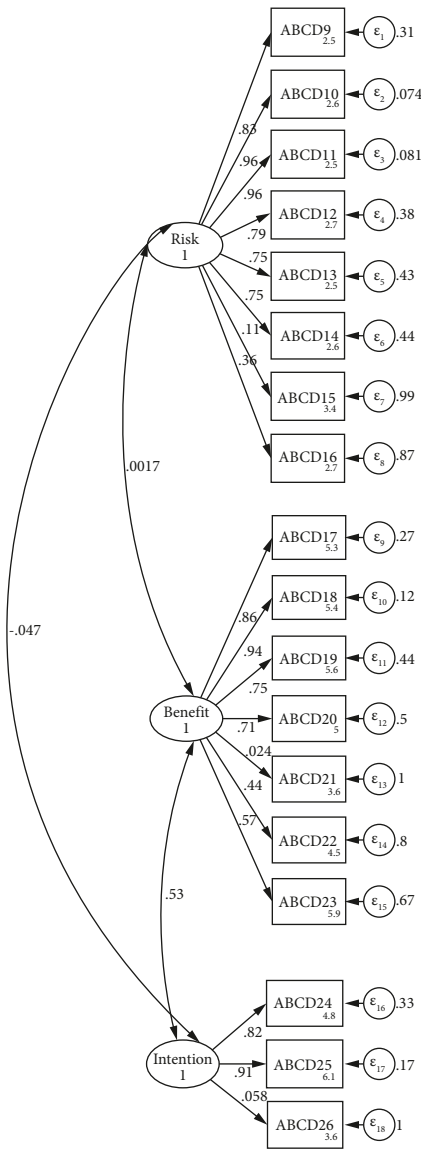


FIGURE 2: CFA model for original ABCD Risk Questionnaire.

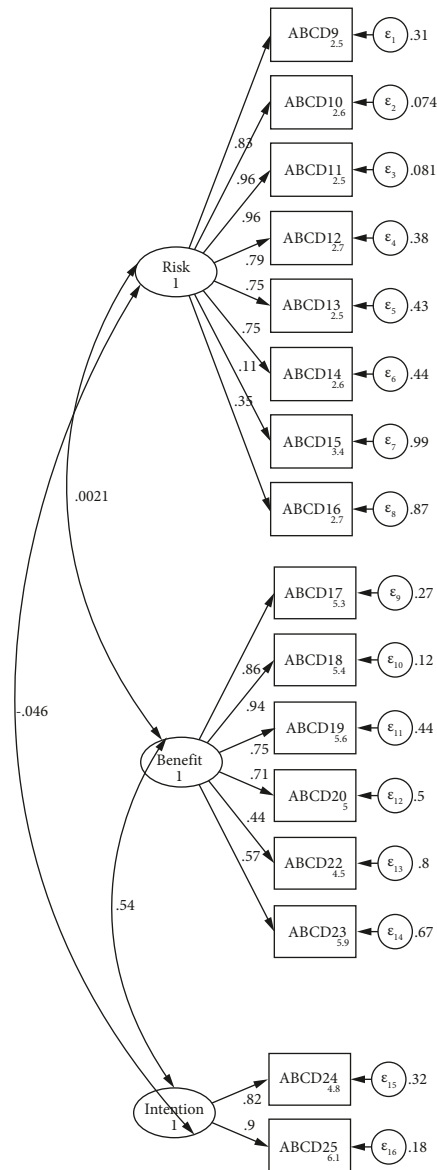


FIGURE 3: CFA model for ABCD Risk Questionnaire with 2 items taken.

### 4. Discussion

In this study, we adopted the Indonesian ABCD Risk Questionnaire with an online survey of adult respondents. The original questionnaire consists of the following four domains: CVDs knowledge, perceived risk of heart attack/stroke, perceived benefits, and intentions to change, and healthy eating intentions [9]. The content validity of our findings shows the overall I-CVI and S-CVI above the expected (0.78 and 0.70), which means the Indonesian version of ABCD risk is valid [26]. The two items with an I-CVI under 0.70 are modified to be more understandable in Indonesian. Item number 8, “a family history of heart disease is not a risk factor for high blood pressure,” is a negative statement, and it is a common statement in the Indonesian population. The respondents may misunderstand whether the answer is true or false since this statement might confuse the reader. It is also shown in the difficulty index that item

TABLE 4: Reliability estimated with Cronbach  $\alpha$  and ordinal  $\alpha$ .

Factor	Cronbach	Ordinal
Perceived risk	0.873	0.859
Perceived benefits	0.787	0.828
Intention to change	0.431	0.676
Overall questionnaire	0.737	0.638

number 8 has the lowest grade. The difficulty index of 0.7 is considered easy to answer by respondents [27]. This item was changed into a positive statement: “a family history of heart disease is a risk factor for high blood pressure”. Item number 9, “I feel I will suffer from a heart attack or stroke sometime during my life” is too forthright, and the respondents are confused about how to respond. Asian people, including Indonesians, are more likely to choose fewer

extreme responses [28]. We changed item number 9 to “*there is a possibility that I will have a heart attack or stroke*” as the initial development by Woringer et al. [9].

The unidimensional test using the Mokken analysis showed that a coefficient of scalability ( $H$ ) reflected the result of  $H \geq 0.5$  [29]. All 18 items constructed in the questionnaire showed that  $H$  ranged between 0.910 and 0.409 (all are above 0.4) [30]. This result implies that the scalability of the questionnaire is good and then all the questions were retained as a set of questionnaires. Furthermore, this study showed the KMO result of 0.79 with a significant  $p$  value of Bartlett’s Test of Sphericity (0.0001), indicating the sample size was adequate for EFA analysis. A KMO level of 0.5 is suitable for analysis, whereas 0.8 is best for analysis [31]. On the other hand, the  $p$  value significance of Bartlett’s test of sphericity reflects that the analysis could proceed [17]. The goodness of fit of the first CFA model of CFA was not satisfactory. However, the second model showed a better and more acceptable model compared to the first model (reflected through higher TLI and CFI values and SRMR value of 0.08 considered as high). The SRMR provides the accuracy test of fit better than RMSEA [32].

The EFA and CFA showed that Indonesia ABCD questionnaire has three latent variables. In our findings, three factors emerged based on eigenvalues ( $>1$ ) of factor analysis. Following this, we conducted parallel analysis (PA) to determine the appropriate number of factors (see Figure 1). PA calculates the eigenvalues of randomly generated multiple data matrices with the same number of variables and cases as the original raw dataset. The differences between randomly generated and empirical eigenvalues were then tested. The cutoff point of this comparison will extract the retained factors. Therefore, three factors were retained through the EFA and PA analysis. This finding shows a similar result to the original questionnaire, as well as other versions from several different countries (China: 3 factors, Hungary: 3 factors, United Kingdom: 3 factors, and Netherlands: 3 factors [12–14, 33]). However, based on EFA result in this study, item 5 of perceived benefit factor will be allocated into different factors from the original instrument.

Based on CFA, practically all ABCD items had a three-factor structure, which was similar to the original instruments. However, as items 21 and 26 had low factor loading scores, these were removed from the model to improve the model’s goodness of fit. These two questions were negative remarks on the ABCD Risk Questionnaire. There is a lack of research on negative statements in Likert scales in Indonesia; nonetheless, previous research suggests that both positive and negative statements should not be included in a scale [34]. The presence of these two types of statements caused confusion for the respondent [34]. Therefore, we recommend changing the negative statements into positive ones.

The internal consistency of the overall scale was lower than the original scale (0.85, 0.82, and 0.56 for perception risk, benefit, and healthy eating intentions) [9]. Even though Cronbach’s  $\alpha$  for two domains (knowledge and intention to change) were below the minimum threshold of 0.70, we found that the entire questionnaire’s reliability was strong as

a set. Furthermore, considering the Likert scale used in the instrument (from question 9 to 26), we also calculated the ordinal  $\alpha$  for the entire instrument (0.638) that showing a lower  $\alpha$  score than the Cronbach  $\alpha$  (0.737). However, almost all the ordinal  $\alpha$  for each factor (assessing with ordinal scale) were greater than the Cronbach  $\alpha$ . Therefore, considering the factor analysis study using the Likert-style scale, we are more confident on the reliability result calculated with ordinal coefficient alpha [25]. Our findings were similar to the Malay version that internal consistency of that version was over 0.70 [14]. Furthermore, the low Cronbach’s  $\alpha$  was acceptable as the original questionnaire for domain intention to change because this domain only has a three-item scale.

## 5. Limitation

This study was distributed through an online platform. Consequently, the demographic data do not vary, especially on religion and background education. However, the number of respondents was significant to achieve the data variation. Moreover, there are several Indonesian terminologies which could not be as precise as the meaning of English terminologies. Therefore, we considered the panelist’ difficulties in selecting the most representative Indonesian terminologies during the forward translation. This issue may lead to ambiguity among the respondents in interpreting the questions and statements in the questionnaire.

## 6. Conclusion

Based on psychometric investigation, this study concluded that the Indonesian version of ABCD questionnaire is a valid and accurate to be used for assessing the knowledge, perceived risk, perceived benefit, and intention to change. A few items on the ABCD questionnaire have been modified to be fitted into Indonesian cultural norms and make the questionnaire easier to respond. Because CVDs are common in low-income countries, this conclusion can be extended to the original study to assess Indonesian attitudes and beliefs.

## Data Availability

The survey’s raw data will not be available to protect the personal information of the study responders.

## Conflicts of Interest

The author states that there are no conflicts of interest.

## Acknowledgments

We thank all that contributed to this study including Mrs. Dame Elysabeth Tarihoran, RN. (Ph.D. student, the University of Auckland), Mrs. Renata Komalasari, Ph.D. (Postdoctoral scholar at Carol Nese Pennsylvania State University), Mrs. Sutantri, Ph.D., RN. (Lecturer at Universitas Muhammadiyah Yogyakarta, Indonesia), Mrs. Morlin, MD., and Mrs. Afriani Citra, RN. for engaging with

the translation and content validity indexing processes. We would also like to thank everyone who agreed to participate in this study. This research received funding from Universitas Pelita Harapan and Tarumanagara Institute.

## References

- [1] World Health Organization, "Cardiovascular diseases (CVDs)," 2021, <https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-cvds>.
- [2] C. W. Tsao, A. W. Aday, Z. I. Almarzooq et al., "Heart disease and stroke statistics—2022 update: a report from the American Heart Association," *Circulation*, vol. 145, no. 8, pp. e153–e639, 2022.
- [3] M. Vaduganathan, G. A. Mensah, J. V. Turco, V. Fuster, and G. A. Roth, "The global burden of cardiovascular diseases and risk: a compass for future health," *Journal of the American College of Cardiology*, vol. 80, no. 25, pp. 2361–2371, 2022.
- [4] Kementerian Kesehatan Indonesia, "Profil kesehatan Indonesia 2018," 2018, <https://www.kemkes.go.id/id/profil-kesehatan-indonesia-2018>.
- [5] J. M. Rippe and T. J. Angelopoulos, "Lifestyle strategies for risk factor reduction, prevention and treatment of cardiovascular disease," *American Journal of Lifestyle Medicine*, vol. 13, pp. 19–36, 2019.
- [6] I. M. Rosenstock, V. J. Strecher, and M. H. Becker, "Social learning theory and the health belief model," *Health Education Quarterly*, vol. 15, no. 2, pp. 175–183, 1988.
- [7] D. Boateng, F. Wekesah, J. L. Browne et al., "Knowledge and awareness of and perception towards cardiovascular disease risk in sub-Saharan Africa: a systematic review," *PLoS One*, vol. 12, no. 12, Article ID e0189264, 2017.
- [8] M. R. da Rocha, H. N. da Conceição, H. S. do Vale, M. T. P. Rodrigues, M. D. M. Mascarenhas, and A. R. V. da Silva, "Knowledge assessment instruments on cardiovascular diseases: integrative Review," *Enfermería Global*, vol. 20, no. 4, pp. 659–672, 2021.
- [9] M. Woringer, J. J. Nielsen, L. Zibarras et al., "Development of a questionnaire to evaluate patients' awareness of cardiovascular disease risk in England's National Health Service Health Check preventive cardiovascular programme," *BMJ Open*, vol. 7, no. 9, Article ID e014413, 2017.
- [10] Z. Guo, C. Ding, W. Gao et al., "Psychometric properties of the Chinese version of attitudes and beliefs about cardiovascular disease risk perception questionnaire," *Scientific Reports*, vol. 12, no. 1, Article ID 20241, 2022.
- [11] H. Y. Hassen, M. Bowyer, L. Gibson, S. Abrams, and H. Bastiaens, "Level of cardiovascular disease knowledge, risk perception and intention towards healthy lifestyle and socioeconomic disparities among adults in vulnerable communities of Belgium and England," *BMC Public Health*, vol. 22, no. 1, p. 197, 2022.
- [12] Y. Liu, W. Yu, M. Zhou et al., "Translation and validation of the Chinese ABCD risk questionnaire to evaluate adults' awareness and knowledge of the risks of cardiovascular diseases," *BMC Public Health*, vol. 22, no. 1, p. 1671, 2022.
- [13] T. Martos, M. Csabai, Z. Bagyura et al., "Cardiovascular disease risk perception in a Hungarian community sample: psychometric evaluation of the ABCD Risk Perception Questionnaire," *BMJ Open*, vol. 10, no. 7, Article ID e036028, 2020.
- [14] Z. Mat Said, T. A. Tengku Ismail, A. Abdul Hamid, R. Sahathevan, Z. Abdul Aziz, and K. I. Musa, "The Malay version of the attitudes and beliefs about cardiovascular disease (ABCD-M) risk questionnaire: a translation, reliability and validation study," *BMC Public Health*, vol. 22, no. 1, p. 1412, 2022.
- [15] W. S. P. Harmadha, F. R. Muharram, R. S. Gaspar et al., "Explaining the increase of incidence and mortality from cardiovascular disease in Indonesia: a global burden of disease study analysis (2000–2019)," *PLoS One*, vol. 18, no. 12, Article ID e0294128, 2023.
- [16] U. Lorenzo-Seva, "SOLOMON: a method for splitting a sample into equivalent subsamples in factor analysis," *Behavior Research Methods*, vol. 54, no. 6, pp. 2665–2677, 2021.
- [17] H. Taherdoost, S. Sahibuddin, and N. Jalaliyoon, "Exploratory factor analysis; concepts and theory," *Advances in Applied and Pure Mathematics*, vol. 27, pp. 375–382, 2022.
- [18] J. Shi, X. Mo, and Z. Sun, "Content validity index in scale development," *Zhong nan da xue xue bao. Yi xue ban= Journal of Central South University. Medical sciences*, vol. 37, no. 2, pp. 152–155, 2012.
- [19] M. W. Watkins, "Exploratory factor analysis: a guide to best practice," *Journal of Black Psychology*, vol. 44, no. 3, pp. 219–246, 2018.
- [20] L. Sürücü, İ. Yikilmaz, and A. Maslakci, "Exploratory Factor Analysis (EFA) in quantitative researches and practical considerations," 2022, <https://econpapers.repec.org/paper/osfosfxxx/fgd4e.htm>.
- [21] R. P. Sarmiento and V. Costa, "Confirmatory factor analysis--a case study," 2019, <https://arxiv.org/ftp/arxiv/papers/1905/1905.05598.pdf>.
- [22] World Health Organization, "Process of translation and adaptation of instruments," 2013, [https://www.who.int/substance\\_abuse/research\\_tools/translation/en/](https://www.who.int/substance_abuse/research_tools/translation/en/).
- [23] C. A. C. Prinsen, L. B. Mokkink, L. M. Bouter et al., "COSMIN guideline for systematic reviews of patient-reported outcome measures," *Quality of Life Research*, vol. 27, no. 5, pp. 1147–1157, 2018.
- [24] A. M. Gadermann, M. Guhn, and B. D. Zumbo, "Ordinal alpha," in *Encyclopedia of Quality of Life and Well-Being Research*, F. Maggino, Ed., pp. 1–3, Springer International Publishing, Berlin Germany, 2021.
- [25] B. D. Zumbo, A. M. Gadermann, and C. Zeisser, "Ordinal versions of coefficients alpha and theta for Likert rating scales," *Journal of Modern Applied Statistical Methods*, vol. 6, no. 1, pp. 21–29, 2007.
- [26] D. F. Polit, C. T. Beck, and S. V. Owen, "Is the CVI an acceptable indicator of content validity? Appraisal and recommendations," *Research in Nursing & Health*, vol. 30, no. 4, pp. 459–467, 2007.
- [27] G. R. Chauhan, B. R. Chauhan, J. V. Vaza et al., "Relations of the number of functioning distractors with the item difficulty index and the item discrimination power in the multiple choice questions," *Cureus*, vol. 15, no. 7, Article ID e42492, 2023.
- [28] L. Liao, S. Chung, J. Altamirano et al., "The association between Asian patient race/ethnicity and lower satisfaction scores," *BMC Health Services Research*, vol. 20, pp. 678–711, 2020.
- [29] J. Stochl, P. B. Jones, and T. J. Croudace, "Mokken scale analysis of mental health and well-being questionnaire item responses: a non-parametric IRT method in empirical research for applied health researchers," *BMC Medical Research Methodology*, vol. 12, pp. 74–16, 2012.
- [30] G. Aleo, A. Bagnasco, R. Watson et al., "Comparing questionnaires across cultures: using Mokken scaling to compare

the Italian and English versions of the MOLES index,” *Nursing Open*, vol. 6, no. 3, pp. 1022–1028, 2019.

- [31] N. Li, J. Huang, and Y. Feng, “Construction and confirmatory factor analysis of the core cognitive ability index system of ship C2 system operators,” *PLoS One*, vol. 15, no. 8, Article ID e0237339, 2020.
- [32] D. Shi, A. Maydeu-Olivares, and Y. Rosseel, “Assessing fit in ordinal factor analysis models: SRMR vs. RMSEA,” *Structural Equation Modeling: A Multidisciplinary Journal*, vol. 27, no. 1, pp. 1–15, 2020.
- [33] H. Y. Hassen, N. Aerts, S. Demarest, M. D. Manzar, S. Abrams, and H. Bastiaens, “Validation of the Dutch-Flemish translated ABCD questionnaire to measure cardiovascular diseases knowledge and risk perception among adults,” *Scientific Reports*, vol. 11, no. 1, p. 8952, 2021.
- [34] R. DeVellis, *Scale Development: Theory and Applications*, SAGE Publishing, New York, NY, USA, 2012.



## Research Article

# NoFumo+: Mobile Health App to Quit Smoking Using Cognitive-Behavioral Therapy

Patricia García-Pazo <sup>1,2</sup>, Joana Fornés-Vives <sup>1</sup> and Albert Sesé Abad <sup>2,3</sup>

<sup>1</sup>Department of Nursing and Physiotherapy, University of the Balearic Islands (UBI), Ctra. Valldemossa, km 7.5, Palma E-07122, Spain

<sup>2</sup>Health Research Institute of the Balearic Islands (IdISBa), Ctra. Valldemossa, 79, Palma E-07120, Spain

<sup>3</sup>Department of Psychology, University of the Balearic Islands (UBI), Ctra. Valldemossa, km 7.5, Palma E-07122, Spain

Correspondence should be addressed to Patricia García-Pazo; [patricia.garcia@uib.es](mailto:patricia.garcia@uib.es)

Received 27 March 2023; Revised 9 July 2024; Accepted 1 September 2024

Academic Editor: Suja P. Davis

Copyright © 2024 Patricia García-Pazo et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

This paper describes the development and test of a smartphone application to quit smoking using cognitive behavioral therapy (CBT). The tool includes recommendations from US Clinical Practice Guidelines (USCPG), drawing on the potential of smartphones and complying with the health App (mHealth) assessment standards. The mHealth created, called NoFumo+, is structured by 4 weeks treatment, implements the USCPG 5A recommendations (ask, advise, assess, assist, and arrange) and incorporates a CBT. It also includes complementary information, monitoring of the smoking behavior, social support for users, proposals for alternative activities to smoking, and innovative gamification to encourage and reward adherence. To technical development, a multidisciplinary team was formed (healthcare, research, and software engineers) that made theoretical decisions on both technical issues and the incorporation of therapeutic techniques. The validation was carried out in two phases; the first in the laboratory by a group of experts in information and communication technologies and CBTs ( $n = 15$ ) and the second, a field study with smokers ( $n = 10$ ). The standards for the development of mHealth recommended by the Andalusian Healthcare Quality Agency and the App quality evaluation guidelines of the Catalanian ICT Foundation for Social Health were used as assessment protocols by the experts' panel and the smokers' group, respectively. Experts' assessment results were satisfactory and some improving changes were suggested, such as to add more gamification elements. The group of smokers rated the mHealth as 100% easy to use and effective for quit smoking and understandable by the 83.3%. They also found No Fumo + quite useful to have the information available at all times. The obtained evidence after a complete two-phased validation study, with experts and potential users, shows a mHealth with high quality and easy to use. Finally, investigation project registered in ClinicalTrials.gov with reference to this trial is registered with NCT045402004.

## 1. Introduction

Tobacco use is one of the most serious health problems worldwide and the main cause of various respiratory, cardiovascular, and oncological diseases [1]. In Spain (2021), the prevalence of daily tobacco consumption is 32%, [2] and the Balearic Islands has the seventh highest rate of smoking prevalence in Spain [3]. Smoking produces a high morbidity and mortality rate, given that about half of all tobacco users die from it [4]. Tobacco is not only harmful to smokers but also to the people around them, many of them children. In

addition to being a serious health problem, smoking places a heavy economic burden on people around the world. In Europe, by the year 2027, estimations indicate that direct costs (hospitalization, inpatient rehabilitation, outpatient care, and medication) will reach 36 billion euros, whereas indirect costs (death, loss of work days, and early retirement) will reach 43 billion euros [5].

Smoking is an addiction that is usually extremely difficult to break, and it has a high relapse rate, especially among patients with chronic diseases [6]. Due to the magnitude of this problem, healthcare personnel consider it a priority to

treat smoking addiction in order to improve smokers' health [7]. For this reason, in our context, the Spanish Society of Pneumology and Thoracic Surgery (SEPAR), in accordance with the Clinical Practice Guidelines of Fiore et al. (CPG) [8], states that healthcare professionals, regardless of their discipline (doctor, nurse, and psychologist, among others), should begin to treat tobacco use when the smoker visits any healthcare service [9]. In Spain, between 15 and 27% of patients admitted to hospital are smokers [10]. In this regard, the hospitalization period of smokers is considered a "teachable moment" to modify the smoking habit [11–13]. There are two basic reasons for taking advantage of this period. On the one hand, patients may be more motivated to remain abstinent when their health is threatened [12]; on the other hand, smoking is prohibited in hospitals (in Spain, Law 42/2010 of December 30th, which modifies Law 28/2005 of December 26th) [14].

Moreover, in this situation, smokers are surrounded by healthcare professionals who can advise them and promote interventions to overcome their addiction [15]. These interventions could be carried out through effective actions, such as brief advice with the mnemonic rule of the 5A's recommended by the CPG: ask, advise, assess, assist, and arrange; that is, ask about consumption, advise the person to quit, assess and help to elaborate a specific action plan, and arrange follow-ups [8, 16].

However, it usually is not implemented in many hospitals; specifically, a study conducted in 13 Spanish hospitals indicates that only 4.6% of hospitalized smokers received the full brief advice [17]. There are several reasons why brief advice is not implemented in hospitals: professionals responsible for its application often lack the necessary skills, motivation, or trust in these treatments, and hospital management typically does not facilitate this type of intervention [18–21]. The evidence-based treatments that have shown the greatest efficacy in quitting smoking include pharmacological therapies (varenicline, bupropion, or nicotine replacement therapy), cognitive behavioral therapy (CBT), either group or individual, or the combination of the two [22].

Generally speaking, CBT to quit smoking is offered in multicomponent programs designed not only to stop smoking, but also to maintain abstinence [23]. These programs highlight components such as motivational techniques, behavior analysis, stimulus control, response prevention, social support, problem solving, social skills training, and stress management techniques. CBT also includes cognitive techniques such as cognitive restructuring and thought stopping [23, 24]. According to a review carried out by Almaraz and Alonso [25], the techniques that have shown greater effectiveness in quitting smoking are analysis of the smoking behavior by identifying triggers, social support to maintain motivation, and stress management techniques to prevent relapse. In accordance with a recent systematic review with a meta-analysis, cessation rates are strongly predicted by the number of behavior change techniques used [26].

In the context of this study, the different areas of public health in the Balearic Islands (Spain) have been applying a standardized multicomponent CBT program to quit

smoking that incorporates the aforementioned interventions in a face-to-face format, either individually or in groups [27]. That program is an adaptation of the one proposed by Becoña [23, 24], which has shown good results in different studies obtaining abstinence rates of 30% and 41% at 12 months of follow-up [28, 29]. As in other therapy of substance use disorders, these types of multicomponent programs foster the practice of healthy behaviors such as physical exercise and adopting a healthy diet [30, 31]. In general, these programs have mainly been developed for outpatient settings [32, 33] although they have also shown their efficacy in the hospital context [7, 34]. However, the face-to-face application of CBT also has some disadvantages, such as high cost, rigid norms (the user must adapt to the timetable of the sessions), the limited duration of the treatment, poor accessibility, not availability at any time, lack of viability in relapse situations, putting extra pressure on smokers, or accessible way [35–37].

Therefore, it would be desirable to find other alternatives overcome these difficulties, without reducing the effectiveness of the treatment. In this context, digital interventions are experiencing significant growth due to their capacity to address health-related issues, utilizing the capabilities of mobile devices, including smartphones, as well as other wireless tools such as patient monitoring devices and digital assistants. All of these digital methods are commonly named as mobile health (mHealth). These devices, through their applications, known as Apps, can provide meaningful support in the treatment of health problems [38, 39]. Smartphones are currently one of the most widely used electronic device by the general population. In Spain, around 93% of the adult population has one [40].

The main advantage of these smartphone applications is their ability to reach a large population by reducing location and cost barriers [41]. In addition, treatments can be adapted to users, providing them with rapid assistance, anonymity (e.g., benefit in pregnant smokers), offering constant advice and access to therapies at any time, thus increasing the possibility of modifying unhealthy behavior from a distance [42–44]. For this therapeutic purpose, smartphones make it possible to implement complex functions, including audio and video, two-way communication, and additional content when an Internet connection is available [45, 46]. These devices also provide the option of using other online applications, such as a chat to provide social support to users through a forum [47, 48] or a pedometer to provide feedback and encourage physical activity [49, 50]. An international taxonomy with demonstrated efficacy [51] has been described and recommended to adapt behavior change techniques to quit smoking to a smartphone App format [52].

The main weakness of the apps is that 77% stop using them within 72 hours of downloading them, which explains the low adherence to treatment [53]. To counteract this problem, they use notifications as a reminder or warning [54], as well as gaming elements ("gamification") such as leaderboards, badges, rewards, and avatars to increase patients' encouragement and hence improve effectiveness [55–58]. The motivating and reinforcing capacity of gaming activities has been proven in the literature [59] since when

applied within the framework of behavior modification [60], they can have a positive impact on health promotion and maintenance as, for example, to reduce alcohol consumption or increase physical activity [61].

Currently, there are many unresolved questions due to the lack of further research and the heterogeneity among such devices that hinders the study. However, the common consensus of all digital tools lies in developing a user-centered tool and defining the commitment required from the user to achieve the objective for which it has been developed. In the case of an mHealth that applies therapeutic principles such as CBT to pursue behavioral and cognitive change, user's commitment is considered similar to the face-to-face format, which is completing the treatment [38].

In Spain, when developing and implementing an mHealth, organizations such as the Andalusian Healthcare Quality Agency [62] and the Catalanian ICT Foundation for Social Health [63] make recommendations about the design (icons, images, text, videos, etc.), usability (ease of use), and security of the application before putting it into operation. In addition, after evaluating the application and confirming that it meets a series of requirements, identifies it with a quality seal [64].

In the field of tobacco addiction, the use of an mHealth as a therapeutic resource is widespread, both in terms of the number of apps on the market, over 400 for Android or iPhone operating systems [64], and the number of downloads, nearly 800,000 in one month in English alone [65]. However, even taking into account the potential of these devices for implementing these therapies, applications to quit smoking have exhibited significant scientific and therapeutic shortcomings because, in general, they do not adapt to the basic 5A's recommended by the CPG [8]. For example, they do not give brief advice about drop out or guidance about pharmacological treatments [66, 67]. Furthermore, most mHealth do not implement CBT [68, 69]. The ones that do are not free, and not all of them include an analysis of the smoking behavior [70]. Moreover, they do not include social support in a generalized way; only between 2.7% and 17% provide this support [66, 71, 72], and only 4% use gamification [68].

In light of the shortcomings found in the literature on the quality of smartphone mHealths to quit smoking and committed to the development and scientific advancement of digital devices in health. The study is aimed to provide a detailed account of the steps taken in the "NoFumo+" mHealth's creation, including the components it encompasses, its functionality, and the usability and satisfaction tests conducted with groups of experts and potential users prior to its pilot implementation.

## 2. Methods

This study was approved by the Ethics Committee of the Balearic Islands (reference no. IB 3865/19). The consent was obtained written.

The mHealth development to quit smoking started from the choice and theoretical justification and the CBT program selection and its operationalization. After establishing the

therapeutic approach, we proceeded with the technical development of the application, followed by its technical and theoretical validation through expert judgment (Phase 1). Finally, a field study was carried out with smokers to obtain evidence of an adequate understanding, usability of the mHealth functioning, and satisfaction (Phase 2). The application was developed throughout 2018-2019, with the first version available for the Android operating system in October 2019 and for Apple devices one month later.

*2.1. App's Theoretical Foundations and Design.* The theoretical framework in which the mHealth was developed is based on the treatment recommended by the CPGs proposed by Fiore et al. [8] and its adaptation to the hospitalized smoker by SEPAR [9]. The techniques implemented followed the 5A's of the CPG (ask, advise, assess, assist, and arrange), and Becoña's multicomponent CBT program [24]. Two existing online applications were added to this program, namely, "Google Fit" as a pedometer, and "Google Chat" to provide social support to users. On one hand, tracking physical activity is associated with an increase in this kind of activity [73]. On the other hand, the implementation of a social chat between peers in treatments of smoking cessation has shown good results [48]. To increase users' motivation to help change their behavior, gamification elements were implemented [65].

For accomplishing the 5A's, the mHealth recommends breaking the habit and advices about the use of medication through recorded informative videos, podcasts, leaflets, and links to official websites. The plan for breaking the smoking habit is offered through the mHealth's dynamics by presenting the contents sequentially and informing the user of the plan objectives through both written information and the mHealth's website. Likewise, the programmed follow-ups were carried out through the feedback provided by the tool itself (informing them of the time they have been abstinent).

The techniques of the multicomponent CBT program were designed and operationalized through written information or audio recordings, short explanatory videos, and interactive learning activities (e.g., a recorded video of the person rejecting cigarettes). A space was also provided for taking notes (e.g., a list of reasons why I want to stay abstinent after hospitalization).

The implemented multicomponent program was distributed in 15 different boxes. Each box includes information about (1) contents, such as information about the components of tobacco, behavior analysis, or problem-solving techniques; (2) activities, such as relaxation, recording the pros and cons of quitting smoking, and social support; and (3) links with organizations or associations on smoking (Table 1).

The behavior analysis technique takes the form of a daily self-record, which is presented through a questionnaire to document the following (Figure 1): the number of cigarettes smoked, the situations that triggered consumption (Figure 2), the user's emotional state with regard to three emotions (anxiety, mood, and anger), the desire to smoke, the user's perceived self-efficacy in maintaining abstinence, and the monitoring of the pharmacological treatment.

TABLE 1: Smartphone mHealth multicomponent program; behavior modification techniques.

Box	Information (text/audio)	Contents (short videos and leaflets)	Activities (interactive and notes)	Links (internet/web pages)
1	Treatment plan (establish objectives). Stimulus control ("golden rules")	Tobacco components; nicotine; controlled breathing	Relaxation training; encouraging social support (friend/family); recording benefits for those who quit smoking now	Recommendations to stop smoking. <a href="https://www.altadis.com/tabaco-y-regulacion/fumar-y-salud/">https://www.altadis.com/tabaco-y-regulacion/fumar-y-salud/</a>
2	The analysis of smoking behavior. Prevention of response. Advice about change of routine	Health effects of tobacco, pharmacological advice	Write down reasons to stop smoking, encourage social support	Information on how tobacco affects health: <a href="https://www.youtube.com/watch?v=ZAq0aNH7T88">https://www.youtube.com/watch?v=ZAq0aNH7T88</a>
3	Behavior analysis; the desire to smoke. Contents: activities	Abstinence syndrome. Advise on coping strategies	Select and/or note optional activities	Alternative coping strategies for withdrawal symptoms <a href="https://espanol.smokefree.gov/sintomas-de-abstinencia">https://espanol.smokefree.gov/sintomas-de-abstinencia</a>
4	Maximize the self-rewarding experience. Contents	Physical benefits of quitting smoking. Social support. Distraction. Prevention of response	Activities: Training in coping skills for risk situations	Benefits of quitting smoking. <a href="https://www.cdc.gov/tobacco/quit_smoking/how_to_quit/benefits/spanish/index.htm">https://www.cdc.gov/tobacco/quit_smoking/how_to_quit/benefits/spanish/index.htm</a>
5	Analyze smoking behavior and desire to smoke, personal reasons to quit. Feedback graphics	Identify risk situations	Relaxation (Jacobson and autogenous)	Controlled breathing, self-guided relaxation technique (Jacobson). <a href="https://m.youtube.com/watch?v=ZwOj80h_jEA">https://m.youtube.com/watch?v=ZwOj80h_jEA</a>
6	Remember to control stimuli that remind you to smoke (e.g., situations, smoke-free spaces ...)	Effective pharmacological treatments to stop smoking	Activities to maintain abstinence	Life without tobacco. <a href="https://m.youtube.com/watch?v=8Vom45IDUXQ">https://m.youtube.com/watch?v=8Vom45IDUXQ</a>
7	History of tobacco. Raising awareness in tobacco advertising. Assert yourself as a nonsmoker	Informing about the history of tobacco, psychological part of addiction	Alternative activities for risk situations; social support	Harmful advertising about smoking. <a href="https://m.youtube.com/watch?v=Gf6Kbje_nTI">https://m.youtube.com/watch?v=Gf6Kbje_nTI</a>
8	Time management. Graphical feedback of behavior analysis	Social support (chat). Distraction	Smoking behavior analysis charts	Common myths. <a href="https://pnsd.sanidad.gob.es/ciudadanos/informacion/tabaco/menuTabaco/mitosRealidades.htm">https://pnsd.sanidad.gob.es/ciudadanos/informacion/tabaco/menuTabaco/mitosRealidades.htm</a>
9	Negative thoughts	Advice about errors in thinking and their modification; social chat	Write down negative thoughts and modify them; talk to yourself	Change in thinking
10	Stress management	The problem-solving technique	Technical problem-solving training	Problem-solving technique. <a href="https://m.youtube.com/watch?v=OXt2XTAPr0">https://m.youtube.com/watch?v=OXt2XTAPr0</a>
11	Advise about social skills as a technique	Talking to oneself: Thought-stopping technique; social skills for cigarette refusal	Training in social skills	
12	Reinforcing abstinence as a reward and objective of the program	Cognitive restructuring: true story OD chronic obstructive pulmonary disease (COPD)	Action in the event of a fall or/and relapse Testimony one ex-smoking COPD (5 years abstinence)	The reason for the fall and relapse <a href="https://m.youtube.com/watch?v=M28UeqzDeY">https://m.youtube.com/watch?v=M28UeqzDeY</a>
13	Strengthen the ex-smoker's identity (smoking is not an option)	The urge to smoke, the temptation	Testimony of 2 ex-smoking patients (1 year and 25 years of abstinence)	Resources/testimonies from other ex-smokers. <a href="https://m.youtube.com/watch?v=M28UeqzDeY">https://m.youtube.com/watch?v=M28UeqzDeY</a>
14	Reinforcing alternative smoking behaviors	Physical exercise of different intensities. Psychoeducation and behavioral activation	Use a pedometer	Program to promote physical exercise at different ages. <a href="https://www.estilosdevidasaludable.mschs.gob.es/actividadFisica/actividad/daEIPaso/comoLoHacen/home.htm">https://www.estilosdevidasaludable.mschs.gob.es/actividadFisica/actividad/daEIPaso/comoLoHacen/home.htm</a>
15	Reinforcement and reobjectives of the treatment in terms of monitoring in person and through the application	Weight control. Training in planning (diet and exercise)	Harvard plate	Healthy eating education and recipes <a href="https://www.hsph.harvard.edu/nutritionsource/healthy-eating-plate/translations/spanish/">https://www.hsph.harvard.edu/nutritionsource/healthy-eating-plate/translations/spanish/</a>

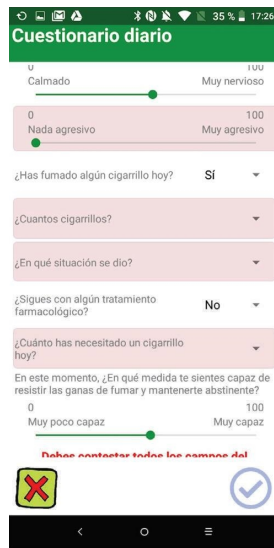


FIGURE 1: Screenshot of self-registration questionnaire the behavior analysis. The user answers the questions: Have you smoked any cigarettes today? In what situation did it occur? Are you still on any pharmacological treatment? How much have you needed a cigarette? At this moment, to what extent do you feel able to resist the urge to smoke and maintain abstinence?

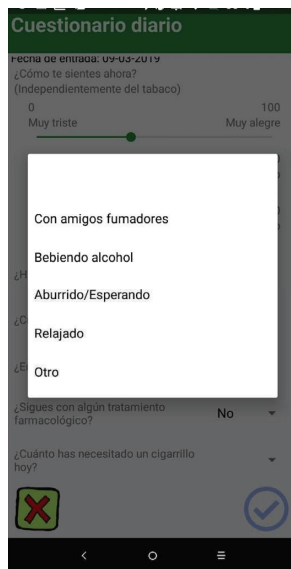


FIGURE 2: Screenshot of situations triggering behavior: “with friends who smoke”; “drunk alcohol”; “bored/waiting”; “relaxed”; and “other”.

All of these variables are measured on a sliding scale from 0 to 100 and they are represented in graphics that provide the user with feedback from the behavior analysis (Figure 3).

The mHealth starts with a main screen with a drawing of an avatar surrounded by a circle divided into 15 numbered boxes. At the end of the treatment the 15 boxes are colored (Figure 4).

As the user progresses through the sessions daily, following a programmed 4-week sequence, 2 days for each box. Each box indicates a treatment session, and three boxes

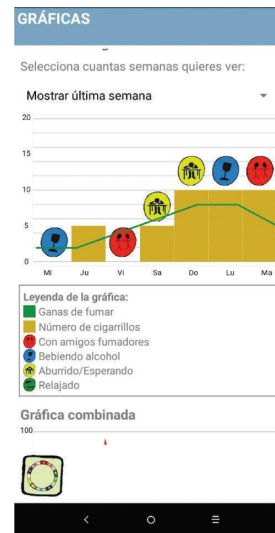


FIGURE 3: Screenshot of graphical resources describing smoking behavior analysis. In the columns of the graph you can see the “number of cigarettes smoked” (yellow square) and the green line indicates the “desire to smoke” (green square). The circle-shaped labels show the situations: red circle “with smoking friends”; blue circle “drinking alcohol”; yellow circle “bored/waiting”; and green circle “relaxed”.



FIGURE 4: Screenshot of the main NoFumo+’s screen.

make up a phase. There are a total of five phases, and the change to the next phase can only be made after correctly answering a questionnaire that evaluates the contents of reviewed that phase. To encourage social support, an icon was designed to provide direct access to a “chat room” among the mHealth’s users, available 24 hours a day, moderated by a psychology professional (Figure 5).

Among the motivational techniques of the program, personalized text messages are used, accompanied by a video “gift” represented by healthcare professionals who congratulate users for their abstinence or encourage them to return to abstinence if they have smoked. The motivational

messages are all positive and they will appeal more to fear according to the response than to the user's assessment of perceived self-efficacy to remain abstinent (available in the self-registration). Likewise, to reinforce abstinence, the mHealth is complemented with basic elements such as a counting calculator (days without smoking, money saved, and cigarettes not smoked) and the possibility of sharing personal achievements through social networks.

In addition, users were able to make a call directly from the mHealth to their mobile contact list to a person who could provide support in critical situations.

The gamification included in the mHealth has the following two basic objectives [65]: for the user to complete the treatment offered by the mHealth and to reinforce the number of days of abstinence. To maintain adherence to the treatment, as a game element, an avatar (drawing of a bust) was designed that simulates the smoker.

Avatar's coloring improves weekly, appears on the screen in a greyish color at the beginning of the treatment, simulating the presence of carbon monoxide (CO) in the blood. At the end of the treatment, if abstinence is achieved, the avatar changes to a pink color that represents the elimination of CO acquiring a healthier appearance. The mHealth also offers rewards in the form of accessories to complement the avatar such as a mouth, hair, hat, and clothing. For "craving" situations, it offers the possibility of connecting to online games that foster distraction at those times.

**2.2. mHealth's Technical Development.** A multidisciplinary team was made up of professionals with training and experience in the area of healthcare, research, and technology with competencies to design a mHealth [74]. Specialized healthcare professionals from the Smoking Cessation Unit (SCU) (a psychologist, two nurses, and two pneumologists) considered the development of a digital tool to intervene in the treatment of smoking in hospitalized smokers. This team contacted researchers studying CBT for smoking cessation from the University of Balearic Islands (UIB). Subsequently, the Balearic Islands Technological Foundation (Bit Foundation), an external institution which has an agreement with the Balearic Public Health Service, was contacted. Bit Foundation provided two computer engineers for the mHealth development. The team met weekly to establish key concepts and constructions that should be included in the mHealth.

The healthcare professionals and the researcher from the UIB were responsible for agreeing on and adapting the contents of the standardized CBT program to the format of a Smartphone application. The UIB researcher proposed the design and dynamics of the treatment through the application (sequence and order of presentation of the contents). The pneumologists developed videos, podcasts, and informative texts about the way tobacco affects the lungs and the evidence-based pharmacological treatments. The nurses developed videos, podcasts, and leaflets about the components of tobacco and the health benefits of quitting smoking. In addition, they contacted other hospital specialists (cardiologist, nutritionist, and physiotherapist) to program videos and informative texts about tobacco's effect on the

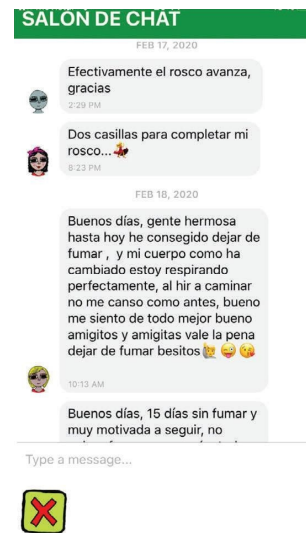


FIGURE 5: Screenshot of the social chat in the text, where 3 different mHealth users share their achievements; "Two boxes to complete my bagel. . .," "Good morning people, until today I have managed to quit smoking. . .and my body has changed and I breathe perfectly. . .when I go for a walk I don't get tired like before I feel better all around, well my friends, it is worth quitting smoking."

cardiovascular system, recommendations for weight control, physical training, and respiratory care. The psychologist proposed and developed the activities to be included in the app for each session (e.g., record of behavior analysis, writing down the reasons for deciding to stop smoking, record of alternative activities to smoking behavior, and management of social support through a chat). In addition, the psychologist contacted different experts in psychology to develop psychoeducation techniques for abstinence syndrome, problem-solving techniques, training in cigarette rejection skills, identification of negative thoughts, and cognitive restructuring.

In order to functionally adapt the experts' treatment proposal, the software engineers created the executive environment and framework for the mHealth development. Different Javascript tools we used for the server, such as Node.js runtime environment, and the framework for development of mobile applications Expo (which in turn is based on the React Native framework). The use of React Native (through Expo) allowed the same program code (written in Javascript) to generate the executables required by each operating system (Android or iOS). Once it was verified that the code worked with both operating systems, the executables for each system were generated using the pertinent native libraries. Regarding the design characteristics, icons with universal shape and color codes were used for different functions, such as information, graphics, chat, and emergencies. Once the executables were generated, the mHealth was uploaded to "Google Play" for the Android system, and to "App Store" for iOS. The mHealth was only available for smartphones with Android (version 5.0 onward) or Apple (version 4.0 onwards) operating systems. Finally, all the team members agreed on the user-application interaction variables to be collected, in order to carry out



a subsequent study on the efficacy and mHealth efficiency [75]. Furthermore, the software engineers added the possibility for that, the research team to send direct notifications to the user's Smartphone through the interface (for example, reminders to perform the application's activities, such as the daily questionnaire, use of the chat, and propose greater help).

The mHealth was named NoFumo+ ["I smoke no more"] and has been developed in compliance with the provisions of the Spanish Organic Law on Data Protection (IB3865), not only regarding the regulation of technical aspects of data protection but also the consent that must be requested for data process and analysis. Patients can access all the mHealth registered data at any time through a web-type platform created for this purpose.

**2.3. Phase 1: Testing Phase. Participants.** A panel composed of 15 psychologists, 13 of them women, was intentionally recruited, with a mean age of 26 years. All of them were studying Information and Communication Technology (ICT) in Health, belonging to the Master of General Health Psychology at the UIB. This group of psychologists was recognized as experts in the field due to their completion of a postgraduate degree, which included formal education in clinical psychology (CBT intervention). In addition, they received training in mHealth evaluation, particularly focused on smartphone apps.

**Assessment protocol.** The app assessment by the panel of experts had the objective of evaluating the presence or absence of quality and safety criteria a mHealth should have. As an evaluation protocol, the panel used the guidelines of the Andalusian Health Quality Agency (Spain) [50]; specifically, the adaptation made by Andújar-Espinosa et al. [76], which added criteria to evaluate gamification elements. The protocol consists of 31 dichotomous items (presence/absence) that are distributed in 7 categories: (1) the mHealth's functioning and the usability of its interface (1 item); (2) the relevance and suitability of its elements (1 item); (3) the quality of the contents (based on scientific evidence) and the safety of the information (whether it involves health risks, etc.) (3 items); (4) the services provided (technical support) (1 item); (5) the confidentiality and privacy (guarantee of anonymity and data treatment) (2 items); and (6) the gamification elements (rewards, avatars, badges, levels, challenges, etc.) (11 items). Given that the app was designed within the CBT framework, the research team added 6 items to the protocol for assessing the behavior modification techniques implemented.

The assessment protocol used shows a high degree of similarity with the Mobile App Rating Scale (MARS) [77] that includes the following dimensions: engagement, functionality, aesthetics, information, and subjective quality. In general, almost all MARS contents are subsumed in the protocol of this study. The inclusion in the mHealth of innovative elements such as gamification, not specifically contemplated by the MARS scale, led to the decision to opt for the Spanish protocol.

**2.3.1. Procedure.** The computer engineers and software developers checked the overall operation of the mHealth before the evaluation of the panel of experts to avoid system errors and not delaying the process. The experts' panel assessment procedure took place on the university premises. In a 4-hour session, the healthcare professionals described the standardized multicomponent CBT program to quit smoking and the quality and safety criteria a healthcare app should have, according to the protocol. The participating experts downloaded the application onto their Smartphones and tested the mHealth without receiving any prior explanation. Thus, they had complete freedom to analyze its usability and interaction efficiency in the. Afterwards, the app's functioning was explained and doubts were resolved. The panel had a total of 30 days to test the application, fill out the checklist, and send, via email, comments or suggestions for improvement that were not originally included on the protocol.

#### **2.4. Phase 2: Field Test Usability**

**2.4.1. Participants.** A group of smokers ( $n = 10$ , 4 men and 6 women) who had completed a group CBT smoking cessation treatment at a health center were recruited to participate voluntarily and without any economic incentive in the field study. They had just quit smoking. The mean age of the participants was 48.5 years ( $SD = 8$ ), with an average consumption before the group treatment of 21 cigarettes per day. None of them reported having any previous experience with an mHealth.

**2.4.2. Assessment Protocol.** The main objectives of the field study were to assess potential users' opinions about (1) the usability of the application, (2) the comprehension of the contents, and (3) the degree of satisfaction with the mHealth as a tool to quit smoking. To meet the first objective, a questionnaire adapted to users' understanding was designed based on the criteria recommended by the TIC Social Health Foundation of the Generalitat of Catalonia (Spain) [51]. This questionnaire is composed by 39 dichotomous items (yes/no) that measure usability and accessibility. It reasonably matches the scales of operation, ease of use, navigation, gestural design, and aesthetics (layout, graphics, and visual appeal) of the user version of the MARS scale (uMARS) [78]. To answer the second and third objectives, a telephone interview was carried out, consisting in two dichotomous questions (yes/no): (1) "Have you understood all the information and techniques that health professionals have given you through the videos?", and (2) "Do you think that the app can be useful to help you quit smoking?" Also, possible comments to both questions were collected. Additional telephone interviews were conducted to gather supplementary data (available here) on understanding all the information and the perceived utility of the app in smoking cessation. During the field study, the research team also tested the operation of the application interface to assess whether the computing platform collected all user data correctly (questionnaires and notifications).



**2.4.3. Procedure.** The research team contacted the coordinators of a Primary Care center that was conducting stop smoking group therapy. Once the objectives of the study had been explained, the center accepted and offered the possibility for a group of smokers to participate in the field study for the usability testing of the mHealth. After obtaining the consent of all the participants, they were individually contacted by phone to provide them with the codes to download the mHealth. Employing a mixed-method approach, once the results of the mHealth evaluation had been obtained, we collected additional qualitative information through telephone interviews, enabling the acquisition of more precise data than what was gathered through the questionnaires [79].

**2.5. Design and Statistical Analysis.** A quantitative descriptive design is suitable for this study, considering the various evaluations included in both phases of the mHealth development process. Basic descriptive statistics were used to manage the variables of scale. All analyzes were carried out using SPSS 25.0.

### 3. Results

This section presents the results of the two phases of the evaluation protocol.

**3.1. Results of Phase 1: Testing with Experts.** Seventy-three percent (11/15) of the experts recruited in phase 1 completed the NoFumo + mHealth evaluation using the assessment protocol. Table 2 summarizes the obtained results in terms of agreement as well as the suggestions for the mHealth improvement.

As Table 2 shows, the majority of the experts easily located all the variables on the checklist and positively rated the application, describing it as being easy and intuitive to use. However, some suggestions for improvement should be highlighted, such as: (1) incorporating a tutorial video to complement the written explanation of the mHealth's functioning; (2) incorporating a notification indicating that its use is not a health risk; and (3) adding some other gamification insignia, such as a medallion, to reinforce long-term adherence, lasting up to five years, through a medallion (Figure 6).

**3.2. Results of Phase 2: Usability Testing with Smokers.** For the field study with the group of smokers who completed the treatment, valid results were obtained from 80% (8/10) of the smokers contacted. The evaluations obtained using the assessment protocol indicated that 100% (10/10) of the smokers identified a good quality level of the usability and accessibility criteria in the mHealth. Regarding the results of the telephone interviews, all of them (10/10) indicated that they were satisfied with the application and 83% (8/10) of the participants valued the comprehensibility of the contents positively. Also, all users (10/10) rated positively the information provided by the professionals through videos,

highlighting that they are short and concise. We highlighted the following comments from participants: they pointed out the advantage of having the information and own behavior feedback available at all times through the mHealth; in regards of the app Google Fit, two participants mentioned that they used it and another participant said not to do it because he already had another mHealth. Finally, the effects of gamification elements were quite gratifying for users, in their opinion; these elements highly increased their motivation to use NoFumo + mHealth.

The research team tested the interface while participants were assessing the NoFumo + mHealth and confirmed that the platform correctly collected all the data (Table 3) and that the notifications functioned adequately. Table 3 collects the interface variables that show user interaction with the application, such as daily questionnaire, daily activity, connections to social chat, use of the emergency button, and evaluations on the use of the mHealth. It was also verified that 70% (7/10) of the participating smokers used the chat correctly. However, the team indicated that users' identification in the chat could be improved by adding their avatars as profile picture.

Throughout the field study, small functionality errors were also detected and corrected, such as difficulty downloading the mHealth due to lack of space on their personal smartphones, problems with entering the passwords to download NoFumo+, and excessive complexity of some of the evaluations to move through the treatment phases, which frustrated some users. Similarly, some content was modified or removed from the definitive mHealth; in the former case because it was not understood by the group of smokers and in the latter case because it was considered too extensive. As a final proposal for improvement, a "YouTube" type page was designed with tutorials on the activities and the mHealth's functioning.

### 4. Discussion

This paper presents the development of the mHealth "NoFumo+" to quit smoking that incorporates the main components of CBT and the recommendations of the CPG, as brief advice [8, 9]. The mHealth was developed by a multidisciplinary team and uses the potential of smartphones. Two pilot studies were carried out prior to its implementation. Finally, a clinical trial was conducted to validate the application in hospitalized patients, which results have been published [80].

There are other mHealths with the same purpose, such as Quit Genius, Smart Quit, or Smoke Mind, which also use CBT and CPG [81–83], although one of them (Smart Quit) does not use CBT as its main therapy, but instead uses acceptance and commitment therapy (ACT). For this reason, its intervention techniques are more focused on ACT, and publications on this mHealth do not clearly define how they perform the behavior analysis [82, 84], the main element of CBT. In the case of the other two applications (Quit Genius and Smoke Mind) each performs the behavior analysis differently. Quit Genius uses a questionnaire that records the variables and provides feedback on a graph.

TABLE 2: Results and suggestions about NoFumo + mHealth from the experts' panel according to the assessment protocol ( $n = 11$ ).

Variables <sup>a</sup>	Indicators <sup>b</sup>	Results $n$ (%) <sup>c</sup>	Suggestions <sup>d</sup>
Functioning	Easy to use	11 (100%)	Change the format to a video tutorial or web page
	Purpose and clarity in the objectives pursued	11 (100%)	
Quality and security of information	Appropriate to the audience	11 (100%)	Add the possibility of being able to listen to the information, as well as read it
	Transparency about owners	11 (100%)	
	Reliability contained	6 (54%)	Add the sentence: "The app is not harmful to health"
Providing services	Health risk they may have with the use of the application	11 (100%)	Add a video on how to use the app
Confidentiality and privacy	Technical support and assistance on its handling	8 (72%)	Unify all information dealing with this indicator
	Privacy/data protection	11 (100%)	
Gamification elements	Data processing	11 (100%)	
	Rewards	11 (100%)	
	Awards	11 (100%)	
	Avatars	8 (72%)	Add a contest, create competition
	Classification tables	10 (90%)	
	Levels	6 (54%)	
	Challenges	7 (63%)	Add medallion
	Points	11 (100%)	
	Feedback	10 (90%)	
	Goals	11 (100%)	
	Social interaction	11 (100%)	
Behavior modification techniques	Achievements	11 (100%)	
	Feedback	11 (100%)	
	Self-monitoring	11 (100%)	
	Behavior comparison	11 (100%)	
	Rewards and threats	11 (100%)	
	Incentive	11 (100%)	
BCT techniques	Self-observation: Self-registration and graphic representation of consumption	11 (100%)	
	Information on tobacco	11 (100%)	Add attractive text format, leaflets
	Stimulus control	11 (100%)	
	Activities to avoid nicotine withdrawal symptoms	8 (72%)	
	Physiological feedback from cigarette smoking	4 (36%)	Add other indicators (e.g., co-oximetry)
	Social commitment	11 (100%)	
	Relapse prevention strategies	11 (100%)	

<sup>a</sup>Variable to be measured. <sup>b</sup>The indicators of each variable. <sup>c</sup>Number of psychologist who locate the variable ( $n$ ); sample the percentage of psychologists who locate the variable (%). <sup>d</sup>Suggestions for improvements by users.



FIGURE 6: Screenshot of medal table shows medals earned from 1 day without smoking, 2 days without smoking. . .30 days without smoking.

TABLE 3: Elements and variables included in the mHealth’s interface.

Elements	Variables
Diary questionnaire	(i) Number of times the user enters data (ii) Emotions 0–100; calm-nervous/cheerful-sad/nonaggressive (iii) Smoking: yes/no (1) Number of cigarettes (number) (2) Situations (other smokers, drinking alcohol, bored, relaxed, other) (iv) Pharmacological treatment: yes/no (1) Treatment (patches, varenicline, other)
Activity	(i) Number of boxes fulfilled (ii) Duration of the activity (min): from when it is switched on to when it is switched off (iii) PDF read: if you open it (yes/no) (iv) Video display time: if you do not stop it, it continues to count (v) Additional material link: (yes/no)
Chat connections	(i) Date (ii) Time spent in the chat
Emergency button	(i) Date (ii) Length of stay (iii) Telephone call (iv) Online games (v) Send email to the service yes/no
Evaluation/gamification elements	(i) If user passes (evaluation: 1/2/3/4/5): yes/no (obtains gamification) (ii) Number of attempts to pass the evaluation

Smoke Mind uses a phone call from a professional, a specialist in CBT, who contacts users when they have smoked a cigarette. Online access to professionals is available in these two mHealts. Quit Genius facilitates communication with a “coach” the user can access during the treatment to reinforce motivation. NoFumo + starts with the record, as Quit Genius does, and increases its intensity in the intervention through the behavior analysis, according to its efficacy results. It also facilitates contact with a professional through a chat or by email.

It should be noted that, in the three applications mentioned above, users have to make an additional payment to

access most of the contents and techniques (Smart Quit and Quit Genius) or have a private health system (Smoke Mind). However, NoFumo + offers this personalized support within a free public health system.

Another important difference between NoFumo+ and the three Apps mentioned above is the social support. These applications use social networks to share achievements as their only support. NoFumo + adds a chat between users moderated by a professional, thanks to the use of online applications that allow it. Another feature of our mHealth is that it uses the potential of smartphones to provide greater support or encourage effective activities, such as increasing

physical activity. Perhaps it is these additional elements that result in better adherence rates on NoFumo+ (42%) [80] compared to other applications such as Smart Quit (24%) [84].

As a final result, NoFumo+ maintains the elements of other mHealths, but we believe that it also tries to fill their gaps. This may be the reason why NoFumo+ has achieved better abstinence rates (90.58%) 2 months after the end of treatment [80] than Smart Quit app (28%) [84].

The research team, recognizing the importance of evaluating the role of gamification in smoking cessation applications [85] and following expert recommendations, decided to incorporate additional gaming elements with a competitive dimension (e.g., a medal system and view their avatar's status in the chat). This approach is grounded in the premise that findings on mHealth with gamification factors may motivate both healthy and unhealthy individuals to maintain their health status [86]. It is worth noting that, although some research supports the effectiveness of these interventions, there is a scarcity of mobile applications for smoking cessation that incorporate gaming elements, and more clinical trials are needed to assess this function [85].

It is worth noting that the two pilot studies were carried out prior to its implementation, both pilot study with the experts' panel, and the study with smokers were very useful for improving the functionality of the mHealth and helping to solve arising problems.

**4.1. Limitations.** First, in regards the questionnaire about the mHealth testing, the choice of response options (yes/no) for the experts and users may have limited the variability in their responses. For future research, 5- or 7-point scale or qualitative methods could be used. Second, the field study was carried out with smokers who requested help in their health center because the mHealth has been designed within the framework of a public health program for smokers who suffer a hospital admission and, therefore, a period of forced abstinence. Smokers who do not seek help and lack sufficient self-motivation to face therapy should be recruited as well. . . Third, the sample size used in phase 2 is too small to extrapolate to the entire smoking population. However, the good results regarding the usability of the mHealth seem to indicate that it is easily usable by the smoking population with the same characteristics of the sample. Finally, it is important to note that the mHealth is currently only available in Spanish although it will be adapted to English.

The results of the clinical trial of the NoFumo+ mHealth indicate that it can be an effective tool in the treatment of smoking cessation in the hospital setting. However, the global pandemic of COVID-19 limited the recruitment process, so it is necessary to conduct the study on larger samples, which will allow the analysis of the functions of the mHealth that show greater effectiveness.

## 5. Conclusions

After developing NoFumo+, an innovative quit smoking CBT-based mHealth including gamification elements, in the

immediate future we plan to carry out a clinical application and evaluate its efficacy. As some authors point out [75, 87], efficacy studies have to be evidence-based and, thus, allow comparison with other mHealth Apps with homogeneous interventions. Although the first version of the NoFumo+ mHealth was designed to be used with hospitalized patients, the research team will extend it to the general smoking population, depending on the results obtained. This mHealth could be adapted to be used in other contexts, not only hospitalized patients. This would require modifying the content (activities and examples) to the new given contexts, as well as the possibility of combining NoFumo+ with face-to-face visits if necessary. The final objective is to make this smartphone mHealth an efficient and affordable mobile tool to quit smoking and improve people's health.

## Data Availability

The data used to support the findings of this study are available on request from the corresponding author.

## Ethical Approval

This study was approved by the Ethics Committee of the Balearic Islands (reference no IB 3865/19).

## Conflicts of Interest

The authors declare that they have no conflicts of interest.

## Acknowledgments

This project was made possible by a collaboration agreement between three entities (ref. 3871): The Pneumology Unit of Son Llatzer University Hospital in Palma de Mallorca, the Balearic Foundation for Innovation and Technology, and the University of the Balearic Islands. The authors would like to thank everyone who has participated in the development of the application and its piloting, including all the healthcare professionals who have helped to develop the contents of NoFumo+. Finally, we would like to thank *JMIR Publications* for publishing the first version of this manuscript in preprint [85]. Open access funding was enabled and organized by CRUE-CSUC Gold.

## Supplementary Materials

Supplementary material is available for this article online (S1). (*Supplementary Materials*)

## References

- [1] S. Abuse, "Substance abuse and mental health services administration," 2014, <https://www.usa.gov/agencies/substance-abuse-and-mental-health-services-administration>.
- [2] Plan Nacional Sobre Drogas, "Informe 2021: Alcohol, Tabaco y Drogas ilegales en España," 2021, <https://pnsd.sanidad.gob.es/profesionales/sistemasInformacion/informesEstadisticas/pdf/2021OEDA-INFORME.pdf>.

- [3] Instituto Nacional de Estadística, “Encuesta Europea de Salud en España (ESEE) [Internet]. [National Institute of Statistics,] *European Health Survey in Spain (ESEE)*, vol. 2020, 2021.
- [4] World Health Organization, “WHO launches new report on global trends in tobacco use,” 2019, <https://www.who.int/es/news-room/detail/19-12-2019-who-launches-new-report-on-global-tobacco-use-trends>.
- [5] C. A. Jiménez-Ruiz and K. O. Fagerström, in *El tabaquismo como enfermedad crónica. Visión global*, Grupo Aula Médica S.L, España, Spain, 2012.
- [6] K. Ho, W. H. C. Li, M. P. Wang, K. K. W. Lam, T. H. Lam, and S. S. C. Chan, “Comparison of two approaches in achieving smoking abstinence among patients in an outpatient clinic: a Phase 2 randomized controlled trial,” *Patient Education and Counseling*, vol. 101, no. 5, pp. 885–893, 2018.
- [7] A. C. F. Campos, A. S. F. Nani, V. A. d S. Fonseca, E. N. Silva, M. C. S. d. Castro, and W. Martins, “Comparison of two smoking cessation interventions for inpatients,” *Jornal Brasileiro de Pneumologia*, vol. 44, no. 3, pp. 195–201, 2018.
- [8] J. C. R. Fiore, T. B. Baker, W. Bailey et al., “Treating tobacco use and dependence: 2008 update. Public health service clinical practice guideline executive summary,” *Respiratory Care*, vol. 53, 2008.
- [9] J. De Granada Orive, S. Solano Reina, J. Riesco Miranda et al., “Tratamiento del tabaquismo en pacientes hospitalizados [Guidelines for the Treatment of Smoking in Hospitalized Patients],” *Sociedad Española de Neumología y Cirujía Torácica (SEPAR)*, pp. 1–44, Barcelona, España, Spain, 2017.
- [10] M. P. Suárez-Bonel, M. V. Villaverde-Royo, I. Nerín, C. Sanz-Andrés, J. Mezquida-Arno, and R. Córdoba-García, “Health care costs and work absenteeism in smokers: study in an urban community,” *Archivos de Bronconeumología*, vol. 51, no. 12, pp. 615–620, 2015.
- [11] S. A. Duffy, S. E. Cummins, J. L. Fellows et al., “Fidelity monitoring across the seven studies in the consortium of hospitals advancing research on tobacco (CHART),” *Tobacco Induced Diseases*, vol. 13, no. 1, 2015.
- [12] H. Lando, D. Hennrikus, M. McCarty, and J. Vessey, “Predictors of quitting in hospitalized smokers,” *Nicotine and Tobacco Research*, vol. 5, no. 2, pp. 215–222, 2003.
- [13] K. Gregor and B. Borrelli, “Barriers to quitting smoking among medically ill smokers,” *Journal of Behavioral Medicine*, vol. 35, no. 5, pp. 484–491, 2012.
- [14] Agencia Estatal Boletín Oficial del Estado, in *Ley 42/2010, de 30 de diciembre, por la que se modifica la Ley 28/2005, de 26 de diciembre, de medidas sanitarias frente al tabaquismo y reguladora de la venta, el suministro, el consumo y la publicidad de los productos del tabaco*, BOE, España, Spain, 2010.
- [15] M. C. Fiore, E. Goplerud, and S. A. Schroeder, “The joint commission’s new tobacco-cessation measures — will hospitals do the right thing?” *New England Journal of Medicine*, vol. 366, no. 13, pp. 1172–1174, 2012.
- [16] M. C. Fiore and T. B. Baker, “Treating smokers in the health care setting,” *New England Journal of Medicine*, vol. 365, no. 13, pp. 1222–1231, 2011.
- [17] C. Martínez, A. Feliu, Y. Castellano et al., “Factors associated with receipt of the 5As model of brief intervention for smoking cessation among hospitalized patients,” *Addiction*, vol. 115, no. 11, pp. 2098–2112, 2020.
- [18] A. Andrés, Y. Castellano, M. Fu et al., “Exploring individual and contextual factors contributing to tobacco cessation intervention implementation,” *Addictive Behaviors*, vol. 88, pp. 163–168, 2019.
- [19] J. Grech, R. Sammut, M. B. Buontempo, P. Vassallo, and N. Calleja, “Brief tobacco cessation interventions: practices, opinions, and attitudes of healthcare professionals,” *Tobacco Prevention & Cessation*, vol. 6, 2020.
- [20] T. C. Laschober, J. L. Muilenburg, and L. T. Eby, “Factors linked to substance use disorder counselors’ (Non)Implementation likelihood of tobacco cessation 5 A’s, counseling, and pharmacotherapy,” *Journal of Addictive Behaviors, Therapy & Rehabilitation*, vol. 4, pp. 134–215, 2015.
- [21] S. Choi and Y. Kim, “Factors affecting Korean registered nurses’ intention to implement smoking cessation intervention,” *Osong Public Health and Research Perspectives*, vol. 7, no. 1, pp. 63–70, 2016.
- [22] National Institute for Health and Care Excellence Nice, “Stop smoking interventions and services,” 2018, <https://www.nice.org.uk/guidance/ng92/resources/stop-smoking-interventions-and-services-pdf-1837751801029>.
- [23] E. Becoña, M. C. Míguez, E. Fernandez del Río, and A. López, “El tratamiento psicológico de los fumadores [Psychological treatment of smokers],” *En: Dependencia del tabaco Manual de casos clínicos*, pp. 43–60, Sociedad Española de Psicología Clínica, Legal y Forense, España, Spain, 2010.
- [24] E. Becoña, *Programa para dejar de fumar*, Servicio d. Santiago de Compostela, España, Spain, 1993.
- [25] D. A. Almaraz and M. M. Alonso, “Terapia Cognitivo Conductual para Dejar de Fumar: Revisión Sistemática [Cognitive Behavioural Therapy for Smoking Cessation: A Systematic Review],” *Enfermería Comunitaria*, vol. 14, pp. 1–9, 2018.
- [26] N. Black, M. C. Eisma, W. Viechtbauer et al., “Variability and effectiveness of comparator group interventions in smoking cessation trials: a systematic review and meta-analysis,” *Addiction*, vol. 115, no. 9, pp. 1607–1617, 2020.
- [27] F. J. Pérez-Pareja, A. Palmer, A. Sesé, A. F. Romo, and M. Tomás, “Influence of negative emotions (anxiety, depression and anger) on the efficiency of cognitive-behavioral quit smoking program,” *Clinica Y Salud*, vol. 21, no. 1, 2010.
- [28] E. Becoña, E. Fernández, A. López-Durán, Ú Martínez, C. Martínez, and R. A. Rodríguez, “The psychological treatment of tobacco dependence. EFFICACY, barriers and challenges,” *Papeles del Psicólogo*, vol. 35, pp. 161–168, 2014.
- [29] C. Martínez-Vispo, R. Rodríguez-Cano, A. López-Durán, C. Senra, E. Fernández del Río, and E. Becoña, “Cognitive-behavioral treatment with behavioral activation for smoking cessation: randomized controlled trial,” *PLoS One*, vol. 14, no. 4, Article ID e0214252, 2019.
- [30] P. M. Smith, L. D. Seamark, and K. Beck, “Integration of an evidence-based tobacco cessation program into a substance use disorders program to enhance equity of treatment access for northern, rural, and remote communities,” *Translational Behavioral Medicine*, vol. 10, no. 3, pp. 555–564, 2020.
- [31] E. Zschucke, A. Heinz, and A. Ströhle, “Exercise and physical activity in the therapy of substance use disorders,” *The Scientific World Journal*, vol. 2012, pp. 1–19, 2012.
- [32] A. Raich, J. Martínez-Sánchez, E. Marquilles, L. Rubio, M. Fu, and E. Fernández, “Abstinencia a los 12 meses de un programa multicomponente para dejar de fumar,” *Adicciones*, vol. 27, no. 1, pp. 37–46, 2015.
- [33] F. Alonso-Pérez, C. Alonso-Cardenoso, J. V. García-González, J. M. Fraile-Cobos, N. Lobo-Llorente, and R. Secades-Villa, “Effectiveness of a multicomponent smoking cessation intervention in primary care,” *Gaceta Sanitaria*, vol. 28, no. 3, pp. 222–224, 2014.
- [34] F. Ortega, A. Vellisco, E. Márquez et al., “Effectiveness of a cognitive orientation program with and without nicotine

- replacement therapy in stopping smoking in hospitalised patients,” *Archivos de Bronconeumología*, vol. 47, no. 1, pp. 3–9, 2011.
- [35] N. F. BinDhim, K. McGeechan, and L. Trevena, “Assessing the effect of an interactive decision-aid smartphone smoking cessation application (app) on quit rates: a double-blind automated randomised control trial protocol,” *BMJ Open*, vol. 4, no. 7, Article ID e005371, 2014.
- [36] G. Ingall and M. Cropley, “Exploring the barriers of quitting smoking during pregnancy: a systematic review of qualitative studies,” *Women and Birth*, vol. 23, no. 2, pp. 45–52, 2010.
- [37] G. Gulati and B. Hinds, “Smoking cessation potential of smartphone-assisted behavioral therapy coupled to programmable carbon nanotube membrane nicotine delivery device,” *Critical Reviews in Therapeutic Drug Carrier Systems*, vol. 35, no. 6, pp. 495–520, 2018.
- [38] L. Yardley, B. J. Spring, H. Riper et al., “Understanding and promoting effective engagement with digital behavior change interventions,” *American Journal of Preventive Medicine*, vol. 51, no. 5, pp. 833–842, 2016.
- [39] A. Mahmood, S. Kedia, D. K. Wyant, S. Ahn, and S. S. Bhuyan, “Use of mobile health applications for health-promoting behavior among individuals with chronic medical conditions,” *Digital Health*, vol. 5, Article ID 205520761988218, 2019.
- [40] Observatorio Nacional de las Telecomunicaciones y la Sociedad de la Información, “LA SOCIEDAD EN RED. Transformación digital en España. Informe Anual 2018,” 2019, <https://www.ontsi.es/sites/ontsi/files/2019-10/InformeAnualLaSociedadEnRedEdic2019.pdf>.
- [41] A. E. Kazdin, “Technology-based interventions and reducing the burdens of mental illness: perspectives and comments on the special series,” *Cognitive and Behavioral Practice*, vol. 22, no. 3, pp. 359–66, 2015.
- [42] H. Do, B. X. Tran, Q. Pham et al., “Which eHealth interventions are most effective for smoking cessation? A systematic review,” *Patient Preference and Adherence*, vol. 12, pp. 2065–84, 2018.
- [43] C. Herberts and C. Sykes, “Midwives’ perceptions of providing stop-smoking advice and pregnant smokers’ perceptions of stop-smoking services within the same deprived area of London,” *Journal of Midwifery and Women’s Health*, vol. 57, no. 1, pp. 67–73, 2012.
- [44] I. Tombor, J. Neale, L. Shahab, M. Ruiz, and R. West, “Healthcare providers’ views on digital smoking cessation interventions for pregnant women,” *Journal of Smoking Cessation*, vol. 10, no. 2, pp. 116–23, 2015.
- [45] C. D. Norman, S. Mcintosh, P. Selby, G. Eysenbach, and C. D. Norman, “Web-Assisted Tobacco Interventions: Empowering Change in the Global Fight for the Public’s (e),” *Health Corresponding Author*, vol. 10, pp. 1–6, 2008.
- [46] S. E. Sherman, P. Krebs, L. S. York et al., “Telephone care coordination for tobacco cessation: randomised trials testing proactive versus reactive models,” *Tobacco Control*, vol. 27, no. 1, pp. 78–82, 2018.
- [47] E. Granado-Font, C. Ferré-Grau, C. Rey-Reñones et al., “Coping strategies and social support in a mobile phone chat app designed to support smoking cessation: qualitative analysis,” *JMIR mHealth uHealth*, vol. 6, no. 12, Article ID e11071, 2018.
- [48] L. G. Morrison, L. Yardley, J. Powell, and S. Michie, “What design features are used in effective e-health interventions? A review using techniques from critical interpretive synthesis,” *Telemedicine and e-Health*, vol. 18, no. 2, pp. 137–44, 2012.
- [49] S. A. Buckingham, A. James, K. Morrissey, L. Price, and J. Harrison, “Mobile health interventions to promote physical activity and reduce sedentary behaviour in the workplace: a systematic review,” *Digital Health*, vol. 5, pp. 1–50, 2019.
- [50] Y. Liu, R. Kornfield, B. R. Shaw, D. V. Shah, F. McTavish, and D. H. Gustafson, “Giving and receiving social support in online substance use disorder forums: how self-efficacy moderates effects on relapse,” *Patient Education and Counseling*, vol. 103, no. 6, pp. 1125–33, 2020.
- [51] S. Michie, N. Hyder, A. Walia, and R. West, “Development of a taxonomy of behaviour change techniques used in individual behavioural support for smoking cessation,” *Addictive Behaviors*, vol. 36, no. 4, pp. 315–9, 2011.
- [52] R. West, A. Walia, N. Hyder, L. Shahab, and S. Michie, “Behavior change techniques used by the English Stop Smoking Services and their associations with short-term quit outcomes,” *Nicotine & Tobacco Research*, vol. 13, pp. 1316–20, 2011.
- [53] F. H. McKay, C. Cheng, A. Wright, J. Shill, H. Stephens, and M. Uccellini, “Evaluating mobile phone applications for health behaviour change: a systematic review,” *Journal of Telemedicine and Telecare*, vol. 24, no. 1, pp. 22–30, 2018.
- [54] F. Naughton, “Delivering “just-in-time” smoking cessation support via mobile phones: current knowledge and future directions,” *Nicotine & Tobacco Research*, vol. 19, no. 3, pp. 379–83, 2017.
- [55] C. Cheek, T. Fleming, M. F. G. Lucassen et al., “Integrating health behavior theory and design elements in serious games,” *JMIR Mental Health*, vol. 2, p. e11, 2015.
- [56] E. A. Edwards, J. Lumsden, C. Rivas et al., “Gamification for health promotion: systematic review of behaviour change techniques in smartphone apps,” *BMJ Open*, vol. 6, no. 10, Article ID e012447, 2016.
- [57] T. M. Fleming, L. Bavin, K. Stasiak et al., “Serious games and gamification for mental health: current status and promising directions,” *Frontiers in Psychiatry*, vol. 7, p. 215, 2016.
- [58] D. Johnson, S. Deterding, K. Kuhn, A. Staneva, S. Stoyanov, and L. Hides, “Gamification for health and wellbeing: a systematic review of the literature,” *Internet Interventions*, vol. 6, pp. 89–106, 2016.
- [59] K. Glanz and D. B. Bishop, “The role of behavioral science theory in development and implementation of public health interventions,” *Annual Review of Public Health*, vol. 31, no. 1, pp. 399–418, 2010.
- [60] B. Cugelman, “Gamification: what it is and why it matters to digital health behavior change developers corresponding author,” *JMIR Serious Games*, vol. 1, pp. 1–6, 2013.
- [61] D. Crane, C. Garnett, J. Brown, R. West, and S. Michie, “Behavior change techniques in popular alcohol reduction apps: content analysis,” *Journal of Medical Internet Research*, vol. 17, no. 5, p. e118, 2015.
- [62] Agencia de Calidad Sanitaria de Andalucía, “Estrategias de Calidad y seguridad en aplicaciones móviles en salud,” 2012, <https://www.calidadappsalud.com/>.
- [63] Fundació Tic Salut Social, “Guia bàsica de recomanacions pel desenvolupament d’apps de salut i atenció social,” 2018, <https://ticsalutsocial.cat/recursos/mhealth/guia-basica-de-recomanacions-pel-desenvolupament-dapps-de-salut-i-atencio-social/>.
- [64] K. Regmi, N. Kassim, N. Ahmad, and N. A. Tuah, “Effectiveness of mobile apps for smoking cessation: A review,” *Tobacco Prevention & Cessation*, vol. 3, no. April, pp. 1–11, 2017.

- [65] J. Hartmann-boyce, L. F. Stead, K. Cahill, and T. Lancaster, "Efficacy of interventions to combat tobacco addiction: cochrane update of 2012 reviews," *Addiction*, vol. 108, no. 10, pp. 1711–21, 2013.
- [66] L. C. Abrams, J. Lee Westmaas, J. Bontemps-Jones, R. Ramani, and J. Mellerson, "A content analysis of popular smartphone apps for smoking cessation," *American Journal of Preventive Medicine*, vol. 45, no. 6, pp. 732–6, 2013.
- [67] D. Thomas, M. J. Abramson, B. Bonevski, and J. George, "System change interventions for smoking cessation," *Cochrane Database of Systematic Reviews*, vol. 2, no. 2, 2017.
- [68] B. L. Haskins, D. Lesperance, P. Gibbons, and E. D. Boudreaux, "A systematic review of smartphone applications for smoking cessation," *Translational Behavioral Medicine*, vol. 7, no. 2, pp. 292–9, 2017.
- [69] H. K. Ubhi, D. Kotz, S. Michie et al., "Comparative analysis of smoking cessation smartphone applications available in 2012 versus 2014," *Addictive Behaviors*, vol. 58, pp. 175–181, 2016.
- [70] P. García-Pazo, J. Fornés-Vives, A. Sesé, and F. J. Pérez-Pareja, "Apps for smoking cessation through cognitive behavioural therapy. A review," *Adicciones*, vol. 33, no. 4, pp. 359–68, 2021.
- [71] B. B. Hoepfner, S. S. Hoepfner, L. Seaboyer et al., "How Smart are smartphone apps for smoking cessation? A content analysis," *Nicotine and Tobacco Research*, vol. 18, no. 5, pp. 1025–31, 2016.
- [72] J. Lee, J. Dallery, A. Laracuenta et al., "A content analysis of free smoking cessation mobile applications in the USA," *Journal of Smoking Cessation*, vol. 14, no. 4, pp. 195–202, 2019.
- [73] J. J. Lin, L. Mamykina, S. Lindtner, G. Delajoux, and H. B. Strub, "Fish'n'Steps: encouraging physical activity with an interactive computer game," *Lecture Notes in Computer Science*, vol. 4206, pp. 261–78, 2006.
- [74] British Standards Institution, *Health and Wellness Apps - Quality Criteria across the Life Cycle - Code of Practice (PAS 277:2015)*, BSI, Keynes, UK, 2015.
- [75] J. Torous, G. Andersson, A. Bertagnoli et al., "Towards a consensus around standards for smartphone apps and digital mental health," *World Psychiatry*, vol. 18, no. 1, pp. 97–8, 2019.
- [76] R. Andújar-Espinosa, L. Salinero-González, M. Castilla-Martínez, C. Castillo-Quintanilla, R. Ibañez-Meléndez, and C. Hu-Yang, "Evaluación de aplicaciones para la deshabituación tabáquica con elementos de gamificación: elaboración y aplicación de un check-list = Evaluation of gamification apps in smoking cessation: development and application of a check-list," *Revista Española De Comunicación En Salud*, vol. 9, no. 2, pp. 152–62, 2018.
- [77] S. Stoyanov, L. Hides, D. J. Kavanagh, O. Zelenko, D. Tjondronegoro, and M. Mani, "Mobile app rating scale: a new tool for assessing the quality of health mobile apps," *JMIR mHealth uHealth*, vol. 3, no. 1, p. e27, 2015.
- [78] S. R. Stoyanov, M. Psych, L. Hides, D. J. Kavanagh, and H. Wilson, "Development and validation of the user version of the mobile application rating scale (uMARS) corresponding author: related article," *JMIR mHealth uHealth*, vol. 4, pp. 1–5, 2016.
- [79] I. Maramba, A. Chatterjee, and C. Newman, "Methods of usability testing in the development of eHealth applications: a scoping review," *International Journal of Medical Informatics*, vol. 126, pp. 95–104, 2019.
- [80] P. García-Pazo, A. Sesé, J. Llabrés, and J. Fornés-Vives, "NoFumo+: a clinical trial of an mHealth for smoking cessation with hospitalized patients," *International Journal of Environmental Research and Public Health*, vol. 18, no. 19, Article ID 10476, 2021.
- [81] A. H. Alsharif and N. Philip, "Cognitive behavioural therapy embedding smoking cessation program using smartphone Technologies," *En: 5th World Congress on Information and Communication Technologies, WICT 2015*, pp. 134–9, Olten, Switzerland, 2015.
- [82] J. L. Heffner, R. Vilardaga, L. D. Mercer, J. A. Kientz, and J. B. Bricker, "Feature-level analysis of a novel smartphone application for smoking cessation," *The American Journal of Drug and Alcohol Abuse*, vol. 41, no. 1, pp. 68–73, 2015.
- [83] Y. Lin, C. Tudor-Sfetea, S. Siddiqui, Y. Sherwani, M. Ahmed, and A. B. Eisingerich, "Effective behavioral changes through a digital mHealth app: exploring the impact of hedonic well-being, psychological empowerment and inspiration," *Journal of Medical Internet Research*, vol. 20, 2018.
- [84] J. B. Bricker, W. Copeland, K. E. Mull et al., "Single-arm trial of the second version of an acceptance and commitment therapy smartphone application for smoking cessation," *Drug and Alcohol Dependence*, vol. 170, pp. 37–42, 2017.
- [85] P. García-Pazo, J. Fornés-Vives, and A. Sesé Abad, "NoFumo+: mobile health app to quit smoking using cognitive-behavioral therapy," *JMIR Preprints*, vol. 11/11, Article ID 25681, 2020.
- [86] C. Lee, K. Lee, and D. Lee, "Mobile healthcare applications and gamification for sustained health maintenance," *Sustainability*, vol. 9, p. 772, 2017.
- [87] I. Ahmed, N. S. Ahmad, S. Ali et al., "Medication adherence apps: review and content analysis," *JMIR mHealth uHealth*, vol. 6, no. 3, p. e62, 2018.



## Research Article

# Optimizing Door-to-Balloon Time for Patients Undergoing Primary Percutaneous Coronary Intervention at King Abdullah Medical City

Ebtisam A. Elhihi <sup>1</sup>, Faisal A. Alasmari,<sup>1</sup> Omar K. Abdel Rahman,<sup>2</sup> Fahad T. Almoallad,<sup>3</sup> Reem A. Alsalmi,<sup>3</sup> Shuruq F. Alosaimi,<sup>3</sup> Faisal M. Alhazmi,<sup>3</sup> Marwan S. Hawsawei,<sup>4</sup> and Ziyad A. Alasmari<sup>5</sup>

<sup>1</sup>Nursing Research and Evidence-Based Practice Department, King Abdullah Medical City, Makkah, Saudi Arabia

<sup>2</sup>Cardiac Care Unit, King Abdullah Medical City, Makkah, Saudi Arabia

<sup>3</sup>Cath Lab, King Abdullah Medical City, Makkah, Saudi Arabia

<sup>4</sup>Nursing Administration, King Abdullah Medical City, Makkah, Saudi Arabia

<sup>5</sup>Day Care Department, King Abdullah Medical City, Makkah, Saudi Arabia

Correspondence should be addressed to Ebtisam A. Elhihi; [elhihi.e@kamc.med.sa](mailto:elhihi.e@kamc.med.sa)

Received 21 November 2023; Revised 28 April 2024; Accepted 14 August 2024

Academic Editor: Majed Alamri

Copyright © 2024 Ebtisam A. Elhihi et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Background.** The acute myocardial infarction mortality risk rises by 8% per year for every 30-minute delay in early coronary intervention following the onset of symptoms. Thus, it is important to reduce the door-to-balloon time as much as possible, especially in hospitals where early coronary intervention is carried out within 90 minutes. **Aim.** The purpose of this study was to determine the impact of King Abdullah Medical City's strategies on balloon time for patients with ST elevation myocardial infarction. **Methods.** Prospective observational research was conducted in King Abdullah Medical City. This study included 67 patients who had a primary percutaneous coronary intervention. Data were collected in Hajj 2023 through direct observation using a checklist that included two parts: (I) patients' demographic characteristics and relevant time intervals. The data were analyzed using descriptive statistics (frequency and percentage; median and interquartile range) and inferential statistics (Mann–Whitney *U* test, Kruskal–Wallis *H* test, Spearman correlation coefficient test). **Results.** It was noted that the median overall door-to-balloon time was 68 minutes for direct admission patients and 100 minutes (median) for interhospital transferred patients, with a statistically significant *P* value of 0.001. DTBT had no significant correlation with either the length of stay or hospital mortality rates (*P* > 0.05). **Conclusions.** King Abdullah Medical City accomplished an international benchmark in door-to-balloon time for ST elevation myocardial infarction patients visiting the hospital for percutaneous coronary intervention during the hajj season. Healthcare organizations can take proactive steps to optimize the management of STEMI cases. This includes establishing efficient communication channels, standardizing protocols, and facilitating seamless transitions between healthcare facilities.

## 1. Introduction

Primary percutaneous coronary intervention (PCI) is the gold standard treatment for acute myocardial infarction with ST-segment elevation. Regrettably, many patients diagnosed with acute myocardial infarction (AMI) are admitted to institutions that lack the resources to deliver prompt and

appropriate acute care, including early revascularization procedures. It is mentioned that these patients be transferred to facilities with the capability to perform percutaneous coronary intervention for subsequent therapy. The American Heart Association has popularized the term door-to-balloon (DTBT) to highlight the importance of prompt PCI management. The period between a patient's arrival at

a hospital and the time their balloon is inflated is recognized as door-to-balloon time. According to the guidelines, the objective DTBT is 90 minutes or less. First medical contact to device time of 120 minutes is recommended by both European and American ST Elevation Myocardial Infarction (STEMI) standards for the transfer STEMI population [1, 2].

The measurement of DTBT has emerged as a crucial metric in PCI in recent years and has been included in national guidelines as a fundamental performance indicator. Nevertheless, advancements in DTBT have not been accompanied by proportional declines in fatality rates [3]. As a surrogate for total ischemic time, some scholars have proposed symptom-to-balloon time (STB) as a more suitable metric for PCI performance [4]. In a previous study, it was demonstrated that an STB time exceeding 160 minutes is linked to a higher incidence of left ventricular dysfunction six weeks after primary percutaneous coronary intervention. Previous studies have indicated that prolonged ischemia is linked to elevated levels of oxidative stress, greater size of infarction, and heightened likelihood of unfavorable outcomes such as mortality [5].

Upon arrival at the emergency department, several strategies can facilitate the evaluation and management of STEMI situations. These include early ECG, rapid ECG interpretation, early actuation of catheterization lab, a swift activation response, and rapid reperfusion [6, 7]. During the hajj season, many pilgrims are exposed to acute coronary syndrome and transfer to King Abdullah Medical City (KAMC) for therapeutic interventions like percutaneous coronary intervention. Due to the high rate of admission, new strategies are implemented to provide high-quality care to patients with AMI as a new pathway of the patient admission, critical bed management group and chest pain unit during hajj. So, the aim of this study is to determine the impact of King Abdullah Medical City's strategies on door-to-balloon time in patients with STEMI.

## 2. Methods

**2.1. Study Design.** Prospective observational research using checklist for direct observation which included two parts, Part one: it included patients' demographic characteristics, Part two: relevant time intervals.

**2.2. Study, Setting, and Participants.** This study was conducted in King Abdullah Medical City which is one of Saudi Arabia's largest medical cities with 390 active beds capacity in Makkah. All patients undergoing PCI during hajj from 23/6/2023 to 7/7/2023 either direct admission or interhospital transfer were included. Patients who died before starting the procedure and patients whose transfer time surpassed an acceptable duration prevent them from timely reperfusion intervention were excluded. This study included a convenience sample of 67 patients. All patients provided oral consent.

**2.3. Data Collection.** After getting official permission from the KAMC, Holy Makkah IRB with the approval number 23-1092, the data were collected by the researchers through direct observation using checklist. Upon the patient's arrival, verbal agreement was sought from each patient for data collection and subsequent follow-up.

### 2.3.1. King Abdullah Medical City Hajj' Strategies

- (1) New patient admission pathway implemented. The Cath lab crew and medical coordinator were notified when the physician accepted the patient for PCI by hotline. The medical coordinator informed the admission office, health information management, and bed management coordinators. The admission office accessed patient files and the bed management coordinator booked a bed. The Cath lab team prepared the theater and assigned medical staff who was responsible for the patient. PCI was ready when the patient arrived at the hospital.
- (2) WhatsApp group named Critical bed management group for administrative purposes aimed to check availability of beds to book beds for patients before arrival to the hospital.
- (3) A new crucial section, the chest pain unit, opens during Hajj season. All patients entered chest pain unit directly. This unit had three cubic with 10 beds, 3 critically ill patients' beds with mechanical ventilators, backup intubation, and 2 crash cards. Three cardiologists, two echo technicians, one respiratory therapist, one patient care technician, and two porters were also assigned. The chest pain unit had a charge nurse and three cubic nurse groups. One of the three nurses in each group is the team leader and a senior critical care professional. All patients should have fast screen echo at chest pain unit to roll out mechanical issues.

**2.4. Instrument.** The checklist included two parts: Part one covered patients' demographics such gender, age, marital status, education, diagnosis, and comorbidities. Part 2: relevant times. This study examined the time from the initial door entry to the initiation of the electrocardiogram (ECG) procedure, the time between the ECG and the final diagnosis, the time from diagnosis to the second door entry, the time from the second door entry to the confirmation of the ECG results, the time between the ECG and the confirmed diagnosis, and the time from acute myocardial infarction confirmed diagnosis to the commencement of the catheterization laboratory (Cath lab) procedure, and the duration from the Cath lab procedure to the initiation of balloon angioplasty.

The difference in time between the time of ballooning and the time of patient arrival at the first hospital was defined as the door-to-balloon time. Length of stay was calculated

from the day of admission today of discharge. In hospital mortality was defined as the rate of death from any cause.

In the context of patients who present directly to KAMC, a facility equipped for Primary Percutaneous Coronary Intervention (PPCI), irrespective of whether their arrival is through self-presentation or via Emergency Medical Services, the parameter of DTBT was defined as the temporal interval from the moment of the patient's arrival at KAMC to balloon inflation time.

DTBT was defined as arrival time at the noncapable healthcare facility to balloon inflating time for patients who transferred from another facility. Medical professionals who transferred patients to KAMC provided the arrival time for PCI-incapable healthcare facilities and the first EEG time from ECG paper. The classification of DTBT was based on the following time intervals: first door to first ECG, AMI diagnosis to second door, ECG to AMI confirmed diagnosis, Cath lab arrival to balloon inflation, and AMI confirmed diagnosis to second door (PCI-capable hospital door). D1-D2 time was also calculated. Electronic health records provided hospital stay and death data. All data were tabulated in Excel.

**2.5. Data Analysis.** Data were analyzed through using Statistical Package for the Social Sciences (SPSS), version 26. The normality distribution was assessed using Kolmogorov–Smirnov test and the normality assumption was rejected ( $P < 0.05$ ). Therefore, categorical variables were presented as frequency and percentages and continuous variables were presented as medians with interquartile ranges (IQR). The Mann–Whitney  $U$  test was used to assess differences between two independent groups. Whereas Kruskal–Wallis  $H$  test was used to assess differences between more than two independent groups. The Spearman correlation coefficient test was employed to assess the strength and direction of associations between nonparametric variables. Statistical significance was set at  $P < 0.05$ .

### 3. Results

Table 1 shows demographic characteristics of the patients, it was observed that majority of patients were male, married, and aged more than 50 years old (91%, 98.5%, and 83.6%, respectively). 14.9% of patients were Saudi and 13.4 were Indian. Regarding body mass index, it was found that 88.1% of patients had normal body mass index. 76.1% of patients transfer from another healthcare facility and 25.4% of them transfer from Alnoor hospital.

Table 2 presents patients' health-relevant data, regarding past medical history it was noted that more than half of patients (52.2%) had hypertension, 47.8% of patients had diabetes and 14.9% of patients had history of angiography and PCI. It was noted that more than one third of patients (46.3%) had right coronary artery occlusion with inferior MI and 31.3% of patients had normal left ventricle ejection fraction. Moreover, 6% of patients had Cardiopulmonary resuscitation, 4.5% of them died.

TABLE 1: Demographic characteristics of the studied patients.

Characteristics	<i>N</i>	%
Age		
(i) 30–39	2	3.0
(ii) 40–49	9	13.4
(iii) >50	56	83.6
Gender		
(i) Male	61	91.0
(ii) Female	6	9.0
Nationality		
(i) Saudi	10	14.9
(ii) Pakistani	8	11.9
(iii) Indian	9	13.4
(iv) Turkish	8	11.9
(v) Indonesian	5	7.5
(vi) Egyptian	6	9.0
(vii) Others	21	31.3
Marital status		
(i) Married	66	98.5
(ii) Single	1	1.5
Body mass index		
(i) Normal	59	88.1
(ii) Overweight	3	4.5
(iii) Obese	5	7.5
Access to hospital		
Direct admission	16	23.9
Transfer	51	76.1
Name of referral hospital		
(i) Alnoor hospital	13	25.49
(ii) Hajj mission	12	23.52
(iii) King Abdulaziz hospital	5	9.80
(iv) Mina hospital	5	9.80
(v) Arafat hospital	3	5.88
(vi) King Faisal hospital	5	9.80
(vii) Others	8	15.68

Table 3 shows the parameters of DTBT for studied patients. It was noted that the median overall door-to-balloon time was 68 minutes for direct admission patients and 100 minutes for interhospital transferred patients with statistically significant,  $P = 0.001$ . The median time from diagnosis of AMI to Cath lab for direct admitted patients was 36.50 minutes and 60 minutes for transferred' patients with statistically significant,  $P = 0.001$ .

Figure 1 illustrates the comparison of DTBT with the standard time between direct admission and interhospital transfer. The median of DTBT for direct admitted' patients was found to be less than the standard time of DTBT for PCI-capable hospital (68 m to 90 m, respectively). For interhospital transfer patients median DTBT was 100 m compared with the 120 m for the standard time.

Table 4 presents the time spent from patients' diagnosis to balloon for interhospital transfer patients. It was noted that the median time from AMI diagnosis to second door (door of capable hospital) was 47 minutes and from arrival to capable hospital to balloon inflation was 28 minutes. The median time from D1 to D2 was 65 minutes and median time from D2 to balloon (patient arrival to KAMC to balloon) for interhospital transferred patients was 28 minutes

TABLE 2: Health profile of the studied patients.

Past history		
(i) Hypertension	35	52.2
(ii) Diabetes	32	47.8
(iii) Smoking	12	17.9
(iv) Dyslipidemia	8	11.9
(v) History of angiography	10	14.9
(vi) History of PCI	10	14.9
Procedural characteristics		
(1) Type of myocardial infraction		
(i) Anterior MI	28	41.8
(ii) Inferior MI	31	46.3
(iii) Posterior MI	6	9.0
(iv) Lateral MI	2	3.0
(2) Patients' blocked arteries		
(i) Right coronary artery	31	46.3
(ii) Left main coronary artery	1	1.5
(iii) Left anterior descending coronary artery	30	44.8
(iv) Left circumflex coronary artery	5	7.5
Left ventricle ejection fraction		
(i) Normal	21	31.3
(ii) Mild dysfunction	20	29.9
(iii) Moderate dysfunction	18	26.9
(iv) Severe dysfunction	8	11.9
In hospital clinical outcomes		
(i) Cardiogenic shock	3	4.5
(ii) Death	3	4.5
(iii) Cardiopulmonary resuscitation	4	6.0

TABLE 3: Comparison door-to-balloon time between direct admission and interhospital transfer for the studied patients.

	Direct admission N (16)		Interhospital transfer N (51)		Z
	Median	IQR	Median	IQR	
(1) Door-to-ECG time (m)	10.0	4.0	10.0	0.00	2.36**
(2) ECG to AMI diagnosis time (m)	4.5	7.0	6.0	15.0	1.36
(3) Diagnosis of AMI to cath lab time (m)	36.50	45.50	60.0	30.0	3.42**
(4) Cath lab to balloon time (m)	18.50	16.50	15.0	10.0	1.58
(5) Door-to-balloon time (m)	68.0	33.0	100.0	39.0	3.44**

Z: Mann-Whitney *U* test/\*\* significant at  $P < 0.05$ .

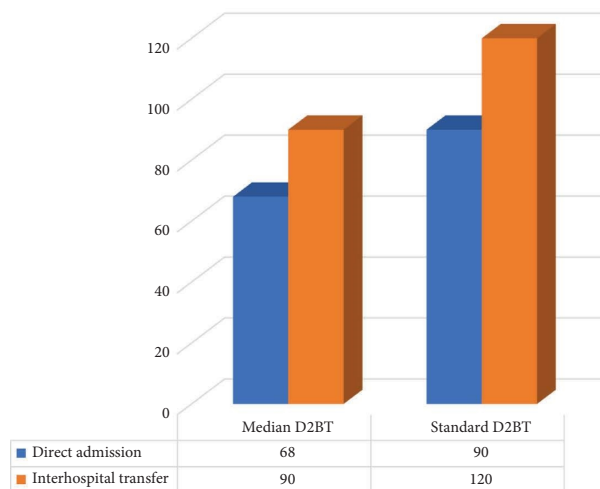


FIGURE 1: Comparison of DTBT with the standard time between direct admission and interhospital transfer.

TABLE 4: The time spent from patients' diagnosis to balloon for interhospital transfer patients.

	Median	IQR
(1) AMI diagnosis time to D2	47.00	35.00
(2) D1 to D2	65.00	40.00
(3) D2 to balloon	28.00	13.00

which is within the recommended guidelines for patients transfer time.

Table 5 reveals that DTBT had no significant correlation with either the length of stay or hospital mortality rates.

Table 6 presents that no statistically significant variations were found between demographic data of the studied patients and door-to-balloon time except name of hospitals ( $P < 0.05$ ).

#### 4. Discussion

This study aimed to determine the impact of King Abdullah Medical City's strategies on balloon time for patients with ST elevation myocardial infarction. All relevant clinical guidelines agree that PPCI is the most effective early therapy for patients experiencing a STEMI and that rapid PCI is the most effective early therapy for patients experiencing a high-risk or very high-risk non-ST-segment elevation myocardial infarction (NSTEMI). Patients presenting with STEMI or highly high-risk NSTEMI should be moved to a PCI-capable institution within 120 minutes, as recommended by current recommendations [2, 8, 9].

Our study found that the median DTBT for STEMI patients either direct admission or transfer was within the guidelines recommended time, this may be due to efficient coordination and communication between hospitals, sufficient resources, and staffing levels to handle interhospital transfers efficiently, dedicated transfer protocols implementation using aircraft and emergency medical services and availability of cardiac catheterization labs at KAMC. The findings of this study align with a previous investigation conducted in Saudi Arabia by Butt et al. at a tertiary care institution in Riyadh. This study's purpose was to outline various interventions, collect data for the designated study period, address the challenges associated with ensuring round-the-clock patient access to PCI, and evaluate quality indicators. This study concluded that for individuals presenting with STEMI in the emergency department, PCI is the preferred therapeutic approach. Furthermore, the King Faisal Specialist Hospital and Research Centre in Riyadh has successfully attained and sustained an international benchmark of DTBT within 90 minutes through effective multidisciplinary collaboration [10].

Interhospital transfer patients were observed to have a shorter admission to balloon time than direct admitted patients. This discrepancy may be attributed to the initial assessment conducted at the referring hospital, which aids in discerning whether the patient was diagnosed with STEMI prior to their subsequent transfer to PCI-capable medical center, patients were admitted directly to chest pain unit, available medical staff waiting patient' arrival, patient's medical file was prepared, and Cath lab teams are already at

the hospital, waiting for the patients instead of needing to come in from their homes. This result is in line with Hu et al. and Kawecki et al. who reported that the patients who were transported had a shorter DTBT than those who arrived directly at hospitals with PCI capabilities [11, 12].

The present study's findings reveal that the median DTBT for direct admitted' patients at KAMC were found to be less than the standard time and PCI was performed within 28 minutes from interhospital transfer patients' arrival to hospital door. This could be due KAMC strategies that focus on implementation of streamlined protocols, effective communication between healthcare providers, effective utilization of technology, optimal resource allocation, optimized patient flow, and prioritization of high-risk cases which result in a shorter DTBT. This result is supported by Ravi et al., Nathan et al., and Dhungel et al., who reported that the DTBT was well within the current American College of Cardiology and American Heart Association guideline recommendation [13, 14]. Bypassing unnecessary admission to the chest pain unit and directly transferring patients from the ambulance to the catheterization lab can be an effective approach to expedite reperfusion therapy.

The present study demonstrates that there is no statistically significant relationship between total door-to-balloon time and length of stay or total door-to-balloon time and in-hospital mortality. The observed phenomenon may be attributed to the constrained sample size, which has resulted in restricted statistical power to identify major disparities and developments in medical practices during the hajj season. This result is supported by Fan et al. [15] who reveal that there are no statistically significant differences between in-hospital mortality rate and D2B time. In contrast, Chew et al., Park et al., and Foo et al. found that delay in primary PCI could lead to increase in-hospital mortality [16, 17]. Moreover, Li et al. reported that patients with ST-elevation myocardial infarction had a strong association between hospital costs and length of stay [18, 19].

The findings of this study demonstrated that there were statistically significant differences between access to hospitals and the DTBT. This may be due to the proximity and accessibility of hospitals that play a crucial role in DTBT. Patients admitted directly to the hospital have shorter travel times that reduce the overall DTBT. On the other hand, patients transferring from remote areas or facing transportation challenges may experience delays in reaching the hospital, leading to longer door-to-balloon times.

The findings of the study have significant implications for clinical practice, highlighting the crucial role of effective coordination, streamlined procedures, and prompt access to institutions equipped for PCI in lowering DTBT and enhancing outcomes for patients with STEMI. Further investigation is needed to examine the factors that affect DTBT

TABLE 5: Relationship between door-to-balloon time and length of stay and hospital mortality.

Variables	Door-to-balloon time	
	<i>r</i>	<i>P</i>
Length of stay	0.09	0.42
Hospital mortality	0.10	0.39

TABLE 6: Relationship between the demographic data and door-to-balloon time.

Characteristics	Door-to-balloon time		Test of significance Chi-square/Z
	Median	IQR	
Age years			
(i) 30–39	144.00	51.00	0.55
(ii) 40–49	95.00	43.00	
(iii) >50	93.50	45.25	
Gender			
(i) Male	95.00	42.00	0.19
(ii) Female	92.00	72.25	
Nationality			
(i) Saudi	79.00	24.50	4.14
(ii) Pakistani	88.50	23.75	
(iii) Indian	81.00	44.00	
(iv) Turkish	84.00	94.00	
(v) Indonesian	106.00	163.00	
(vi) Egyptian	99.50	69.50	
(vii) Others	104.00	47.50	
Body mass index			
(i) Normal	92.00	36.00	1.95
(ii) Overweight	110.00	75.00	
(iii) Obese	120.00	122.50	
Type of myocardial infraction			
(i) Anterior MI	91.00	44.25	0.13
(ii) Inferior MI	99.00	41.00	
(iii) Posterior MI	92.50	86.00	
Patients' blocked arteries			
(i) Right coronary artery	100.00	32.00	4.73
(ii) Left anterior descending coronary artery	82.00	46.25	
(iii) Left circumflex coronary artery	84.00	34.00	
Name of hospitals			
(i) Alnoor hospital	110.00	103.50	16.08*
(ii) King Abdullah medical city	68.00	33.00	
(iii) Hajj mission	83.50	92.25	
(iv) King Abdulaziz hospital	104.00	19.00	
(v) Mina hospital	105.00	86.50	
(vi) Arafat hospital	100.00	56.00	
(vii) King Faisal hospital	101.00	40.50	
(viii) Others	85.00	24.50	

Chi-square: Kruskal–Wallis *H* test/*Z*: Mann–Whitney *U* test/\**P* < 0.05.

and patient outcomes to improve reperfusion techniques and enhance the quality of treatment for individuals with acute myocardial infarction. Furthermore, studies investigating the potential of new technology like artificial intelligence and telemedicine to enhance DTBT procedures may provide fresh ideas for improving the effectiveness and efficiency of treatment delivery.

**4.1. Limitations.** Despite the study limitations firstly as a single-center observational study with a limited sample size and heterogeneity within the study population due to

a significant influx of pilgrims from diverse geographic regions and backgrounds during hajj season, this study accurately reflects the clinical realities of PPCI procedures throughout the hajj season. The results of KAMC strategies are applicable to other regions. Secondly, the time of the patients' transfer from a noncapable hospital was not available (door out), so door in and door out time could not be evaluated. Thirdly, there may have been an inherent selection bias in the enrollment process, as the study exclusively encompassed patients possessing comprehensive information pertaining to DTBT, their arrival at a PCI-capable facility, and their subsequent participation in PCI.

## 5. Conclusions

The KAMC was able to accomplish a DTBT that set an international benchmark for STEMI patients who presented to the hospital for PCI during the hajj season, primarily through the implementation of strategic approaches to decrease DTBT. By implementing KAMC strategies, the processes of diagnosis, decision-making, and patient transfers will be executed in a synchronized and expeditious manner, resulting in improved patient care and less suffering. Further research into the effects of symptom onset, initial contact with a medical provider or balloon time on clinical outcome is also required.

## Data Availability

The data that were used and analyzed to support the findings of this study are available from the corresponding author on request.

## Conflicts of Interest

The authors declare that they have no conflicts of interest.

## References

- [1] P. T. O'gara, F. G. Kushner, D. D. Ascheim et al., "ACCF/AHA guideline for the management of ST-elevation myocardial infarction: a report of the American College of Cardiology foundation/American Heart association task force on practice guidelines," *Journal of the American College of Cardiology*, vol. 61, no. 4, pp. e78–e140, 2013.
- [2] R. A. Byrne, X. Rossello, J. J. Coughlan et al., "ESC Guidelines for the management of acute coronary syndromes: developed by the task force on the management of acute coronary syndromes of the European Society of Cardiology (ESC)," *European Heart Journal*, vol. 25, 2023.
- [3] D. S. Menees, E. D. Peterson, Y. Wang et al., "Door-to-balloon time and mortality among patients undergoing primary PCI," *New England Journal of Medicine*, vol. 369, no. 10, pp. 901–909, 2013.
- [4] J. A. Doll and M. T. Roe, "Time to treatment as a quality metric for acute STEMI care," *The Lancet*, vol. 385, no. 9973, pp. 1056–1057, 2015.
- [5] J. Lønborg, M. M. Schoos, H. Kelbæk et al., "Impact of system delay on infarct size, myocardial salvage index, and left ventricular function in patients with ST-segment elevation myocardial infarction," *American Heart Journal*, vol. 164, no. 4, pp. 538–546, 2012.
- [6] C. J. Coyne, N. Testa, S. Desai et al., "Improving door-to-balloon time by decreasing door-to-ECG time for walk-in STEMI patients," *Western Journal of Emergency Medicine*, vol. 16, no. 1, pp. 184–189, 2015.
- [7] R. O. Bonow, D. L. Mann, D. P. Zipes, and P. Libby, *Braunwald's Heart Disease E-Book: A Textbook of Cardiovascular Medicine*, Elsevier Health Sciences, New York, NY, USA, 2011.
- [8] J. Collet, H. Thiele, E. Barbato et al., "2020 ESC guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation," *European Heart Journal*, vol. 42, no. 14, pp. 1289–367, 2021.
- [9] B. Ibanez, S. James, S. Agewall et al., "ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation: the Task Force for the management of acute myocardial infarction in patients presenting with ST-segment elevation of the European Society of Cardiology (ESC)," *European Heart Journal*, vol. 39, no. 2, pp. 119–177, 2018.
- [10] T. S. Butt, E. Bashtawi, B. Bououn et al., "Door-to-balloon time in the treatment of ST segment elevation myocardial infarction in a tertiary care center in Saudi Arabia," *Annals of Saudi Medicine*, vol. 40, no. 4, pp. 281–289, 2020.
- [11] D. Hu, Y. Hao, J. Liu et al., "Inter-hospital transfer in patients with acute myocardial infarction in China: findings from the improving care for cardiovascular disease in China-acute coronary syndrome project," *Frontiers in Cardiovascular Medicine*, vol. 9, Article ID 1064690, 2022.
- [12] D. Kawecki, M. Gierlotka, B. Morawiec et al., "Direct admission versus interhospital transfer for primary percutaneous coronary intervention in ST-segment elevation myocardial infarction," *JACC: Cardiovascular Interventions*, vol. 10, no. 5, pp. 438–447, 2017.
- [13] V. Krishnan S, M. Ravi, S. V. Abraham, B. U. Palatty, and J. M. Balakrishnan, "Door to balloon time in patients presenting with acute ST elevation myocardial infarction and time factors influencing it; an observational study from a tertiary care teaching hospital in India," *Indian Heart Journal*, vol. 73, no. 3, pp. 359–361, 2021.
- [14] S. Dhungel, R. Malla, C. Adhikari et al., "Door-to-balloon time, and the determining factors in a tertiary cardiac center in Nepal," *Indian Heart Journal*, vol. 70, pp. S309–S312, 2018.
- [15] C. M. Fan, C. L. Lai, A. H. Li, K. P. Chung, and M. C. Yang, "Shorter door-to-balloon time in ST-elevation myocardial infarction saves insurance payments: a single hospital experience in Taiwan," *Acta Cardiologica Sinica*, vol. 31, no. 2, pp. 127–135, 2015.
- [16] N. W. Chew, C. H. Sia, H. L. Wee et al., "Impact of the COVID-19 pandemic on door-to-balloon time for primary percutaneous coronary intervention—results from the Singapore western STEMI Network," *Circulation Journal*, vol. 85, no. 2, pp. 139–149, 2021.
- [17] C. Y. Foo, K. O. Bonsu, B. K. Nallamothu et al., "Coronary intervention door-to-balloon time and outcomes in ST-elevation myocardial infarction: a meta-analysis," *Heart*, vol. 104, no. 16, pp. 1362–1369, 2018.
- [18] Q. W. Li, X. J. Liu, J. H. Li et al., "Applying WCACG modified process is beneficial on reduced door-to-balloon time of acute STEMI patients," *Biomedicine*, vol. 9, no. 2, p. 10, 2019.
- [19] J. Park, K. H. Choi, J. M. Lee et al., "Prognostic implications of door-to-balloon time and onset-to-door time on mortality in patients with ST-segment-elevation myocardial infarction treated with primary percutaneous coronary intervention," *Journal of the American Heart Association*, vol. 8, no. 9, Article ID e012188, 2019.

## Review Article

# Succession Planning and Leadership Development in Nursing: A Bibliometric Analysis (2000–2023)

**Azza K. Al Hajri** 

*Department of Learning and Performance System, The Pennsylvania State University, Pennsylvania, USA*

Correspondence should be addressed to Azza K. Al Hajri; [azzalhajri85@gmail.com](mailto:azzalhajri85@gmail.com)

Received 20 November 2023; Revised 14 May 2024; Accepted 31 July 2024

Academic Editor: Majed Alamri

Copyright © 2024 Azza K. Al Hajri. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Succession planning is a commonly employed term in business strategy, referring to the systematic process of transferring leadership responsibilities to another employee to ensure the seamless continuity of an organization's operations. Today, this concept has acquired importance in various industries, including healthcare, with a specific focus on nursing. Several factors led nurse managers to consider preparing potential leaders for primary leadership roles due to the shortage of nurses, significantly impacting healthcare services and patient safety. Because of the importance of this topic, this present bibliometric analysis aims to analyze research studies conducted on succession planning and leadership development in nursing from 2000 to 2023 to identify research trends, key themes, and the evolution of research during this period. The Elsevier Scopus database was utilized for this analysis. This methodology identified ( $n = 326$ ) journal studies based on the predefined keywords and timeframe. The data derived from this bibliometric analysis offers a robust foundation for conducting a systematic review, enabling a comprehensive synthesis and evaluation of the evidence in this significant field of study.

## 1. Introduction

Succession planning is a widely used term in the business strategy that aims to transfer leadership responsibilities to another employee to ensure the organization's smooth operation [1]. Today, this concept has acquired importance in various industries, including healthcare, with a specific focus on nursing. Several factors led nurse managers to consider preparing potential leaders for primary leadership roles due to the shortage of nurses, significantly impacting healthcare services and patient safety. According to the American Nursing Association [2], a nursing shortage occurs intermittently, caused by economic crises, waves of retiring nurses, and increased demand for healthcare services. This situation worsened between 2020 and 2021 with the emergence of the Coronavirus disease 2019 (COVID-19), when the world witnessed nurses leaving their jobs as a result of being in high-stress working environments, feeling professional burnout, or seeking positions with higher salaries, which had a substantial influence on global nursing practices and patient safety [3]. According to [4],

healthcare organizations waste \$8 million yearly due to leadership vacancies. The same study emphasizes equipping nurses with leadership competencies as crucial to reduce recruitment and orientation expenses. Hiring nurses for leadership creates a talent pipeline, enhances clinical patient outcomes, and improves healthcare quality standards [5].

## 2. Literature Review

Succession planning is critical to organization development [6]. According to Rothwell [7], succession planning is defined as “a deliberate and systematic effort by an organization to ensure leadership continuity in key positions, retain and develop intellectual and knowledge capital for the future, and encourage individual advancement” (p.29). Why is this concept significant? Rothwell [8] emphasizes that without succession planning “organizations will have difficulty maintaining leadership continuity—or identifying appropriate leaders when a change in business strategy is necessary” (p. 29). Different models and methods have been applied in the practice of succession planning in the business



sector [9, 10]. However, limited literature focuses on the implementation of succession planning within nursing.

*2.1. The Role of Nurse Manager.* Nurse managers are essential figures in healthcare, supervising nursing units within hospitals. Their responsibilities, as outlined in the literature, include ensuring quality patient care, strategic decision-making, and efficient resource management [11]. Acting as a crucial link between hospital executives and frontline nurses, they facilitate communication and alignment [12]. Effective nurse managers, as indicated by research, cultivate supportive environments, advocate for staff, and endeavor to reduce turnover rates [13, 14]. Their role is indispensable for delivering high-quality care and ensuring the success of healthcare organizations [5, 15].

*2.2. Key Factors Highlighting the Necessity of Implementing a Succession Planning.* Several key factors underline the need to implement a succession planning training program for nurses to prepare them for leadership roles. These factors include an aging workforce, nursing turnover, shortages, and more responsibilities and expectations placed on nurses [5]. These factors are a global challenge and require universal best practices to face them [15]. Numerous studies have found that turnover in nursing management significantly impacts patient safety and clinical outcomes due to the disruption it causes in the continuity of leadership and care [16, 17]. A worldwide longitudinal study identifying turnover rates across various industries found that the healthcare industry has the highest management turnover rate at 9.4%, followed by the telecommunications, energy, and information technology sectors [18].

In addition, the time and resources spent on recruiting and onboarding new nursing managers may divert attention from crucial patient-focused activities [18]. Despite nurse managers' essential role, research consistently reveals that healthcare organizations lack structured succession planning training programs [5]. As a result, they bear the heavy financial burden of recruiting new nursing leadership externally rather than developing internal talent [1].

According to Smeltzer [19], succession planning should be a broad focus where individuals are prepared for future roles, not replacing positions within organizations. Smeltzer [19] also emphasizes aligning employees' and managers' objectives with the organization's overall strategic planning to increase productivity, engagement, and commitment. This notion was also supported by Rothwell [8] as succession planning is more than knowing who will take the reins if the corporate jet crashes tomorrow. It is about growing your own talent to ensure your company's future over the long term. (p. 23)

*2.3. Strategies for Best Practice in Nurse Manager Succession Planning.* Studies have identified various strategies for ensuring the best practice of nursing succession planning. According to Trepanier and Crenshaw [5], organizations should maintain a "deep pool" of potential candidates who

are prepared to receive training and step into leadership positions when opportunities arise. Charan [20] asserts that no standard rule dictates internal candidates as the "best choice" and external candidates as the "second best;" the key is to select the most suitable individual for the specific position.

In contrast, Blouin and McDonagh [18] argue that external candidates have lower success rates than internally promoted employees. Organizations must regularly record employee qualities, skills, and career goals. Demand forecasting is one of the strategies that involves preparing employees for future management positions based on the organization's anticipation of the leadership skills needed to achieve its mission [21]. In addition, engaging in discussions with potential candidates about their career growth is a valuable strategy [22]. Implement a mentorship program as an effective practice for inspiring future leaders and involve new nurses in leadership roles [23]. However, some research indicates that mentorship plans can hinder succession planning because potential candidates who could be more competent may be perceived as a threat to their mentors [5]. Preparing future nurses for leadership roles can be achieved through peer-to-peer shadowing. In this method, middle-level nurses shadow their peers, encouraging shared reflection during their activities. This helps nurse middle managers develop a thoughtful approach, moving away from impulsive responses to immediate needs, avoiding ad hoc actions, and refraining from quick judgments [24].

*2.4. Bibliometric Analysis.* Despite the importance of succession planning and leadership development in nursing, there is a scarcity of a bibliometric analysis in the literature. A bibliometric analysis offers valuable insights into publication trends, key authors, and emerging research areas. Through a bibliometric analysis, researchers can identify gaps in the literature, map the intellectual structure of the field, and inform future research directions [25]. According to Ahmi [25], a bibliometric analysis is the process of analyzing metadata known as bibliographical data, such as author names, affiliations, countries, keywords, and document sources. This information is primarily stored in research database engines such as Scopus and Web of Science. It can serve as a foundation or introduction for researchers before conducting a specific study, providing insight into recent trends and publication patterns.

A bibliometric analysis is essential in shedding light on the landscape of scholarly research within a specific topic. It offers a comprehensive approach to assess the productivity and impact of research within a particular field by evaluating the volume of publications and their corresponding citations, thereby measuring the influence and significance of scholarly contributions [26]. Moreover, a bibliometric analysis assesses the performance of various metadata involved in research, including authors, institutions, countries, and funders. This aspect, known as "performance analysis," constitutes one of the primary components of the bibliometric analysis. In addition, the methodology uncovers

critical themes and topics prevalent in the literature, along with notable trends and gaps [25]. This dimension, “science mapping,” is another key component of the bibliometric analysis. Together, performance analysis and science mapping form the foundational elements of the bibliometric analysis, providing valuable insights into the scholarly landscape [27, 28].

The bibliometric analysis focuses on utilizing technology to gather data from sources such as Scopus and Web of Science. Tools such as bibliometrix in R and VOSviewer help organize and analyze these data quickly and accurately. This method makes handling complex information about publications, citations, keywords, and references easier, which would be complex and time-consuming to do manually. Bibliometrics also gives a clear overview of research trends, essential themes, and connections. It helps identify key insights, gaps in knowledge, and future research directions, giving a better understanding of the academic field [26].

**2.5. Significance of the Study.** There are various reasons for the significance of this study. Firstly, it represents the first recent bibliometric analysis conducted on nurse manager succession planning and leadership development, addressing a notable gap in the existing literature. Secondly, individuals interested in nursing succession planning and leadership development can utilize this study as a comprehensive reference to understand recent trends, identify essential papers, and recognize active authors in the field. Moreover, doctoral students focusing on nursing succession planning and leadership development can use the findings to identify potential supervisors and gain insights for their dissertations. In addition, researchers aiming to conduct systematic reviews on this topic can use this study as a foundational resource, laying the groundwork for further synthesis and evaluation of evidence. Furthermore, this study serves to identify gaps in the current literature, paving the way for future research endeavors and enhancing our understanding of nurse manager succession planning and leadership development. Lastly, researchers seeking international collaboration can find this study helpful for networking and establishing connections with colleagues worldwide.

**2.6. Research Aim and Questions.** This bibliometric analysis aims to analyze research on succession planning and leadership development in nursing from 2000 to 2023 to identify trends, key themes, and the evolution of research during this period. Performance and network analyses of succession planning in nursing were conducted to answer the following research questions:

- (1) What pattern of publications and document citations of the articles on succession planning and leadership development in nursing from 2000 to 2023?
- (2) What is the pattern of contribution of various countries to the publication of succession planning and leadership development in nursing?

- (3) What are the influential scholars and highly cited documents on the topic of succession planning and leadership development in nursing?
- (4) What are the major themes of knowledge that have been explored on the topic of succession planning and leadership development in nursing?
- (5) What are the most active journals that publish research on succession planning and leadership development in nursing?

### 3. Materials and Methods

**3.1. Search Strategy.** This study used the bibliometric analysis to evaluate the research on succession planning and leadership development in nursing. The bibliometric analysis is a quantitative examination of written publications that explores the historical development of scientific works to assess their impact [29–31]. It analyzes metadata including the “the source title, the year the article being published, publisher name, type of documents, the title of the article, author’s name, affiliations and country of the authors, abstract, keywords, and references” [32]. In addition, it helps to understand how a specific field evolves and what is new [27]. The search was conducted on April 22, 2024, utilizing the Elsevier Scopus database to retrieve publications relevant to the study’s topic. While significant bibliographic databases such as Web of Science and Dimensions exist, Elsevier Scopus was selected for its comprehensive coverage of the bibliometric analysis, especially within social science [33]. López-Illescas et al. [34] state that Scopus includes approximately 70% more sources than WoS. As a result, it is expected to yield more articles than Web of Science and Dimensions.

**3.2. Inclusion and Exclusion Criteria.** The inclusion criteria consist of articles meeting the following conditions: (a) publication between 2000 and 2023, (b) peer-reviewed status, and (c) focus on nurse manager succession planning and leadership development. These criteria are not overly restrictive to ensure a broader coverage of studies on this topic. Articles failing to meet these criteria were excluded. These measures were implemented to guarantee the credibility and relevance of the selected articles, aligning with the research objectives.

**3.3. Data Extraction and Cleaning.** The author commenced the search process on the Elsevier Scopus database by exploring article titles, abstracts, and keywords to ensure a comprehensive coverage of studies on nurse manager succession planning and leadership development. The initial keyword search included terms such as “talent development,” “succession management,” “talent acquisition,” “talent retention,” “talent engagement,” and “talent deployment,” combined with “leadership,” “management,” or “human resource management,” and “nurse,” “nurses,” or “nurse,” AND “healthcare” spanning articles published from 2000 to 2023, resulting in a total of 525 documents. Further

refinement of search criteria involved limiting the subject area to nursing and health professions, resulting in 593 documents in total. A thorough data cleaning review and selection process were conducted to assess the suitability of each article. This evaluation included examining content alignment with specific research objectives and ensuring the consistency and reliability of information by reviewing research titles and abstracts to confirm alignment with the research scope and adherence to inclusion criteria. A total of 267 studies were excluded for various reasons, including misalignment with the study's scope or belonging to document types such as editorials, retracted articles, letters, erratum, or reports. In addition, the search was confined to the subject areas of nursing and health professions to exclude studies from unrelated fields such as business, management, accounting, and environmental science. Ultimately, the search yielded a total of 326 documents included in this comprehensive bibliometric analysis. Figure 1 illustrates the search process flowchart, utilizing a bibliometric analysis searching process template adapted from Zakaria et al. [32].

**3.4. Data Analysis.** Following the data cleaning phase, the metadata extracted from the 326 studies underwent an analysis utilizing five main software tools, including Microsoft Excel, OpenRefine, R Studio, Biblioshiny, biblioMagika, and VOSviewer. Any missing data, such as author affiliations and full names, were manually completed. Furthermore, data standardization procedures were implemented; for instance, discrepancies in author names or Scopus IDs were rectified. In addition, author affiliations were verified and added to the Excel sheet manually. Country names were also standardized; for example, variations such as "United State," "United States," and "USA" were unified as "United States." Similarly, variations such as "UK" and "United Kingdom" were standardized. Once all data were cleaned and standardized, the analysis commenced using biblioMagika and Microsoft Excel, VOSviewer, and OpenRefine. The author employed OpenRefine to merge and cluster variations in authors' names, affiliations, and keywords for consistency and accuracy. Subsequently, VOSviewer was utilized to conduct network analysis, allowing for a comprehensive visualization and exploration of the relationships among the extracted data. biblioMagika was used to generate the information, tables, and overall analysis.

## 4. Results and Discussion

In this section, the results of the analyses, as described earlier, are presented in the order of the research questions. The presentation of the analyses includes graphs, tables, and the visualization of bibliometric networks using VOSviewer, accompanied by a discussion pertaining to each analysis and its corresponding results. Table 1 displays the basic information of the documents included in the analysis. Based on the analysis from the year 2000 to 2023, the number of documents found is ( $n=326$ ). The total number of

contributing authors in the area of succession planning and leadership development in nursing is 939. In addition, the number of cited papers is 299, whereas the total citations of the documents are 4,183.

### 4.1. Basic Information

**4.1.1. Document Profile.** Several document types were found among the 326 documents. The majority of the documents are *articles* ( $n=275$ ) with a percentile of 84.36%. Second is the review documents ( $n=34$ , = 10.43%). Then, *editorial* documents ( $n=11$ , = 3.37%) and with *short surveys* being the least frequent ( $n=6$ , = 1.84). Table 2 displays the total publications and their percentiles.

Table 3 summarizes the languages used in nurse manager succession planning and leadership development publications. Most publications, constituting 99.08%, are in English, indicating its dominance in this field of study. Portuguese and Spanish each contribute 1.23% of the publications, while Korean and French have the lowest representation, at 0.61% and 0.31%, respectively. It is important to note that the total count is 334, as some documents are translated into multiple languages, reflecting the international dissemination of research findings and accommodating diverse linguistic audiences. This distribution highlights the prevalence of English in research publications in this area, with comparatively fewer publications available in other languages.

**4.1.2. Research Trends and Pattern of Citations.** Table 4 provides insights into the evolution of research on nursing succession planning and leadership development from 2000 to 2023. A noticeable trend emerges with a consistent increase in the number of publications, indicating a growing interest in this specialized field of study. Despite fluctuations in publication numbers observed over the years, since 2008, there has been a clear upward trend. Concurrently, total citations demonstrate variability across different years since 2003, with a peak observed in 2014, reaching a substantial total of 322 citations. This peak highlights an increasing interest among authors in referencing papers about nursing succession planning and leadership development, indicative of the significance and relevance of research in this domain. Besides, various factors may have contributed to this increase in publications. One possible reason could be advancements in research methods, making it easier for researchers to conduct studies in this area. In addition, changes in healthcare policies or initiatives emphasizing the importance of leadership in nursing may have encouraged more research activities. Moreover, the growing recognition of leadership's significance in nursing and emerging challenges in the profession could have also motivated researchers' interest in exploring this topic further. These factors collectively suggest a varied landscape driving the rise in publications on nursing succession planning and leadership development. Figure 2 graphically represents the total number of publications and citations over the years from 2000 to 2023. Figure 2 visually displays the cumulative

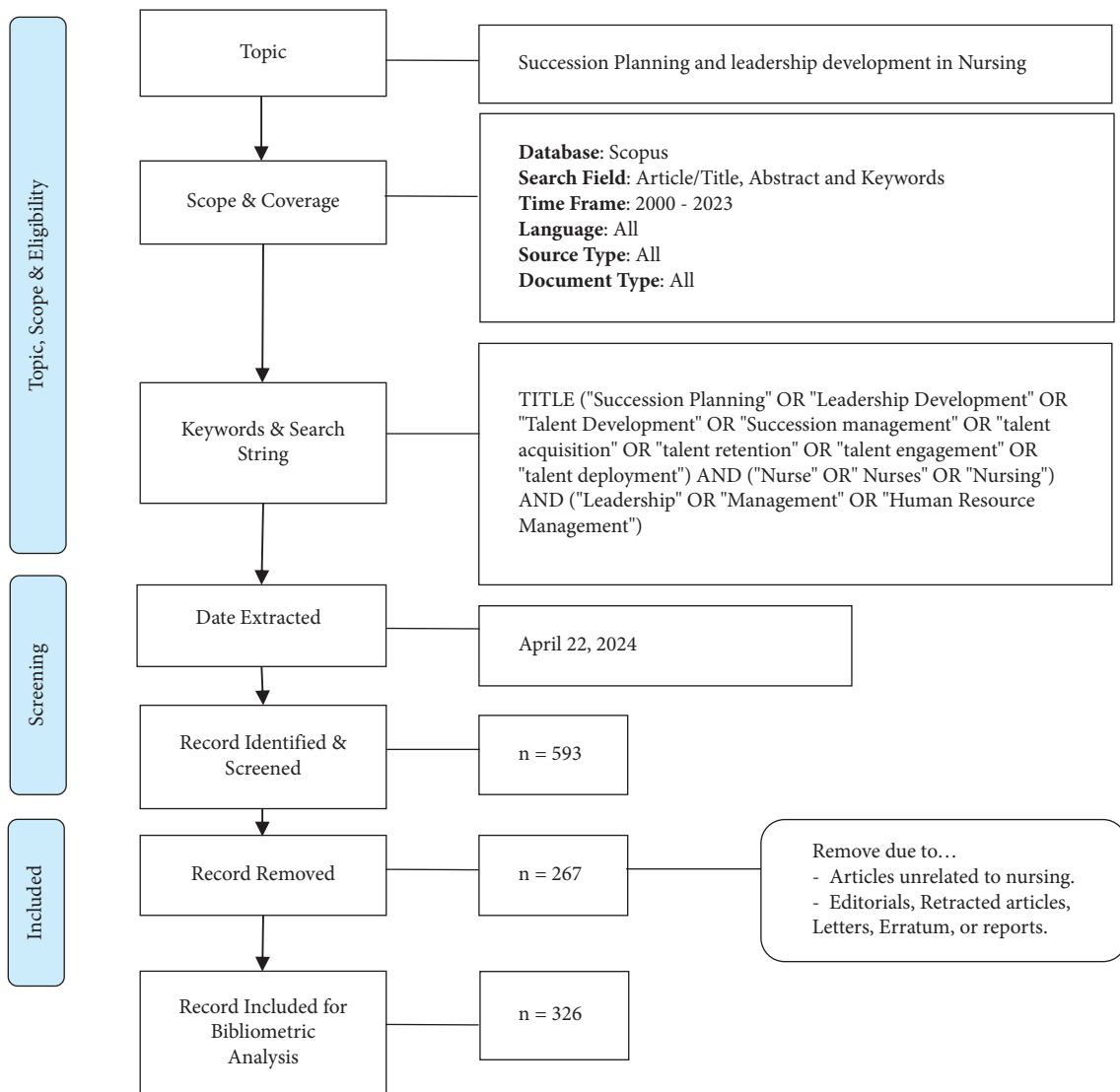


FIGURE 1: Flow diagram of the search strategy.

TABLE 1: Basic information of the documents included in the analysis.

Metrics	Data
Start year	2000
End year	2023
Total publications	326
Number of contributing authors	939
Number of cited papers	299
Total citations	4,183
<i>h</i> -index	34
<i>g</i> -index	48
<i>m</i> -index	1.36

number of publications and citations spanning the years 2000 to 2023. The bars on the chart represent the total publications, while the line illustrates the total citations.

TABLE 2: Document type.

Document type	TP	%
Article	275	84.36
Review	34	10.43
Editorial	11	3.37
Short survey	6	1.84

### 5. Country Contributions and Collaborations

The first part of the second research question attempts to examine patterns of contributions of various countries to the publication of most countries with high publications and citations on succession planning and leadership development in nursing. According to Ahmi [25], Scopus data on countries are mainly associated with the affiliation of the authors rather than the country where the research was

TABLE 3: Languages.

Languages	TP	%
English	323	99.08
Portuguese	4	1.23
Spanish	4	1.23
Korean	2	0.61
French	1	0.31
Total	334	

Note. Some documents in this dataset are translated into multiple languages, accounting for the total count of 334 publications across the languages listed in the table.

TABLE 4: Publication by year.

Year	TP	NCP	TC	<i>h</i>	<i>g</i>
2000	2	2	24	1	2
2001	5	5	41	3	5
2002	12	10	50	4	6
2003	7	6	114	5	7
2004	10	10	132	6	10
2005	4	4	62	3	4
2006	10	10	209	8	10
2007	5	5	225	5	5
2008	11	11	310	8	11
2009	10	10	212	8	10
2010	10	10	301	9	10
2011	14	13	306	9	14
2012	10	8	217	7	10
2013	19	16	286	11	16
2014	19	18	322	10	17
2015	25	23	255	11	15
2016	16	16	171	7	12
2017	10	10	58	4	7
2018	19	19	228	9	14
2019	28	27	264	8	15
2020	24	22	152	7	10
2021	26	22	185	6	13
2022	13	10	39	4	5
2023	17	12	20	2	3
Total	326				

Notes. TP = total number of publications; NCP = number of cited publications; TC = total citations; *h* = *h*-index; *g* = *g*-index.

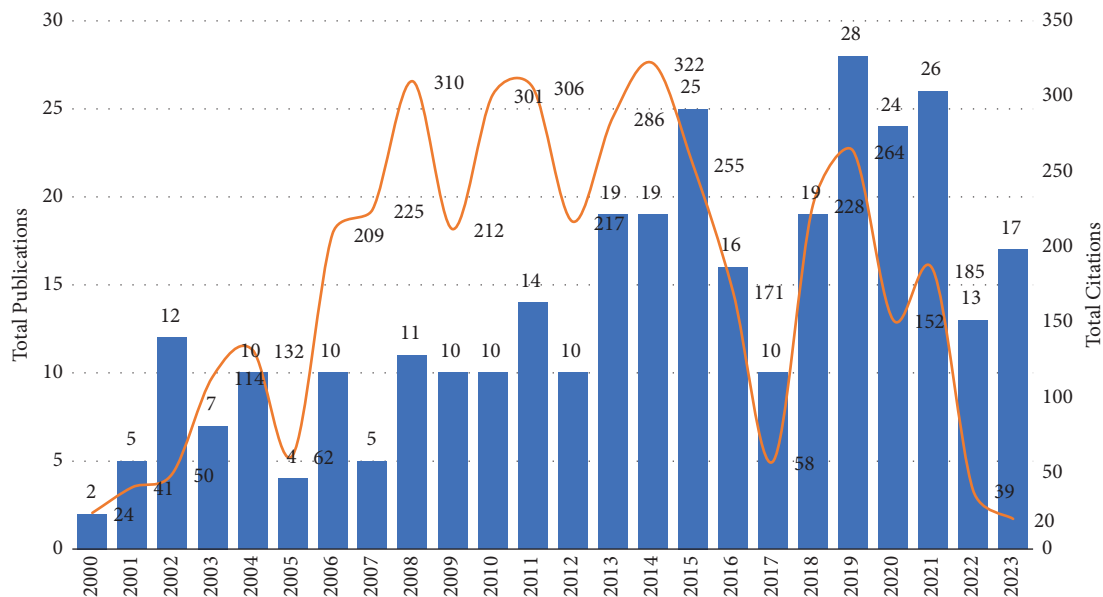


FIGURE 2: Total publication and citation per year. Note. Succession planning and leadership development in nursing publications per year from 2000 to 2023 ( $n = 326$ ).

conducted. In fact, identifying the original country of the research typically requires reading the full article, which falls more within the scope of systematic or narrative reviews rather than the bibliometric analysis [25]. The distribution of publications in Table 5 offers an understanding into the involvement of both developed and developing countries in research on succession planning and leadership development in nursing. Developed countries such as the United States, Australia, the United Kingdom, Canada, and the Netherlands are prominent contributors to the body of the literature in this field. For instance, the United States leads with 234 publications and 2717 citations, showcasing its dominance in scholarly output and impact. Similarly, Australia, with 27 publications and 412 citations, demonstrates significant engagement in advancing knowledge and practices related to nursing succession planning and leadership development. Conversely, developing countries such as Ireland, Brazil, Hong Kong, Jordan, and South Korea also make noteworthy contributions, albeit with fewer publications compared to their developed counterparts. For example, Ireland has 8 publications and 167 citations, indicating a growing interest and engagement in addressing issues related to nursing leadership and succession planning. Despite facing challenges, these countries highlight the global nature of this research topic and the importance of diverse perspectives in advancing the field. Figure 3 displays the global distribution map of publications on succession planning and leadership development in nursing, providing better visualization of the total publications in each country and continent.

**5.1. Productive Authors and Cocitation Networks.** To address the first part of the third research question, an authorship analysis was conducted using biblioMagika to provide valuable insights into the individuals who have made significant contributions to the field of nurse manager succession planning and leadership development in nursing. Table 6 presents the top 10 most active scholars in this area, highlighting their respective affiliations and countries. Michael R. Bleich from Duke University and Rose O. Sherman from Florida Atlantic University emerge as the most active authors, each with nine publications. Sherman's work has greatly impacted the field, as shown by the high number of citations (265). Similarly, Maria R. Shirey, Angela Brown, and Mary Casey each have four publications, but it is noteworthy that Shirey's articles have garnered considerable attention, with a total citation count of 152. Interestingly, the list includes authors from diverse geographical locations, such as the United States, Australia, Ireland, and the United Kingdom, reflecting the global nature of research on nurse manager succession planning. This diversity in authorship highlights the collaborative and interdisciplinary efforts driving advancements in this critical area of nursing practice and education.

The second part of the third research question is about the highly cited document. Table 7 presents the top 20 highly cited articles in nurse manager succession planning and leadership development. These articles have gained

TABLE 5: Distribution of the 10 top countries with higher publications.

No.	Country	TP	TC
1.	United States	234	2717
2.	Australia	27	412
3.	United Kingdom	22	145
4.	Canada	16	523
5.	Ireland	8	167
6.	Netherlands	5	109
7.	Brazil	4	16
8.	Hong Kong	3	22
9.	Jordan	3	25
10.	South Korea	3	13

Notes. TP = total number of publications; TC = total citations.

significant attention within the scholarly community, as evidenced by their high citation counts. One notable article is "Preparing Nurse Leaders for 2020" by Huston [35], which appears twice on the list and has a citation count of 182. Other influential articles include "The Essentials of Nursing Leadership: A Systematic Review of Factors and Educational Interventions Influencing Nursing Leadership" by Cummings et al. [36] with a citation count of 106 and "The Role of the Charge Nurse Manager: A Descriptive Exploratory Study" by McCallin and Frankson [37] with a citation count of 96. These articles offer comprehensive reviews and explorations of key factors and interventions impacting nursing leadership. In addition, several articles focus specifically on leadership competencies and development within nursing practice, such as "An Integrative Review of Leadership Competencies and Attributes in Advanced Nursing Practice" by Heinen et al. [38] and "An Empowerment Framework for Nursing Leadership Development: Supporting Evidence" by Macphee et al. [39]. These articles provide knowledge of the skills and attributes required for effective leadership in nursing. It is important to mention that the "Journal of Nursing Management" and the "Journal of Nursing Administration" are the top sources for most of these articles, indicating that researchers may prioritize these journals when seeking papers on nurse manager succession planning and leadership before considering other journals. However, it is important to recognize that this conclusion is drawn from the data presented in this analysis and may vary depending on researcher interests and preferences.

**5.2. Themes of Knowledge/Keywords Analysis.** The fourth research question aims to explore into the most commonly utilized key concepts, specifically the authors' keywords, within the study of succession planning and leadership development in nursing. Identifying commonly studied concepts provide a different perspective on the conceptual structure of knowledge based within a respective boundary of data [53]. Before analyzing author keywords, all the keywords were cleaned and harmonized using OpenRefine software and manually double-checked. This step is crucial for ensuring consistency, accuracy, and standardization across the dataset, thus facilitating a more reliable and meaningful analysis of keyword trends and patterns. The

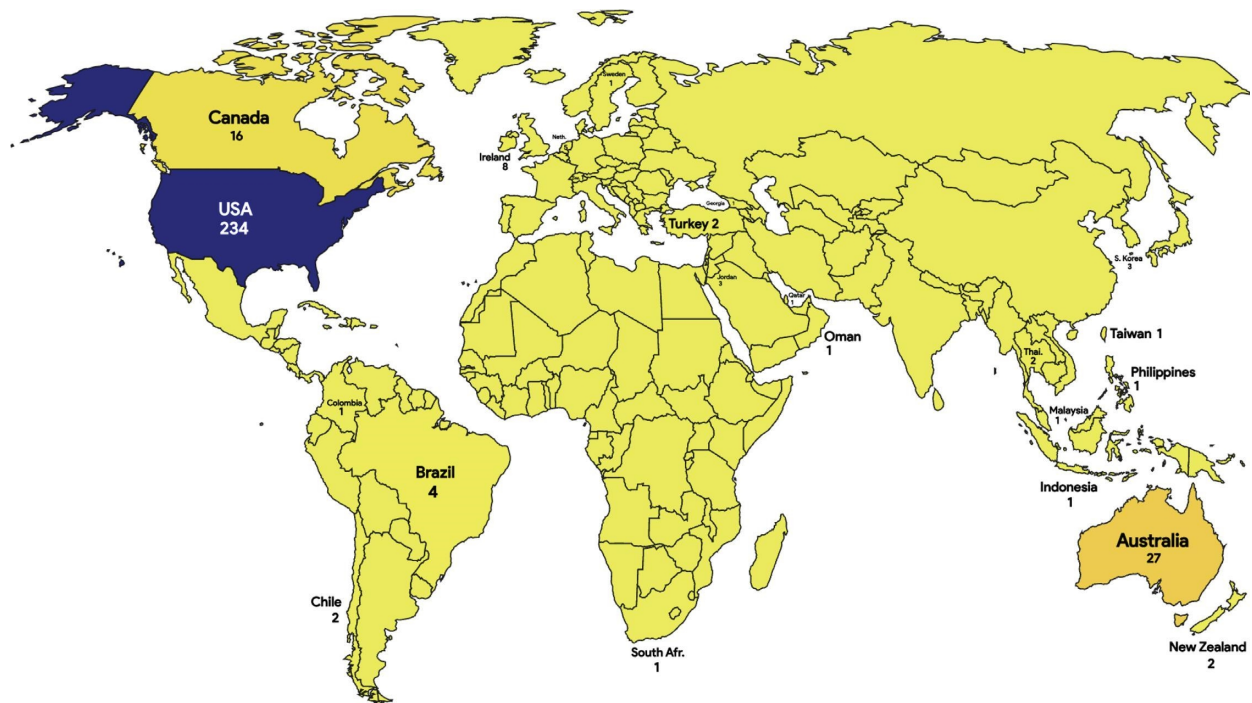


FIGURE 3: Global distribution of publications on succession planning and leadership development in nursing. *Note.* The map generated using <https://iipmaps.com/map/world>.

TABLE 6: Top 10 of the most contributed scholars on nurse manager succession planning and leadership development in nursing.

Author's name	Affiliation	Country	TP	TC
Bleich, Michael R.	Duke University	USA	9	18
Sherman, Rose O.	Florida Atlantic University	USA	9	265
Shirey, Maria R.	Shirey and Associates	USA	4	152
Brown, Angela	University of Wollongong	Australia	4	31
Casey, Mary	University College Dublin	Ireland	4	88
Dewing, Jan	Queen Margaret University	UK	4	31
Young, Patricia K.	Minnesota State University	USA	4	41
Crookes, Patrick	Medicine and Health University	Australia	4	31
Campbell, Jacquelyn	Johns Hopkins University	USA	3	23
Adams, Jeffrey M.	Arizona State University	USA	3	16

process involves harmonizing synonyms, various spellings, and plurals [25]. Then, the comma-separated value file was exported to VOSviewer to start with the author keyword analysis. The type of analysis performed is co-occurrence, with the unit of analysis being *author keywords* and utilizing the counting method of *full counting*. As per the VOSviewer manual (2021), full counting assigns equal strength to each connection, while fractional counting adjusts the strength based on the number of authors involved in a document. The threshold for the minimum number of occurrences of a keyword is three out of the 1060 keywords, with 330 keywords meeting this threshold. These selected keywords, amounting to 330, are displayed in Figure 4.

As illustrated in Figure 4, the analysis of keyword co-occurrence using VOSviewer identified a total of 11 clusters based on themes. However, only the top five clusters have been selected for further discussion. The most relevant keywords within these clusters are (a) leadership in the red

cluster, (b) nursing education in the green cluster, (c) staff development in the blue cluster, (d) mentoring in the gold cluster, and (e) organization innovation in the purple cluster.

First, in the red cluster, which includes keywords such as leadership, academic nursing leadership, administrative personnel, awareness, career, consultation, continuing education, curriculum, education program, future of nursing, interpersonal communication, job performance, job satisfaction, motivation, practice guidelines, team building, teamwork, thinking, training, trust, and work environment, it is notable that these keywords were included in research studies that focus on the importance of leadership and professional development initiatives in advancing the nursing profession and improving patient care outcomes. Based on these keywords, a prominent theme that emerges is Leadership and Professional Development in Nursing. It suggests a focus on enhancing leadership skills, promoting

TABLE 7: Top 20 highly cited articles.

No.	Authors	Title	Source title	T/C
1	Huston [35]	Preparing Nurse Leaders for 2020	Journal of Nursing Management	182
2	Cummings et al. [36]	The Essentials of Nursing Leadership: A Systematic Review of Factors and Educational Interventions Influencing Nursing Leadership	International Journal of Nursing Studies	106
3	Mccallin and Frankson [37]	The Role of the Charge Nurse Manager: A Descriptive Exploratory Study	Journal of Nursing Management	96
4	Heinen et al. [38]	An Integrative Review of Leadership Competencies and Attributes in Advanced Nursing Practice	Journal of Advanced Nursing	91
5	Macphee et al. [39]	An Empowerment Framework for Nursing Leadership Development: Supporting Evidence	Journal of Advanced Nursing	82
6	Sherman and Pross [1]	Growing Future Nurse Leaders to Build and Sustain Healthy Work Environments at the Unit Level	Online Journal of Issues in Nursing	82
7	Titzer et al. [40]	A Nurse Manager Succession Planning Model with Associated Empirical Outcomes	Journal of Nursing Administration	73
8	Redman [41]	Leadership Succession Planning: An Evidence-Based Approach for Managing the Future	Journal of Nursing Administration	59
9	Krugman and Smith [42]	Charge Nurse Leadership Development and Evaluation	Journal of Nursing Administration	59
10	Fennimore and Wolf [43]	Nurse Manager Leadership Development: Leveraging the Evidence and System-Level Support	Journal of Nursing Administration	56
11	Duygulu and Kublay [44]	Transformational Leadership Training Programme for Charge Nurses	Journal of Advanced Nursing	54
12	Stanley and Stanley [45]	Clinical Leadership and Nursing Explored: A Literature Search	Journal of Clinical Nursing	54
13	O'Neil et al. [46]	Developing Nursing Leaders: An Overview of Trends and Programs	Journal of Nursing Administration	52
14	Miles and Scott [47]	A New Leadership Development Model for Nursing Education	Journal of Professional Nursing	52
15	Dyess et al. [48]	Growing Nurse Leaders: Their Perspectives on Nursing Leadership and Today's Practice Environment	Online Journal of Issues in Nursing	51
16	Titzer et al. [49]	Nurse Manager Succession Planning: Synthesis of the Evidence	Journal of Nursing Management	50
17	Harvath et al. [50]	Enhancing Nursing Leadership in Long-Term Care: A Review of the Literature.	Research in Gerontological Nursing	49
18	Gifford et al. [51]	Managerial Leadership for Nurses' Use of Research Evidence: An Integrative Review of the Literature	Worldviews on Evidence-Based Nursing	47
19	Curtis et al. [52]	Developing Leadership in Nursing: The Impact of Education and Training	British Journal of Nursing	45
20	Griffith [15]	Effective Succession Planning in Nursing: A Review of the Literature	Journal of Nursing Management	44



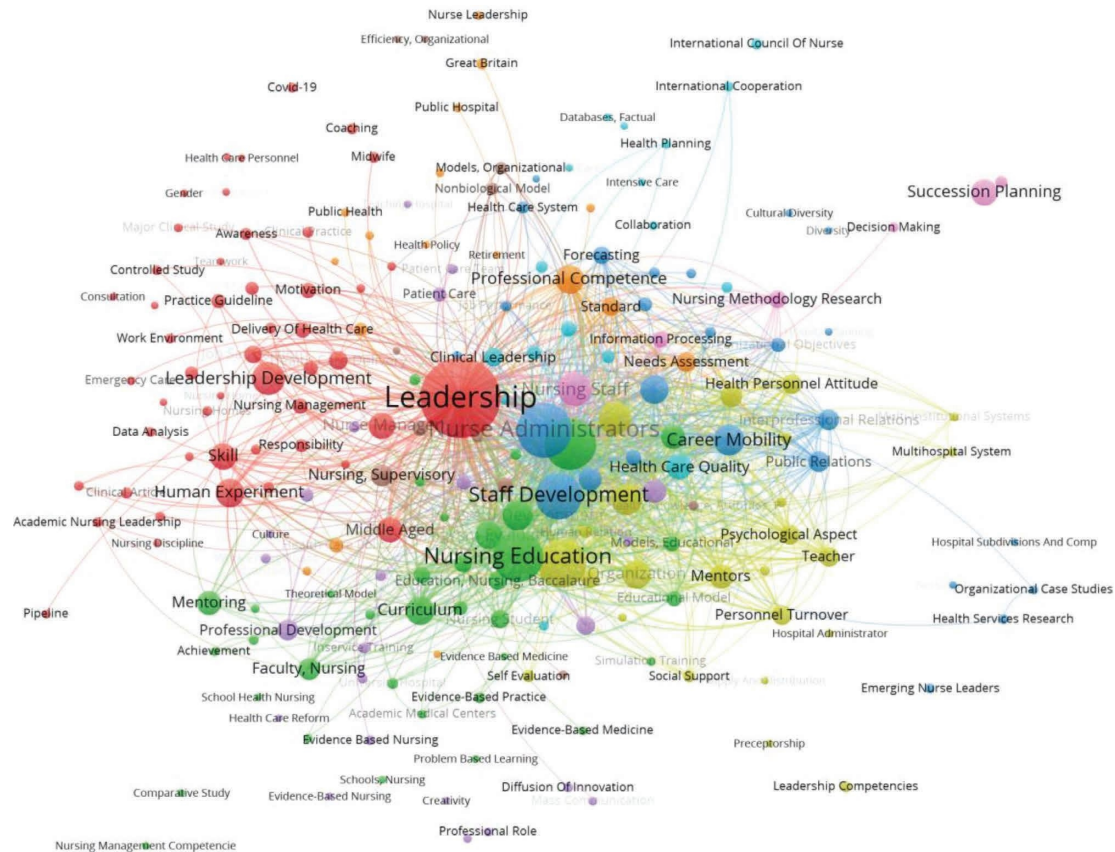


FIGURE 4: Co-occurrence network analysis of the most frequently used author keywords.

career growth, fostering effective communication and teamwork, and ensuring job satisfaction and performance among nursing professionals.

Second, the keywords grouped in the green cluster cover various important aspects of nursing. They include topics such as nursing education, clinical skills, the role of nursing teachers, improving healthcare quality, the challenges faced by middle-aged nurses, conducting nursing research, coaching methods, collaboration between healthcare workers, dealing with the effects of COVID-19, and managing finances in healthcare. The keywords in this cluster directly reflect what researchers have focused on in their studies. Based on the keywords used in this cluster, a prominent theme that emerges is the comprehensive exploration of nursing education and competency development. Researchers could explore into various aspects such as innovative teaching methods in nursing education, strategies to enhance clinical skills among nurses, initiatives to improve healthcare quality, and coping mechanisms for challenges such as the COVID-19 pandemic and resource limitations. This theme highlights the importance of continuous learning, skill-building, collaboration, and adaptation to new challenges in the nursing profession.

In the blue cluster, keywords such as staff development, professional competency, personnel selection, personnel turnover, nurse's role, nurse attitude, mentors, career, and mobility indicate a thematic focus on the development of healthcare personnel, particularly nurses. This cluster

reflects an exploration of strategies and initiatives aimed at enhancing the skills, competencies, and career advancement opportunities for nursing professionals. Researchers studied various aspects, including staff training and development programs, methods to improve professional competence, approaches to personnel selection and retention, understanding the roles and attitudes of nurses in different healthcare settings, the impact of mentorship on career growth, and factors influencing career mobility within the nursing profession. This cluster highlights the importance of investing in the professional development and well-being of nurses to improve patient care outcomes and promote job satisfaction and retention in the healthcare workforce.

Then, in the gold cluster, keywords such as mentoring, nursing education research, nursing leadership, program evaluation, succession planning, capacity building, empowerment, nurse executive, outcome assessment, and strategic planning converge to indicate a thematic focus on leadership development and capacity building within the nursing profession. This cluster reflects an exploration of various topics, including the role of mentoring in supporting professional growth, research on effective nursing education strategies, leadership development initiatives, evaluation of educational programs, succession planning within nursing leadership, building organizational capacity, promoting empowerment among nursing staff, assessing outcomes of nursing interventions, and strategic planning to address future challenges in healthcare delivery. This cluster

TABLE 8: Top 10 of the most active source titles.

Source title	TP	TC	Publisher
Journal of Nursing Administration	41	888	Wolters Kluwer Health
Journal of Nursing Management	29	683	Hindawi
Nurse Leader	25	138	Elsevier
Nursing Administration Quarterly	25	266	Wolters Kluwer Health
Journal of Continuing Education in Nursing	20	138	Slack, Inc.
Journal of Professional Nursing	12	180	Elsevier
Nursing Management	11	47	Wolters Kluwer Health
Nursing Outlook	10	61	Elsevier
Seminars for Nurse Managers	9	24	Elsevier
Journal of Advanced Nursing	7	278	Wiley-Blackwell

highlights the importance of nurturing leadership capabilities, fostering continuous learning and development, and strategically planning for the future to enhance the effectiveness and resilience of nursing practice and education.

Last, in the purple cluster, keywords such as organization innovation, clinical leadership, healthcare policy, in-service training, work engagement, and workload signify a thematic focus on organizational dynamics and innovation within healthcare settings. This cluster reflects an exploration of various topics, including innovative practices in healthcare organizations, effective clinical leadership strategies, the impact of healthcare policies on practice, in-service training programs for healthcare professionals, factors influencing work engagement among staff, and workload management strategies. Researchers have contributed to understand how organizational innovation, leadership practices, policy frameworks, and training programs influence work dynamics, employee engagement, and the delivery of quality care in healthcare settings. In addition, they have emphasized the importance of fostering innovation, effective leadership, and supportive work environments to enhance healthcare delivery and outcomes.

*5.3. The Most Active Journals Publish Research.* To answer the fifth research question, Table 8 presents the top 10 most active source titles for publications on nurse manager succession planning and leadership development. These source titles represent journals that have contributed significantly to the dissemination of research in this field. The top source title is the “Journal of Nursing Administration,” with 41 publications and 888 total citations. This journal, published by Wolters Kluwer Health, emerges as a key platform for scholarly discourse on nurse manager succession planning and leadership development. Following closely behind is the “Journal of Nursing Management” from Hindawi, with 29 publications and 683 total citations. This journal also serves as an important source for research in this area. Other notable source titles include “Nurse Leader” from Elsevier, “Nursing Administration Quarterly” from Wolters Kluwer Health, and the “Journal of Continuing Education in Nursing” from Slack, Inc. These publications have made significant contributions to advancing knowledge and practices related to nurse manager succession planning and leadership development.

## 6. Implication

The implications of this research are significant for both the academic and healthcare communities. The increasing interest in nurse manager succession planning and leadership development, as evidenced by the increase in publications over year, highlights the importance of addressing the impending shortage of nurse managers and cultivating essential leadership competencies. Healthcare institutions are tasked with the responsibility of proactively preparing nurses for management roles and ensuring a robust pipeline of qualified candidates. Succession planning and leadership development are strategic approaches to address this challenge.

Furthermore, international collaboration among countries contributing to this body of knowledge is a promising sign of shared expertise and potential for cross-cultural learning. However, more efforts are required by researchers in the Middle East region, as there are fewer studies published in nurse manager succession planning and leadership development compared to developed countries. Recognizing leading scholars in the field of nurse manager succession planning and leadership development helps to provide a foundation for future research collaboration. This information is also helpful to refer back to the publications of the authors to build upon existing knowledge and exploring the possibility of joint collaboration on future research studies. In addition, identifying key concepts used by authors in publishing research studies on nurse manager succession planning and leadership development, such as leadership development and clinical leadership, mentoring, and organizational innovation, researchers can uncover trends, gaps, and emerging areas of focus within the field.

## 7. Limitations

The bibliometric analysis typically focuses on the published literature indexed in specific databases, for example, Scopus, which may overlook relevant studies published in non-indexed or non-English language journals. Furthermore, the analysis may be subject to biases inherent in the selection and interpretation of data, such as keyword selection criteria or citation practices. Finally, while the bibliometric analysis can reveal trends and patterns over time, it may not capture the nuanced contextual factors that influence research trends

or the practical implications of the findings. Despite these limitations, the study offers valuable future research and collaboration directions.

## 8. Conclusion and Future Direction

In conclusion, this bibliometric study sheds light on the publications of nurse manager succession planning and leadership development published from 2000 to 2023. The analysis highlights the diverse contributions of various countries to the literature on nurse manager succession planning and leadership development. While Western countries, notably the United States, have played a significant role, the emergence of contributions from smaller regions is encouraging. This contribution highlights the potential for collaborative research efforts to deepen our understanding and assess the healthcare system for the best model in nursing succession planning.

Moving forward, this research is a valuable resource for scholars, policymakers, and practitioners, providing a solid foundation for conducting systematic reviews to further synthesize and evaluate evidence in this important field. In addition, future research directions could include exploring the effectiveness of different succession planning strategies, examining the impact of leadership development programs on patient outcomes, and investigating the role of technology in enhancing leadership capabilities in nursing. These suggestions will contribute to advancing knowledge and informing practice in nurse manager succession planning and leadership development.

## Conflicts of Interest

The authors declare that they have no conflicts of interest.

## Acknowledgments

The authors acknowledge financial support from the Pennsylvania State University. Open access funding was enabled and organized by BTAA 2023.

## References

- [1] R. Sherman and E. Pross, "Growing future nurse leaders to build and sustain healthy work environments at the unit level," *Online Journal of Nursing*, vol. 15, no. 1, p. 135, 2010, <http://nursingworld.org/OJIN>.
- [2] American Nursing Association, "Nurses in the workforce," 2022, <https://www.nursingworld.org/practice-policy/workforce/>.
- [3] L. Heather, "Third of nurses plan to leave their jobs in 2022," 2022, <https://www.fiercehealthcare.com/providers/third-nurses-plan-leave-their-jobs-2022-survey-finds>.
- [4] D. H. Warden, R. G. Hughes, J. Probst, J. C. Warden, and S. A. Adams, "Current turnover intention among nurse managers, directors, and executives," *Nursing Outlook*, vol. 69, no. (5), pp. 875–885, 2021.
- [5] S. Trepanier and J. T. Crenshaw, "Succession planning: a call to action for nurse executives," *Journal of Nursing Management*, vol. 21, no. 7, pp. 980–985, 2013.
- [6] S. Brunero, S. Kerr, and G. Jastrzab, "The development and evaluation of a succession planning programme in nursing, in Australia," *Journal of Nursing Management*, vol. 17, no. 5, pp. 576–583, 2009.
- [7] W. Rothwell, "Effective succession planning: ensuring leadership continuity and building talent from within," 2015, <https://ebookcentral.proquest.com/lib/pensu/detail.action?docID=4002869>.
- [8] W. J. Rothwell, "Putting success into your succession planning," *Journal of Business Strategy*, vol. 23, no. 3, pp. 32–37, 2002.
- [9] M. Beyers, "Nurse executives' perspectives on succession planning," *The Journal of Nursing Administration*, vol. 36, no. 6, pp. 304–312, 2006.
- [10] K. A. Goudreau and J. Hardy, "Succession planning and individual development," *The Journal of Nursing Administration*, vol. 36, no. 6, pp. 313–318, 2006.
- [11] T. Phillips, J. L. Evans, S. Tooley, and M. R. Shirey, "Nurse manager succession planning: a cost-benefit analysis," *Journal of Nursing Management*, vol. 26, no. 2, pp. 238–243, 2018.
- [12] M. K. Anthony, T. S. Standing, J. Glick et al., "Leadership and nurse retention: the pivotal role of nurse managers," *The Journal of Nursing Administration*, vol. 35, no. 3, pp. 146–155, 2005.
- [13] C. Duffield, M. Roche, N. Blay, and H. Stasa, "Nursing unit managers, staff retention and the work environment," *Journal of Clinical Nursing*, vol. 20, no. 1-2, pp. 23–33, 2011.
- [14] D. M. Sikora, G. R. Ferris, and C. H. Van Iddekinge, "Line manager implementation perceptions as a mediator of relations between high performance work practices and employee outcomes," *Journal of Applied Psychology*, vol. 100, no. 6, pp. 1908–1918, 2015.
- [15] M. B. Griffith, "Effective succession planning in nursing: a review of the literature: effective succession planning in nursing," *Journal of Nursing Management*, vol. 20, no. 7, pp. 900–911, 2012.
- [16] N. Warshawsky, M. K. Rayens, K. Stefaniak, and R. Rahman, "The effect of nurse manager turnover on patient fall and pressure ulcer rates," *Journal of Nursing Management*, vol. 21, no. 5, pp. 725–732, 2013.
- [17] C. A. Wong, G. G. Cummings, and L. Ducharme, "The relationship between nursing leadership and patient outcomes: a systematic review update," *Journal of Nursing Management*, vol. 21, no. 5, pp. 709–724, 2013.
- [18] A. S. Blouin, K. J. McDonagh, A. M. Neistadt, and B. Helfand, "Leading tomorrow's healthcare organizations: strategies and tactics for effective succession planning," *The Journal of Nursing Administration*, vol. 36, no. 6, pp. 325–330, 2006.
- [19] C. H. Smeltzer, "Succession planning," *The Journal of Nursing Administration*, vol. 32, no. 12, p. 615, 2002.
- [20] R. Charan, "Ending the CEO succession crisis," *Harvard Business Review*, vol. 83, no. 2, pp. 72–147, 2005.
- [21] J. A. Conger and R. M. Fulmer, "Developing your leadership pipeline," *Harvard Business Review*, vol. 81, no. 12, pp. 76–125, 2003.
- [22] E. Cadmus, "Succession planning: multilevel organizational strategies for the new workforce," *The Journal of Nursing Administration*, vol. 36, no. 6, pp. 298–303, 2006.
- [23] S. Sportsman, L. Wieck, P. S. Yoder-Wise, K. M. Light, and C. Jordan, "Creating tomorrow's leaders today: the emerging nurse leaders program of the Texas nurses association," *The Journal of Continuing Education in Nursing*, vol. 41, no. 6, pp. 259–266, 2010.
- [24] P. Lalleman, J. Bouma, G. Smid, J. Rasiah, and M. Schuurmans, "Peer-to-peer shadowing as a technique for the development of nurse middle managers clinical

- leadership: an explorative study,” *Leadership in Health Services*, vol. 30, no. 4, pp. 475–490, 2017.
- [25] A. Ahmi, *Bibliometric Analysis for Beginners*, Penerbit Universiti Utara Malaysia, Kedah, Malaysia, 2022.
- [26] W. M. Lim and S. Kumar, “Guidelines for interpreting the results of bibliometric analysis: a sensemaking approach,” *Global Business and Organizational Excellence*, vol. 43, no. 2, pp. 17–26, 2024.
- [27] N. Donthu, S. Kumar, D. Mukherjee, N. Pandey, and W. M. Lim, “How to conduct a bibliometric analysis: an overview and guidelines,” *Journal of Business Research*, vol. 133, pp. 285–296, 2021.
- [28] D. Mukherjee, W. M. Lim, S. Kumar, and N. Donthu, “Guidelines for advancing theory and practice through bibliometric research,” *Journal of Business Research*, vol. 148, pp. 101–115, 2022.
- [29] R. N. Broadus, “Toward a definition of bibliometrics,” *Scientometrics*, vol. 12, no. 5-6, pp. 373–379, 1987.
- [30] J. D. Lee, A. Cassano-Pinché, and K. J. Vicente, “Bibliometric analysis of human factors (1970–2000): a quantitative description of scientific impact,” *Human Factors: The Journal of the Human Factors and Ergonomics Society*, vol. 47, no. 4, pp. 753–766, 2005.
- [31] F. Pehar, “From statistical bibliography to bibliometrics: development of a quantitative approach to the research of the written word,” *Libellarium: Časopis Za Istraživanja U Području Informacijskih I Srodnih Znanosti*, vol. 3, no. 1, pp. 1–28, 2011.
- [32] R. Zakaria, A. Ahmi, A. H. Ahmad et al., “Visualising and mapping a decade of literature on honey research: a bibliometric analysis from 2011 to 2020,” *Journal of Apicultural Research*, vol. 60, no. 3, pp. 359–368, 2021.
- [33] V. K. Singh, P. Singh, M. Karmakar, J. Leta, and P. Mayr, “The journal coverage of web of science, scopus and dimensions: a comparative analysis,” *Scientometrics*, vol. 126, no. 6, pp. 5113–5142, 2021.
- [34] C. López-Illescas, F. de Moya-Anegón, and H. F. Moed, “Coverage and citation impact of oncological journals in the web of science and scopus,” *Journal of Informetrics*, vol. 2, no. 4, pp. 304–316, 2008.
- [35] C. Huston, “Preparing nurse leaders for 2020,” *Journal of Nursing Management*, vol. 16, no. 8, pp. 905–911, 2008.
- [36] G. G. Cummings, S. Lee, K. Tate et al., “The essentials of nursing leadership: a systematic review of factors and educational interventions influencing nursing leadership,” *International Journal of Nursing Studies*, vol. 115, Article ID 103842, 2021.
- [37] A. M. McCallin and C. Frankson, “The role of the charge nurse manager: a descriptive exploratory study: charge nurse manager role,” *Journal of Nursing Management*, vol. 18, no. 3, pp. 319–325, 2010.
- [38] M. Heinen, C. van Oostveen, J. Peters, H. Vermeulen, and A. Huis, “An integrative review of leadership competencies and attributes in advanced nursing practice,” *Journal of Advanced Nursing*, vol. 75, no. 11, pp. 2378–2392, 2019.
- [39] M. MacPhee, J. Skelton-Green, F. Bouthillette, and N. Suryaprakash, “An empowerment framework for nursing leadership development: supporting evidence,” *Journal of Advanced Nursing*, vol. 68, no. 1, pp. 159–169, 2012.
- [40] J. L. Titzer, M. R. Shirey, and S. Hauck, “A nurse manager succession planning model with associated empirical outcomes,” *The Journal of Nursing Administration*, vol. 44, no. 1, pp. 37–46, 2014.
- [41] R. W. Redman, “Leadership succession planning: an evidence-based approach for managing the future,” *The Journal of Nursing Administration*, vol. 36, no. 6, pp. 292–297, 2006.
- [42] M. Krugman and V. Smith, “Charge nurse leadership development and evaluation,” *The Journal of Nursing Administration*, vol. 33, no. 5, pp. 284–292, 2003.
- [43] L. Fennimore and G. Wolf, “Nurse manager leadership development: leveraging the evidence and system-level support,” *The Journal of Nursing Administration*, vol. 47, no. 10, pp. S20–S26, 2017.
- [44] S. Duygulu and G. Kublay, “Transformational leadership training programme for charge nurses: transformational leadership training programme,” *Journal of Advanced Nursing*, vol. 67, no. 3, pp. 633–642, 2011.
- [45] D. Stanley and K. Stanley, “Clinical leadership and nursing explored: a literature search,” *Journal of Clinical Nursing*, vol. 27, no. 9-10, pp. 1730–1743, 2018.
- [46] E. O’Neil, R. L. Morjikian, D. Cherner, C. Hirschhorn, and T. West, “Developing nursing leaders: an overview of trends and programs,” *The Journal of Nursing Administration*, vol. 38, no. 4, pp. 178–183, 2008.
- [47] J. M. Miles and E. S. Scott, “A new leadership development model for nursing education,” *Journal of Professional Nursing*, vol. 35, no. 1, pp. 5–11, 2019.
- [48] S. M. Dyess, R. O. Sherman, B. A. Pratt, and L. Chiang-Hanisko, “Growing nurse leaders: their perspectives on nursing leadership and Today’s practice environment,” *Online Journal of Issues in Nursing*, vol. 21, no. 1, p. 7, 2016.
- [49] J. Titzer, T. Phillips, S. Tooley, N. Hall, and M. Shirey, “Nurse manager succession planning: synthesis of the evidence,” *Journal of Nursing Management*, vol. 21, no. 7, pp. 971–979, 2013.
- [50] T. A. Harvath, K. Swafford, K. Smith et al., “Enhancing nursing leadership in long-term care,” *Research in Gerontological Nursing*, vol. 1, no. 3, pp. 187–196, 2008.
- [51] W. Gifford, B. Davies, N. Edwards, P. Griffin, and V. Lybanon, “Managerial leadership for nurses’ use of research evidence: an integrative review of the literature,” *Worldviews on Evidence-Based Nursing*, vol. 4, no. 3, pp. 126–145, 2007.
- [52] E. A. Curtis, F. K. Sheerin, and J. de Vries, “Developing leadership in nursing: the impact of education and training,” *British Journal of Nursing*, vol. 20, no. 6, pp. 344–352, 2011.
- [53] A. Mohamed, A. Z. A. Razak, and Z. Abdullah, “Most-cited research publications on educational leadership and management: a bibliometric analysis,” *International Online Journal of Educational Leadership*, vol. 4, no. 2, pp. 33–50, 2020.

## Review Article

# Transformational Leadership and Nursing Retention: An Integrative Review

Becky Goens  and Natalie Giannotti 

Faculty of Nursing, University of Windsor, Windsor, Canada

Correspondence should be addressed to Becky Goens; [bgoens@hotmail.com](mailto:bgoens@hotmail.com)

Received 14 September 2023; Revised 8 April 2024; Accepted 3 May 2024

Academic Editor: Mohammed Baqer Al-Jubouri

Copyright © 2024 Becky Goens and Natalie Giannotti. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

*Aim.* To establish current evidence on the relationship between transformational nursing leadership and turnover intention. *Background.* The persistent nursing shortage in healthcare has led to heightened demands for addressing both current needs and the healthcare requirements of a growing population. Recognizing the pivotal role of nursing leadership in fostering retention, this review highlights the influence of positive leadership on nursing staff. *Evaluation.* An integrative review, guided by Whittemore and Knaff's (2005) framework, was conducted using articles sourced from four online databases deducing to an inclusion of sixteen quantitative articles, one systematic review, and one integrative review published between 1992 and 2022. *Key Issues.* The study reveals conflicting evidence regarding the sole impact of transformational leadership on the nursing staff's intention to remain. However, it highlights transformational leadership's ability to enhance job satisfaction and organizational commitment contributes significantly to retention. *Conclusion.* Using transformational leadership can effectively bolster nursing staff retention along with promoting other favorable workplace outcomes. *Implications for Nursing Management.* This review underscores the importance of enhancing leadership skills within nursing management. This involves not only fostering transformational leadership but also cultivating positive work-related outcomes to optimize nursing staff retention.

## 1. Introduction

The global nursing shortage has become a prominent conversation in nursing and therefore nursing leadership needs to be diligent in identifying and advocating for change [1, 2]. Understanding leadership's impact on patient satisfaction and care is essential for achieving healthcare objectives [3]. Patient safety outcomes rely on a positive safety culture cultivated by effective leadership to dismantle barriers to care [4]. Various leadership styles, such as transformational, transactional, autocratic, and laissez-faire, have been studied. Nursing leadership significantly influences retention by fostering positive leadership, healthy work environments, job satisfaction, and reducing negative work experiences [5]. Nurse managers empower nurses through positive environments. Certain leadership styles, supported in the literature, promote work satisfaction and turnover intention mitigating absenteeism and increased psychological distress [6].

## 2. Review of the Literature

Nurse retention is a complex issue influenced by various factors, including leadership styles, which can be situationally or organizationally rooted based on specific nursing and healthcare demands [7]. Leadership styles hold significant sway over a nurse's inclination to stay within an organization. Transformational leadership stands out as extensively researched across other disciplines and is considered the best-chosen style for healthcare leadership to encourage staff to provide proficient services with improved morale [8], thus, also producing positive outcomes for organizations, staff, and patients [9]. Five measurable components characterize transformational leadership: behavioral idealized influence, attributed idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration [10]. Attributed idealized influence refers to leaders who display confidence in ways that

build respect. Behavioral idealized influence involves discussing values and beliefs, specifying a sense of purpose and emphasizing the importance of a mission. Avolio and Bass [10] also suggest that inspirational motivation uses an energizing attitude for future optimism in achieving goals. Intellectual stimulation pertains to leaders who promote opportunities for professional growth [11]. Finally, individual consideration focuses on the personal needs of each individual, especially those that are seemingly neglected [12]. Such leaders empower and motivate professional growth directly through the provision of a positive environment [6].

Transformational leadership has been linked to improved patient safety, care satisfaction, and decreased adverse events such as medication errors [13, 14]. Crucially, it can mitigate nursing turnover by promoting intentions to stay at work [15]. This “anticipated turnover” strongly correlates with actual turnover, serving as a reliable indicator of future attrition [16]. Retaining experienced nursing staff familiar with unit operations positively impacts patient care outcomes [17], as their departure depletes valuable expertise, skills, and knowledge [7].

### 3. Methods

**3.1. Design.** Guided by Whitemore and Knaf’s [1] integrative review framework, this literature review followed their five-stage process: (1) problem identification; (2) comprehensive literature search; (3) evaluation of the data; (4) data analyses; and (5) presentation of synthesized data. The research question was developed using the PICO format which stands for patient, intervention, comparator (if relevant), and outcome [18]. The research question created was as follows: what is the relationship between transformational nursing leadership and turnover intention among staff nurses?

**3.2. Inclusion and Exclusion Criteria.** Inclusion criteria are as follows: (1) articles must be written in English/translated to English; (2) must be peer-reviewed; and (3) study types must include qualitative, quantitative, mixed-methods, and systematic/integrative/scoping/literature reviews. Exclusion criteria are as follows: (1) opinion pieces, dissertations, thesis, grey literature, letters, and editorials. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram [19] search results are displayed in Figure 1.

**3.3. Search Strategy.** The literature search was carried out in June 2022, using four online databases including Cumulative Index to Nursing and Allied Health Literature (CINAHL), MEDLINE via Ovid, ProQuest Nursing and Allied Health, and PubMed. Search terms were a combination of keywords reported in Table 1.

**3.4. Search Outcomes and Extraction of Data.** Following the literature search, all citations were collected, uploaded, and stored in Covidence, a web-based platform used for

conducting comprehensive literature reviews. Covidence is a software that helps streamline the reviewing process, facilitating the screening of citations, reviewing full-text articles, assessing the risk of bias, extracting study characteristics, and creating reports to export [20]. Duplicates were removed using Covidence, followed by a manual review to ensure accuracy. All titles and abstracts were reviewed in conjunction with our inclusion criteria. When an abstract was not present, the study was read in its entirety to determine appropriateness. Full texts of studies were subsequently retrieved and reviewed again along with our inclusion criteria. As such, articles selected for data extraction were reviewed twice. The quality of the data was evaluated on a 2-point scale examining empirical or theoretical rigour and data relevance. A log within Covidence was recorded to track articles selected for exclusion.

**3.5. Data Evaluation and Synthesis.** As per Whitemore and Knaf [1], after the research identification and literature search have been performed, a comprehensive evaluation of the data must occur. While no specified method for evaluating the quality of data exists, the recommendation is that it should be customized to the type of studies included [1]. Journal Article Reporting Standards (JARS)-quantitative [21], JARS-qualitative and mixed-methods [22] criteria, and methods developed by Moher et al. [19] were used to analyze articles all articles included in this review.

During data analysis, studies were classified based on the type of evidence and analyzed sequentially for similarities and differences [1]. Similar findings were then compared and reduced into a succinct and manageable framework [1]. Articles identified through the quality assessment analysis as low relevance were excluded. After the data extraction process, two additional articles were removed due to a low-quality score not previously identified, and the remaining articles were kept for inclusion. Included studies were manually reduced and entered into a summary table (Table 2). An iterative process was undertaken to examine data, noting patterns, and themes, depicting relationships, and cluster similar variables to draw comparisons [1]. Patterns, commonalities, and differences were identified with frequent verification for accuracy to draw final conclusions [1].

## 4. Results

The final sample consisted of 18 articles published between 1992 and 2022, and designs including quantitative ( $n = 16$  (88.9%)), integrative review ( $n = 1$  (5.56%)), and a systematic review ( $n = 1$  (5.56%)). Of the quantitative studies, most ( $n = 15$  (83.3%)) were identified as cross-sectional. Some studies ( $n = 5$  (27.8%)) did not identify their research design to be cross-sectional; however, due to the singular point of data collection at one point in time, they are cross-sectional in nature (e.g., [23, 24, 29, 31, 33]).

Among the included studies, themes were observed examining transformational leadership and intention to stay/intention to leave/turnover intention, and actual turnover as well as between transformational leadership and



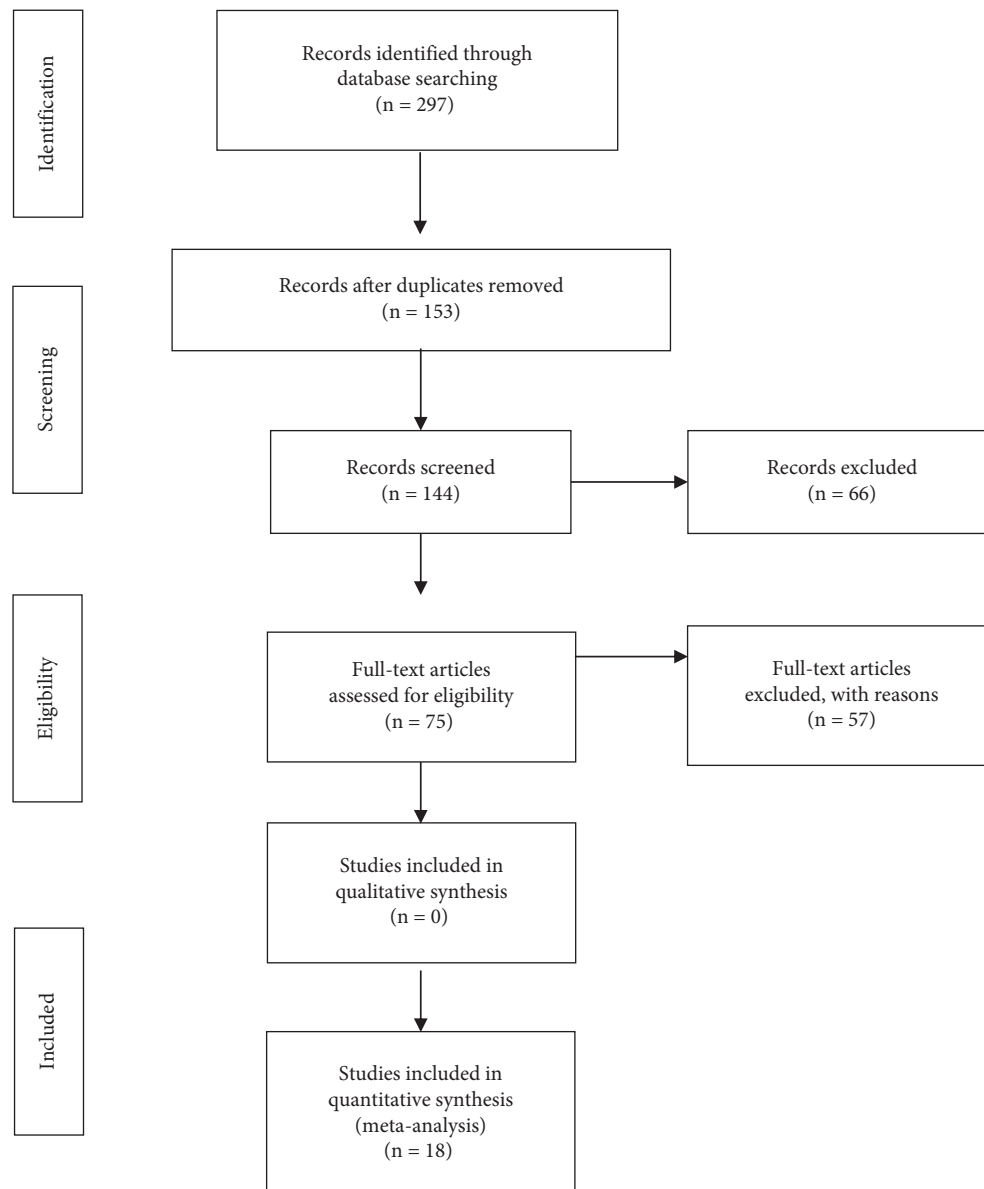


FIGURE 1: PRISMA flowchart.

other variables including culture/climate of safety, organizational culture, organizational commitment, job satisfaction, and job stress.

**4.1. Reported Scores.** Three studies examined the disparities between staff nurses' perceptions of transformational leadership behaviors exhibited by nursing leaders and nurse leaders' own assessments of their transformational leadership behaviors. All three studies indicated that nursing leaders reported more frequent instances of transformational leadership than staff nurses did [28, 29, 32]. Among these, Goh et al. [28] established statistical significance for this difference ( $\rho < 0.05$ ).

**4.2. Culture, Climate, and Commitment.** Laing et al. [30] established that transformational leadership positively influenced a safety-oriented climate, thereby enhancing the intention to remain. Ferreira et al. [27] corroborated these findings across four articles, showcasing how transformational leadership fosters a safety-driven culture or climate. Abualrub and Nasrallah [24] reported a robust positive correlation between transformational leadership behaviors and perceptions of organizational culture ( $r = 0.50, \rho \leq 0.001$ ), as well as the intention to remain in the workplace ( $r = 0.587, \rho \leq 0.001$ ). Brewer et al. [25] and Goh et al. [28] concurred, highlighting a favorable association between transformational leadership behaviors and organizational commitment ( $r = 0.495, \rho < 0.01; rs = 0.594, \rho < 0.05$ ).

TABLE 1: Search results (June 8, 2022).

Search equations (in sequential order of completed searches)	Filters	Identified records	Number of duplicate records
PubMed	((Transformational leadership [Title/Abstract]) AND (nurs* [Title/Abstract] OR RN [Title/Abstract])) AND (attrition [Title/Abstract] OR retention [Title/Abstract] OR turnover [Title/Abstract] OR "intent to stay" [Title/Abstract] OR "intent to leave" [Title/Abstract] OR "intent to quit" [Title/Abstract] OR "turnover intention" [Title/Abstract])	54	1
MEDLINE via Ovid	"Transformational leadership".ti, ab, kw. (nurs* or RN).ti,ab,kw. (retention or attrition or turnover or "intent to stay" or "intent to leave" or "intent to quit" or "turnover intention"). ti, ab, kw	52	52
ProQuest	AB, TI, IF ("transformational leadership") AND AB, TI, IF (nurs* OR RN) AND AB, TI, IF (retention OR attrition OR turnover OR "intent to stay" OR "intent to leave" OR "intent to quit" OR "turnover intention")	98	32
CINAHL	[TI "transformational leadership" OR AB "transformational leadership"] AND [TI (nurs* or RN) OR AB (nurs* or RN)] AND [TI (retention or attrition or turnover or "intent to leave" or "intent to stay" or "intent to quit" or "turnover intention") OR AB (retention or attrition or turnover or "intent to leave" or "intent to stay" or "intent to quit" or "turnover intention")]	93	57



TABLE 2: Literature summary.

Author/year/ country	Study aim	Study design	Methods of measurement	Statistical analyses	Sample	Conclusions/ implications
Abualrub and Alghamdi [23] Saudi Arabia	To examine the impact of leadership styles of nurse managers on Saudi nurses' job satisfaction and their intent to stay at work	Descriptive, cross-sectional/ correlational	Demographic form The multifactor leadership questionnaire (MLQ-5X) Job satisfaction survey (JSS) The McCain's intent-to-stay scale (MISS) Collected via paper	Descriptive Pearson correlation Hierarchical regression Significance 0.05	Convenience sampling $n = 308$ (51.3% response rate) RNs from 6 public hospitals in Western Region of Saudi Arabia with at least 6 months of experience at their current job and under the direct supervision of a nurse manager	Nurse administrations should promote the importance of a transformational leadership style in increasing job satisfaction and thereby increasing intention to stay among nurses
Abualrub and Nasrallah [24] Jordan	To investigate the impact of leadership behaviors of nurse managers and organizational culture on Jordanian nurses' intention to stay at work in public, private, and university hospitals	Descriptive, correlational, cross-sectional, comparative	A sociodemographic form The leadership practice inventory The professional organizational culture (POC) scale The McCain's intent-to-stay scale (MISS) Methods of data collection unclear	Descriptive Pearson product-moment ANOVA Hierarchical multiple regression Significance 0.05 Data cleaned/screened and treated outliers	Convenience sampling $n = 285$ (81% response rate) Nurses from 6 hospitals (public, private, and university-affiliated) in Jordan	The study recommends that organizations should focus on the promotion of transformational leadership through nursing education programs and continuous education programs that also focus on organizational culture as these two variables together can have a large impact on the intention to stay Transformational leadership has the potential to decrease attrition through a positive work environment and increased organizational commitment. Workplaces should also invest in systems change that promotes these
Brewer et al. [25] United States of America	To examine the effect of transformational leadership on early career nurses' intent to stay, job satisfaction, and organizational commitment	Cross-sectional correlational (with descriptive data)	Demographic survey An expanded version of the Price model of turnover was used	Descriptive Ordered probit model	No stated sampling technique $n = 1037$ (69% response rate) RNs licensed for 7.5–8.5 years who worked in the healthcare field and collaborated with MD's	

TABLE 2: Continued.

Author/year/ country	Study aim	Study design	Methods of measurement	Statistical analyses	Sample	Conclusions/ implications
Cowden et al. [26] Canada	To describe the findings of the literature that examines the relationship between managers' leadership practices and staff nurses' intent to stay in their current position	Systematic review	A systematic review of six electronic databases followed by manual searches through specific nursing journals. English articles published between 1985–2010 examining manager leadership and staff nurse's intent to stay were included in the review	Manuscripts reviewed twice against inclusion criteria for relationships and quality. Used adapted tools for quality assessment and critical appraisal. Two reviewers	A total of 23 studies were included in the review and were rated as moderate or strong in quality. Twenty-two of the studies included were quantitative and 1 study was qualitative	Nurse managers who practice relational leadership (e.g., transformational leadership) and ensure positive work environments foster nurse's intention to stay. This review provides a solid foundation for advancing current conceptual models that incorporate leadership theory into management practices
Ferreira et al. [27] Brazil	To map leadership styles that positively impact patients, professionals, and institutions	Integrative review	An integrative review of selected articles was chosen from five databases. Two researchers assessed the quality following the Joanna Briggs Institute's (JBI) recommendations	Four researchers performed analysis using the Preferred Reporting Items for Systematic Reviews and Meta-Analysis. Quality assessed by two researchers using Joanna Briggs Institute's recommendations. Information was deduced into a literature summary table	A total of 35 articles were included in the review. 32 quantitative articles, 2 qualitative articles, and 1 quasiexperimental article were included in the review	The results show the need for nurses to improve their leadership skills through training and development programs in transformational leadership to achieve positive results. Transformational leadership was shown to reduce absenteeism at work and decrease the intention of professionals to quit their jobs

TABLE 2: Continued.

Author/year/ country	Study aim	Study design	Methods of measurement	Statistical analyses	Sample	Conclusions/ implications
Goh et al. [28] Singapore	To assess the leadership styles of nurse leaders, as perceived by their employees, to explore differences between self-ratings and others' ratings of leadership styles, and to determine if there is a correlation between perceived leadership styles and organizational outcomes	Cross-sectional/with comparative, correlational, and descriptive data	Demographic questionnaire The multifactor leadership questionnaire (MLQ-5X) The organizational commitment The three-index item questionnaire	Descriptive Spearman's rho One-sample <i>t</i> -test Significance 0.05 Reported reliability and validity	Convenience sample <i>n</i> = 111 (37% response rate) RNs from 4 inpatient wards at an acute tertiary care hospital	Overall, registered nurses reported that their nurse leaders predominately exhibited both transformational and transactional leadership. Nurse leaders in this study tend to rate themselves higher than others rate them. The results identify the need for self-awareness elements in nursing leadership development programs. Transformational leadership has the ability to increase organizational commitment and decrease turnover intention Transformational leadership was not correlated with staff turnover. However, nurse managers perceived they had higher frequencies of transformational leadership behaviors than staff nurses. Therefore, it is important for nursing managers to be visible to staff nurses which includes schedule adjustments to allow managers to interact with nurses who do not work the day shift
Kleinman [29] United States of America	To describe perceptions of managerial leadership behaviors associated with staff nurse turnover and to compare nurse manager leadership behaviors as perceived by managers and their staff nurses	Stated it was a prospective, correlational design and then also stated it was a descriptive, correlational design. Inferred to be cross-sectional	Demographic questionnaire The multifactor leadership questionnaire (MLQ-5X) Nurse turnover was measured as the percentage of staff nurses who had resigned from the medical center during the 6-month period from January through June 2003	Descriptive Pearson product-moment correlation ANOVA Calculated Cronbach's alpha Significance 0.05	Sampling technique not stated <i>n</i> = 79 staff nurses and 10 nurse managers (response rate 25% for staff nurses and 62% for nurse managers) Conducted at a 465-bed community hospital	

TABLE 2: Continued.

Author/year/ country	Study aim	Study design	Methods of measurement	Statistical analyses	Sample	Conclusions/ implications
Labrague et al. [6] Philippines	Examined the influence of toxic and transformational leadership practices on nurses' job satisfaction, psychological distress, absenteeism, and intent to leave the organization or the nursing profession	Cross-sectional (descriptive and correlational statistics)	Did not state they handed out demographic surveys; however, they created descriptive statistics based on the demographic information The toxic leadership behaviors of nurse managers scale The global transformational leadership (GTL) scale Job satisfaction index Intention to quit scale Adapted (two single-item measures) developed by O'Driscoll and Beeher (1994) Researcher-designed single-item question for absenteeism	Descriptive Pearson correlation Hierarchical multiple regression reported assumptions testing Reported reliability and validity	Sampling technique not stated $n = 770$ (response rate 86%) RN's employed in 15 hospitals with at least 6 months of experience	Nurses perceived their nurse managers are highly transformational. This study indicated transformational leadership to have a positive effect on job satisfaction and turnover intention. Therefore, nurse retention strategies should include measures to increase transformational leadership and decrease toxic leadership in nurse managers through evidence-based education, training, professional development opportunities, and utilizing leadership assessment tools when considering nurse manager candidates

TABLE 2: Continued.

Author/year/ country	Study aim	Study design	Methods of measurement	Statistical analyses	Sample	Conclusions/ implications
Laing et al. [30] Taiwan	To propose a theoretical model and apply it to examine the structural relationships among nurse characteristics, leadership characteristics, safety climate, emotional labour, and intention to stay for hospital nurses	Cross-sectional	Demographic survey The multifactor leadership questionnaire (MLQ-5X) The safety attitudes questionnaire (SAQ) The emotional labour questionnaire The intention to stay scale (ITS)	Descriptive Structural equation modelling Confirmatory factor analysis model Significance set a priori for all statistical calculations. Reported reliability and calculated validity	Purposive sample $n = 414$ (91.6% response rate) Purposely selected 2 regional hospitals in Yilan county (1 public and 1 private)	Intention to stay positively affected safety climate and transformational was found to have an indirect effect on the intention to stay. This indirect effect was also mediated separately by emotional labour and safety climate. The study recommends that administrators encourage nurse managers to adopt transformational leadership to strengthen perceptions of a positive safe climate in the workplace, resulting in increased intention to stay
Lavoie-Tremblay et al. (2015) Canada	To investigate the impact of nurse managers exercising transformational vs. abusive leadership practices with novice nurses	Predictive, cross-sectional	Did not state they handed out demographic surveys; however, they created descriptive statistics based on the demographic information. The global transformational leadership (GTL) scale Abusive leadership scale Intention to quit scale adapted (two single-item measures) developed by O'Driscoll and Beeher (1994) Quality of care scale	Descriptive Linear regression Confirmatory factor analysis model Maximum likelihood Reported reliability and validity	Random sampling $n = 727$ (20.8% response rate) Novice RN's (less than 5 years' experience) and the ability to read French	Transformational leadership strongly predicted quality of care scores and intention to quit healthcare facilities, whereas abusive leadership predicts a nurse's intention to quit the profession. Implications should include the promotion and training of transformational leadership and the reduction of abusive leadership to assist with the nursing shortage which can also increase the quality of patient care

TABLE 2: Continued.

Author/year/ country	Study aim	Study design	Methods of measurement	Statistical analyses	Sample	Conclusions/ implications
Lyu et al. [31] China	To examine the level of intention to stay and the influence of ten predictors (transformational leadership, career growth, workgroup cohesion, educational level, monthly income, professional position, years of experience, gender role conflict, organizational commitment, and job satisfaction) on intention to stay	Descriptive predictive-cross-sectional	Demographic data profile The McCain's intent-to-stay scale (MISS) The leadership practice inventory The career growth of nurse scale The group cohesion scale (GCS) The gender role conflict short-form The three-component model (TCM) employee commitment survey The McCloskey/Mueller satisfaction scale	Descriptive Chi-square Biserial correlation coefficient Significance 0.05 Reported assumptions testing Reported reliability	Sampling technique not stated $n = 430$ (response rate 89.6%) Male nurses working in five university hospitals for at least one year	Work-group cohesion, career growth, transformational leadership, and job satisfaction significantly predicted a nurse's intention to stay in their position. This suggests nursing administrators and policymakers to develop interventions (e.g., training programs) to improve these four modifiable factors  Transformational and participative leadership styles decrease turnover intention whereas autocratic and laissez-faire increase turnover intention. Nurse managers and administrators should emphasize a positive workplace climate and evidence-based leadership practices such as transformational and participative leadership to reduce staff turnover
Magbity et al. [7] Ghana	Investigated the leadership styles of nurse managers' impact on turnover intention among nurses in hospitals	Descriptive, cross-sectional/ correlational	Demographic data were not collected The multifactor leadership questionnaire (MLQ-5X) The turnover intention scale (TIS-6)	Descriptive Pearson product-moment Multiple regression analysis	Sampling technique not noted $n = 250$ (response rate not noted) Nurses employed within 5 distinctive hospitals (assumed to be in Ghana but not specified)	Transformational and participative leadership styles decrease turnover intention whereas autocratic and laissez-faire increase turnover intention. Nurse managers and administrators should emphasize a positive workplace climate and evidence-based leadership practices such as transformational and participative leadership to reduce staff turnover

TABLE 2: Continued.

Author/year/ country	Study aim	Study design	Methods of measurement	Statistical analyses	Sample	Conclusions/ implications
McDaniel and Wolf [32] United States of America	To determine whether transformational theory applies to nurses in an entire nursing service department	Descriptive, comparative, cross-sectional	Demographic data not collected The multifactor leadership questionnaire (MLQ-5X) The work satisfaction scale Turnover data were obtained from the nurse service reported monthly Collected via mail	Descriptive t-tests Pearson correlation Reported validity and reliability Significance 0.05	Sampling technique not noted $n = 46$ registered nurses, 9 midlevel administrators, and 1 nurse executive (60%, 81%, and 100% response rates) Conducted on one unit at a moderate-sized facility	Transformational leadership was positively correlated with job satisfaction as well as the turnover data for registered staff. Is lower in environments where leaders have predominately transformational leadership behaviors. Nurse executives should recruit employees demonstrating transformational characteristics and create structures that will support and facilitate these behaviors
Pishgoote et al. [16] Iran	To investigate the relationship between leadership style and nurse job stress and anticipated turnover	Cross-sectional/correlational	Demographic questionnaire The multifactor leadership questionnaire (MLQ-5X) The health and safety executive questionnaire The anticipated turnover scale (ATS)	Descriptive Pearson correlation Reported assumptions testing Reported reliability Significance 0.05	Randomised multistage sampling and simple random sampling $n = 1617$ (96.76% response rate) All nurses working in 10 government (otherwise known as public) hospitals were randomly selected based on geographical location and size. RN's with 1 year of experience not in a management position	Nurse leaders can improve transformational leadership behaviors and reduce turnover by developing training programs and creating a supportive work environment. Nurse leaders should also provide a supportive work environment to support intention to stay

TABLE 2: Continued.

Author/year/ country	Study aim	Study design	Methods of measurement	Statistical analyses	Sample	Conclusions/ implications
Raup [33] United States of America	To examine the impact of leadership styles used by emergency department (ED) nurse managers in academic health centers on nurse turnover and patient satisfaction as measured by the full-range leadership model	Descriptive, cross-sectional	Demographics survey The multifactor leadership questionnaire (MLQ-5X) Staff turnover rates were self-reported by ED nurse managers using statistics provided by the nurse managers	Descriptive Fisher's exact tests	Convenience sampling $n = 45$ (15.3% response rate) Attempts were made to contact the ED managers of the primary hospitals identified by each of the 101 academic health centers over a 20-month study period. 15/98 possible sites returned questionnaires	This study did not find a statistically significant difference in leadership style on staff nurse retention. However, the transformational leadership style may offer some benefits to both managers and staff nurses in high-stress areas such as the emergency department including increased retention Transformational leadership has a significant role in decreasing nurses' anticipated turnover, therefore training programs, nursing management courses at undergraduate and postgraduate levels, and clinical training of nursing students should focus on this
Suliman et al. [34] Jordan	To assess the effect of nurse managers' leadership styles on predicted nurse turnover	Descriptive, cross-sectional/ correlational	Demographic questionnaire The multifactor leadership questionnaire (MLQ-5X) The anticipated turnover scale (ATS)	Descriptive ANOVA Multiple regressions One-sample $t$ -test Significance 0.05	Convenience sampling $n = 250$ (89% response rate) Nurses employed in three public sector hospitals and one university-affiliated (teaching hospital)	



TABLE 2: Continued.

Author/year/ country	Study aim	Study design	Methods of measurement	Statistical analyses	Sample	Conclusions/ implications
Theucksuban et al. [35] Thailand	To test the causal model of intent to stay in employment of nurses in regional medical centers	Cross-sectional (with correlational and descriptive statistics)	Demographic data form The McCain's intent-to-stay scale (MISS) The leadership practice inventory The social integration scale The nursing activity scale The promotional opportunity scale The Maslach burnout inventory The job satisfaction scale The organizational commitment questionnaire	Descriptive Structural equation modelling Maximum likelihood Reported assumptions testing Reported reliability Significance 0.01	Multistage random sampling $n = 1224$ (95.84% response rate) RN's with more than one year of experience, providing direct care to the obstetrics, surgical, medical, pediatric, operating room, intensive care, or emergency departments in nine regional medical centers	Transformational leadership, coworker support, professional autonomy, opportunities for promotion, marital status, and job satisfaction positively affected intent to stay, whereas burnout negatively affected intent to stay. These seven factors that should be considered by nurse managers in developing a framework for creating interventions to promote intention to stay. Policymakers should consider enacting policies and regulations for nurses' benefits to increase nurses' intent to stay
Wang et al. [36] China	To examine the role of staff nurse emotional intelligence between transformational leadership and nurse intent to stay	Cross-sectional descriptive design	Demographic survey Wong and Law emotional intelligence scale (WLEIS) The transformational leadership scale (Chinese version) The nurse intention to stay scale by Tao and Wang	Descriptive Structural equation modelling Maximum likelihood Significance 0.05	Convenience sampling $n = 535$ (85.9% response rate) RNs from four general hospitals working for at least 1-year full time at the study hospitals	Transformational leadership directly and indirectly affects intention to stay as well as emotional intelligence. Nurse leaders and policymakers should develop training programs for nurse managers, school education, and continuing education programs to foster transformational leadership and nurse's emotional intelligence to aid in retention

Several studies underline how transformational leadership cultivates a positive work climate and reinforces organizational commitment, consequently encouraging nurse's retention (e.g., [24–28, 30]). While Lyu et al. [31] found a moderate and significant relationship between organizational commitment and the intention to remain ( $r = 0.34, \rho \leq 0.001$ ), the data did not distinctly predict a staff nurse's intention to stay.

**4.3. Job Satisfaction and Stress.** Numerous studies reveal a positive correlation between transformational leadership behaviors and job satisfaction [6, 23, 28, 32]. Although Brewer et al. [25] noted that transformational leadership does not significantly forecast nurses' job satisfaction, Labrague et al. [6] and Lyu et al. [31] established a robust predictive link ( $\beta = 0.343, \rho \leq 0.001; \beta = 0.562, \rho < 0.05$ ). The positive nexus between job satisfaction and intention to stay is corroborated by multiple studies [22, 25, 31, 35]. Abualrub and Alghamdi [23] identified that transformational leadership accounted for 19% of the observed change in job satisfaction, while it explained only 2% of the variance in intent to stay [23].

In contrast to job satisfaction, additional research delved into job stress and burnout. Pishgooie et al. [16] unveiled a negative correlation between transformational leadership and job stress ( $r = -0.34, \rho < 0.001$ ) and a positive connection between job stress and turnover intention ( $r = 0.34, \rho < 0.001$ ). Theucksuban et al. [35] reported a negative association between burnout and intention to stay ( $r = -0.300, \rho < 0.01$ ), with burnout elucidating 67.5% of the variation in nurses' intention to stay. While Ferreira et al. [27] could not discern a significant link between transformational leadership and burnout syndrome, their investigation into the separate facets of emotional exhaustion and cynicism revealed that transformational leadership tangibly and indirectly impacted these elements [27].

**4.4. Intention to Stay.** Research has consistently shown a connection between transformational leadership and the intent to stay in the workplace [24, 26, 31, 35, 36] or a converse link with turnover intention [7, 16, 37]. Cowden et al.'s [26] systematic review identified a relationship between transformational leadership and the intent to stay, although one of their included studies did not achieve statistical significance. Lavoie-Tremblay et al. [37] found a strong negative prediction of nurses' intention to leave healthcare facilities ( $\beta = -0.14, \rho < 0.05$ ), yet no significant prediction of nurses' intent to leave the nursing profession. Lyu et al. [31] established transformational leadership as a substantial predictor of intent to stay ( $\beta = 0.793, \rho \leq 0.001$ ).

Furthermore, various studies underline that nurse managers' leadership styles account for 12% of the variance in anticipated nurse turnover, with transformational leadership significantly surpassing other studied styles [26, 34, 38]. However, Abualrub and Alghamdi [23] indicated that transformational leadership only accounted for 1% of the variation in intent to stay. Conversely, some studies suggest an insignificant relationship between

transformational leadership and intent to stay [6, 23, 25, 30, 33].

Brewer et al. [25] found that transformational leadership indirectly influences intent to stay through organizational commitment and positive work environments. Goh et al.'s [28] study revealed that half of the surveyed hospital units showed a significant negative correlation between transformational leadership and turnover intention (ward A:  $r = -0.368, \rho < 0.01$ ; ward D:  $r = 0.61, \rho < 0.01$ ). Labrague et al. [6] echoed this, confirming a negative association between transformational leadership and organizational turnover intention ( $r = -0.080, \rho < 0.01$ ). However, Kleinman [29] did not uncover a significant relationship between turnover intention and transformational leadership.

Transformational leadership also exerts an influence on intent to stay through the mediation of other variables. Laing et al. [30] established a positive impact of transformational leadership on safety climate, indirectly influencing intent to stay. Transformational leadership's positive indirect effect on intent to stay via the mediator of emotional intelligence was noted by Wang et al. [36] ( $\beta = 0.111, \rho \leq 0.01$ ). Lastly, beyond the intent to leave assessments, some studies analyzed actual turnover data. McDaniel and Wolf [32] found a turnover rate 5% lower than a magnet benchmark. Raup [33] observed actual nurse turnover to be 16% lower in units with non-transformational leadership.

## 5. Strengths and Limitations

**5.1. Comprehensive Examination of Transformational Leadership and Retention.** A significant number of studies have investigated the relationship between transformational leadership and nurse retention, often in conjunction with other variables. These studies have revealed varying frequencies of reported leadership behaviors, raising questions about the efficacy of displayed transformational leadership [29]. Nonetheless, despite these differences, Lavoie-Tremblay et al. [37] and Pishgooie et al. [16] underscore the importance of involving both nurses and nursing leadership in the assessment of transformational leadership behaviors. Such inclusive evaluation ensures a comprehensive understanding of the contextual dynamics at play, enhancing the accuracy of conclusions.

**5.2. Cultivating Positive Organizational Culture.** A positive culture within organizations can be gradually formed by leadership over time by systematically solidifying this culture through consistent transformational leadership behaviors [24]. A favorable culture empowers nurses by providing opportunities for decision-making, professional growth, and conflict resolution [24]. By actively seeking input, promoting engagement in decision-making, and embracing shared participation [26], nurse managers cultivate an atmosphere characterized by cooperation and collaboration, thus nurturing a culture of support [7]. This dynamic contributes to nurses' sense of commitment to their roles within the organization, ultimately bolstering retention.

**5.3. Transformational Leadership and Job Satisfaction.** The positive influence that transformational leadership behaviors has on nurses' career satisfaction is substantiated by several studies. As these transformational leadership behaviors look to support and coach nurses in their professional atmosphere, the transformational leader works to support a vision of nursing [32] and if this vision were to change, staff could report more dissatisfaction if they feel they need to change their vision to something they may not see as appropriate. Abualrub and Alghamdi [23] proposed that although job satisfaction may increase a nurse's intention to stay within nursing, it should be considered concurrently with other factors to maximize the potential to reduce actual turnover.

The interesting findings of Pishgooie et al. [16] regarding job stress warrant attention. Nurses reported lower levels of job stress than anticipated, suggesting a potential adaptive response to their demanding environment. However, the correlation between job stress and anticipated turnover emphasizes that even seemingly resilient individuals can be vulnerable to the negative effects of elevated stress levels. If the two major indicators of job stress (role clarity and conflict) become imbalanced, it can lead to the need to activate coping strategies, mitigate emotional exhaustion, and increase job dissatisfaction and anticipated turnover [16]. Given the strong correlation between anticipated turnover and actual turnover, the assessment of anticipated turnover emerges as a valuable tool for gauging the potential for future attrition. [16].

**5.4. Impact of Transformational Leadership on Retention.** While transformational leadership undoubtedly plays a pivotal role in retention [29], it may not have a large enough impact on a nurse's decision to leave the profession. Transformational leadership involves creating opportunities and adapting to organizational change to meet demanding needs [7]. The elements of transformational leadership are important to use for all nurses and are especially important to use as a framework to address the needs of novice nurses [7, 37]. The structured support and mentorship embedded in transformational leadership practices are particularly beneficial for novice nurses, facilitating their professional development. Despite its undeniable relevance, it is important to acknowledge that transformational leadership, while impactful, may need to be complemented by other strategies to achieve significant reductions in both anticipated turnover and intention to quit. These measures are vital for mitigating potential consequences such as decreased productivity and increased organizational costs [27].

In summary, the extensive body of research underlines the central role of transformational leadership behaviors in nurse retention. However, this influence is intertwined with a complex web of organizational, cultural, and individual factors. By embracing transformational leadership as a core principle while addressing these multifaceted dynamics, healthcare institutions can optimize nurse retention, ensuring a positive impact on both the organization and the nursing profession as a whole.

## 6. Implications for Nursing Management

To foster positive outcomes within the nursing organization, effective leadership skills are pivotal for both nursing staff and leadership members. These skills encompass proficient communication, the ability to influence, inspire, and motivate others, and the facilitation of decision-making opportunities. Multiple studies emphasize the significance of robust nursing leadership training to cultivate transformational leadership behaviors that enhance nursing retention [6, 16, 24, 26, 27, 34, 36, 37]. For instance, Theucksuban et al. [35] highlighted the necessity for comprehensive training programs, encompassing areas such as transformational leadership methods, human resource training, and strategic planning, which contribute to the observed elevation in reported transformational leadership behaviors. However, it is imperative to align these behavioral changes with the organizational culture across all tiers [26], underscoring the pivotal role of leadership development programs in promoting favorable leadership behaviors and making sure that they fit well with the organization's values and beliefs.

## 7. Conclusion

In conclusion, the examined literature consistently revealed that nursing leaders often reported higher frequencies of transformational leadership behaviors than staff nurses. Positive links between transformational leadership and culture/climate, organizational commitment, and job satisfaction were evident, while job stress and burnout showed varying correlations. Transformational leadership exhibited connections with intent to stay, although this influence was tempered by other variables. While transformational leadership plays a pivotal role in fostering retention, its impact may need to be complemented by other strategies. Further research is needed to comprehensively assess the impact of transformational leadership on nurse retention, thereby enhancing our understanding and promoting positive workplace outcomes. The implementation of interventional studies, encompassing pre- and postevaluations of organizational outcomes, creates valuable insights for the design and refinement of nursing leadership training programs.

The implications for nursing management are clear: leadership development programs are instrumental in promoting favorable leadership behaviors, but their alignment with the organizational ethos is crucial. Encouraging leadership training tailored to desired outcomes, fostering self-awareness among nurse leaders, and nurturing open communication channels are recommended strategies. By leveraging these insights, nursing leaders can not only enhance their own transformational leadership skills but also foster a positive workplace culture that contributes to nurse retention and, ultimately, the success of the organization.

## 8. Recommendations

The implementation of self-awareness measures within nursing leadership could address the reported disparities in

scores, given that self-awareness is a cornerstone of effective leadership [28]. Proactive strategies to mitigate burnout syndrome should be created, including initiatives that acknowledge and appreciate employees' strengths [27]. The establishment of two-way communication models between nurses and nurse leaders, facilitating an open avenue for expressing concerns, adversities, and organizational issues, is recommended [35]. Organizations are encouraged to tailor leadership training programs to their desired outcomes, recognizing the positive impact of transformational leadership on patient, professional, and institutional levels [27].

The insights gained from this integrative review clearly demonstrate that nursing leaders are well-positioned to not only strengthen their own transformational leadership capabilities, but also institute measures that inspire a positive workplace culture and elevate nursing staff experiences.

### Data Availability

The data that support the findings of this study are included in the supplementary material of this article.

### Conflicts of Interest

The authors declare that they have no conflicts of interest.

### Supplementary Materials

Supplementary materials are presented for the reporting of the PRISMA checklist. (*Supplementary Materials*)

### References

- [1] R. Whittemore and K. Knafl, "The integrative review: updated methodology," *Journal of Advanced Nursing*, vol. 52, no. 5, 2005.
- [2] S. Cardiff, O. Gershuni, and A. Giesbergen-Brekelmans, "How local, first-line nurse leaders can positively influence nurse intent to stay and retention: a realist review," *Journal of Clinical Nursing*, vol. 32, no. 19-20, pp. 6934-6950, 2023.
- [3] R. McCay, A. Lyles, and L. Larkey, "Nurse leadership style, nurse satisfaction, and patient satisfaction," *Journal of Nursing Care Quality*, vol. 33, no. 4, pp. 361-367, 2018.
- [4] L. M. K. Ystaas, M. Nikitara, S. Ghobrial, E. Latzourakis, G. Polychronis, and C. S. Constantinou, "The impact of transformational leadership in the nursing work environment and patients' outcomes: a systematic review," *Nursing Reports*, vol. 13, no. 3, pp. 1271-1290, 2023.
- [5] J. McKenna and D. Jeske, "Ethical leadership and decision authority effects on nurses' engagement, exhaustion, and turnover intention," *Journal of Advanced Nursing*, vol. 77, no. 1, pp. 198-206, 2020.
- [6] L. J. Labrague, C. E. Nwafor, and K. Tsaras, "Influence of toxic and transformational leadership practices on nurses' job satisfaction, job stress, absenteeism and turnover intention: a cross-sectional study," *Journal of Nursing Management*, vol. 28, no. 5, pp. 1104-1113, 2020.
- [7] J. B. Magbity, A. M. A. Ofei, and D. Wilson, "Leadership styles of nurse managers and turnover intention," *Hospital Topics*, vol. 98, no. 2, pp. 45-50, 2020.
- [8] A. Al-Thawabiya, K. Singh, B. A. Al-Lenjawi, and A. Alomari, "Leadership styles and transformational leadership skills among nurse leaders in Qatar, a cross-sectional study," *Nursing Open*, vol. 10, no. 6, pp. 3440-3446, 2023.
- [9] M. Hult, A. Teramo-Moisio, P. Kaakinen et al., "Relationships between nursing leadership and organizational, staff and patient outcomes: a systematic review of reviews," *Nursing Open*, vol. 10, no. 9, pp. 5920-5936, 2023.
- [10] B. J. Avolio and B. M. Bass, *Multifactor Leadership Questionnaire: Manual and Sample Set*, Mind Garden, 3rd edition, 2004.
- [11] T. C. Marufu, A. Collina, L. Vargas, L. Gillespie, and D. Almghairbi, "Factors influencing retention among hospital nurses: systematic review," *British Journal of Nursing*, vol. 30, no. 5, pp. 302-308, 2021.
- [12] B. Bass, "Theory of transformational leadership redux," *The Leadership Quarterly*, vol. 6, no. 4, pp. 463-478, 1995.
- [13] Aydogdu, "Trends of publications on transformational leadership in nursing: a bibliometrics analysis," *Leadership in Health Services*, vol. 31, no. 1, pp. 34-52, 2023.
- [14] M. Lappalainen, M. Härkänen, and T. Kvist, "The relationship between nurse manager's transformational leadership style and medication safety," *Scandinavian Journal of Caring Sciences*, vol. 34, no. 2, pp. 357-369, 2020.
- [15] G. Gebreheat, H. Teame, and E. I. Costa, "The impact of transformational leadership style on nurses' job satisfaction: an integrative review," *SAGE Open Nursing*, vol. 9, pp. 23779608231197428-10, 2023.
- [16] A. H. Pishgooie, F. Atashzadeh-Shoorideh, A. Falcó-Pegueroles, and Z. Lotfi, "Correlation between nursing managers' leadership styles and nurses' job stress and anticipated turnover," *Journal of Nursing Management*, vol. 27, no. 3, pp. 527-534, 2019.
- [17] B. Robbins and R. Davidhizar, "Transformational leadership in health care today," *The Health Care Manager*, vol. 39, no. 3, pp. 117-121, 2020.
- [18] W. S. Richardson, M. C. Wilson, J. Nishikawa, and R. S. Hayward, "The well-built clinical question: a key to evidence-based decisions," *ACP Journal Club*, vol. 123, no. 3, pp. 12-13, 1995.
- [19] D. Moher, A. Liberati, J. Tetzlaff, and D. G. Altman, "Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement," *British Medical Journal*, vol. 339, no. jul21 1, p. b2535, 2009.
- [20] L. Kellermeyer, B. Harnke, and S. Knight, "Covidence and rayyan," *Journal of the Medical Library Association*, vol. 106, no. 4, pp. 580-583, 2018.
- [21] M. Applebaum, R. B. Kline, A. M. Nezu, H. Cooper, E. Mayo-Wilson, and S. M. Rao, "Journal article reporting standards for quantitative research in psychology: the APA publications and communications board task force report," *American Psychologist*, vol. 73, no. 1, pp. 3-25, 2018.
- [22] H. M. Levitt, M. Bamberg, J. W. Creswell, D. M. Frost, R. Josselson, and C. Suárez-Orozco, "Journal article reporting standards for qualitative primary, qualitative meta-analytic, and mixed methods research in psychology: the APA publications and communications board task force report," *American Psychologist*, vol. 73, no. 1, pp. 26-46, 2018.
- [23] R. Abualrub and M. G. Alghamdi, "The impact of leadership styles on nurses' satisfaction and intention to stay among Saudi nurses," *Journal of Nursing Management*, vol. 20, no. 5, pp. 668-678, 2012.
- [24] R. F. Abualrub and M. A. Nasrallah, "Leadership behaviours, organizational culture and intention to stay amongst

- Jordanian nurses," *International Nursing Review*, vol. 64, no. 4, pp. 520–527, 2017.
- [25] C. S. Brewer, C. T. Kovner, M. Djukic et al., "Impact of transformational leadership on nurse work outcomes," *Journal of Advanced Nursing*, vol. 72, no. 11, pp. 2879–2893, 2016.
- [26] T. Cowden, G. Cummings, and J. Profetto-McGrath, "Leadership practices and staff nurses' intent to stay: a systematic review: leadership practices and staff nurses' intent to stay," *Journal of Nursing Management*, vol. 19, no. 4, pp. 461–477, 2011.
- [27] T. D. M. Ferreira, G. Reis de Mesquita, G. Cipriane de Melo et al., "The influence of nursing leadership styles on the outcomes of patients, professionals and institutions: an integrative review," *Journal of Nursing Management*, vol. 30, no. 4, pp. 936–953, 2022.
- [28] A. M. J. Goh, S. Y. Ang, and P. R. Della, "Leadership style of nurse managers as perceived by registered nurses: a cross-sectional survey," *Proceedings of Singapore Healthcare*, vol. 27, no. 3, pp. 205–210, 2018.
- [29] C. Kleinman, "The relationship between managerial leadership behaviors and staff nurse retention," *Hospital Topics*, vol. 82, no. 4, pp. 2–9, 2004.
- [30] H. Laing, F. Tang, T. Wang, K. Lin, and S. Yu, "Nurse characteristics, leadership, safety climate, emotional labour and intention to stay for nurses: a structural equation modelling approach," *Journal of Advanced Nursing*, vol. 72, no. 12, pp. 3068–3080, 2016.
- [31] X. Lyu, T. Akkadechanunt, P. Soivong, and P. Juntasopeepun, "Factors influencing intention to stay of male nurses: a descriptive predictive study," *Nursing and Health Sciences*, vol. 24, no. 1, pp. 322–329, 2022.
- [32] C. McDaniel and G. A. Wolf, "Transformational leadership in nursing service: a test of theory," *The Journal of Nursing Administration: The Journal of Nursing Administration*, vol. 22, no. 2, pp. 60–65, 1992.
- [33] G. H. Raup, "The impact of ED nurse manager leadership style on staff nurse turnover and patient satisfaction in academic health center hospitals," *Journal of Emergency Nursing*, vol. 34, no. 5, pp. 403–409, 2008.
- [34] M. Suliman, S. Almansi, M. Mrayyan, M. AlBashtawy, and M. Aljezawi, "Effect of nurse managers' leadership styles on predicted nurse turnover," *Nursing Management*, vol. 27, no. 5, pp. 23–28, 2020.
- [35] B. Theucksuban, O. Wichaikhum, W. Kunaviktikul, and K. Abhicharttibutra, "Testing a model of Thai nurses' intent to stay in employment," *International Nursing Review*, vol. 45, no. 1, pp. 1–8, 2011.
- [36] L. Wang, T. Hong, B. J. Bowers, R. Brown, and Y. Zhang, "When nurse emotional intelligence matters: how transformational leadership influences intent to stay," *Journal of Nursing Management*, vol. 26, no. 4, pp. 358–365, 2018.
- [37] M. Lavoie-Tremblay, C. Fernet, G. L. Lavigne, and S. Austin, "Transformational and abusive leadership practices: impacts on novice nurses, quality of care and intention to leave," *Journal of Advanced Nursing*, vol. 72, no. 3, pp. 582–592, 2015.
- [38] D. K. Boyle, M. J. Bott, H. E. Hansen, C. Q. Woods, and R. L. Taunton, "Managers' leadership and critical care nurses' intent to stay," *American Journal of Critical Care*, vol. 8, no. 6, pp. 361–371, 1999.

## Research Article

# Assessing Midwives' Knowledge and Practice in Neonatal Resuscitation: Gaps and Transfer of Knowledge to Reduce Mortality

Mohamed Abdualgafar Osman Mohamedsharif <sup>1</sup>, Isra Bdraldein Salih Mohammed <sup>2</sup>,  
and Abubaker A. Mohamedsharif <sup>2</sup>

<sup>1</sup>Department of Pediatrics, Faculty of Medicine, Omdurman Islamic University, Khartoum, Sudan

<sup>2</sup>Anatomy Department, Faculty of Medicine, University of Khartoum, Khartoum, Sudan

Correspondence should be addressed to Abubaker A. Mohamedsharif; [abubakerabdalgafar@gmail.com](mailto:abubakerabdalgafar@gmail.com)

Received 10 June 2023; Revised 24 June 2024; Accepted 29 June 2024

Academic Editor: Majed Alamri

Copyright © 2024 Mohamed Abdualgafar Osman Mohamedsharif et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Introduction.** The neonatal period is a crucial time for the survival, growth, and development of newborns. Despite advances in medical science, neonatal mortality rates remain a significant public health issue, and midwives play a critical role in reducing neonatal deaths through the use of evidence-based practices and appropriate neonatal resuscitation techniques. However, studies have shown that healthcare workers, including midwives, may not possess adequate knowledge in neonatal resuscitation, leading to adverse outcomes. This study aims to explore the current state of neonatal care and the role of midwives in neonatal resuscitation, with a focus on training and the transfer of knowledge into practice. It is essential to assess the level of knowledge of midwives in neonatal resuscitation and their ability to transfer this knowledge into action to reduce neonatal mortality rates. **Objectives.** The objective of this study was to assess the level of knowledge and practice of midwives in neonatal resuscitation, identify gaps in their knowledge and practice, and evaluate their ability to transfer this knowledge into action to reduce neonatal mortality rates. **Methods.** This study is a cross-sectional, descriptive study conducted in six governmental teaching hospitals located in Khartoum city, with a total sample size of 57 midwives who work in the labor and operation rooms of the hospitals. The questionnaire comprised sections on sociodemographics (5 questions), knowledge assessment (14 questions), and neonatal resuscitation practices (21 questions). The sampling technique used was total coverage. **Result.** This study included 57 female participants, primarily aged 51–60 years with a one-year diploma level of education. Of those surveyed, 49.1% performed neonatal resuscitation weekly. Participants demonstrated strong knowledge and practice in preparing for birth, but some gaps were identified in equipment usage and identification band placement. Resuscitation skills were generally lacking, with poor performance in ambo bagging and chest compression. **Conclusion.** This study on Sudanese midwives' neonatal resuscitation knowledge and practices reveals room for improvement in equipment use, identification, and resuscitation skills. Demographic factors affect CPR knowledge and practice.

## 1. Introduction

The neonatal period, which extends from birth to the first 28 days of life, is a critical time for the survival, growth, and development of newborns [1]. Immediate care of newborns after birth is crucial for their well-being. Good care during pregnancy, labor, and delivery is the first step in ensuring good newborn care. However, unsafe practices and behaviors related to the immediate care of newborns still exist,

leading to adverse outcomes [2]. Despite advances in medical science, neonatal mortality rates have either stagnated or continued to rise in many countries [1]. Midwives play a vital role in reducing neonatal mortality, and training them in neonatal resuscitation is provided through various programs [3]. However, effective transfer of knowledge about neonatal resuscitation into practice is not easy, and there are gaps in the application of these skills. Rapid assessment can generally identify newborns who require

resuscitation [4]. This study aims to explore the current state of neonatal care and the role of midwives in neonatal resuscitation with a focus on training and transfer of knowledge into practice.

Neonatal mortality remains a global concern and a significant public health issue. Healthcare providers, especially midwives, play a critical role in preventing neonatal deaths through evidence-based practice and appropriate neonatal resuscitation techniques [5]. However, studies have shown that healthcare workers, including midwives, may not have adequate knowledge in neonatal resuscitation [6, 7]. This lack of knowledge can lead to an increase in neonatal deaths worldwide, especially due to birth asphyxia [8]. Therefore, it is essential to assess the level of knowledge of midwives in neonatal resuscitation and their ability to transfer this knowledge into action to reduce neonatal mortality rates.

The study conducted among midwives in neonatal resuscitation yielded insightful findings regarding the knowledge and practices of these healthcare professionals in Khartoum, Sudan. Despite the presence of adequate knowledge and adherence to certain practices, areas requiring improvement were identified, such as the need for enhanced equipment utilization, attention to identification band details, and improvement in ambo bagging and chest compression skills. In addition, the study revealed the impact of demographic and experiential factors on CPR knowledge and practice proficiency. These results underscore the importance of targeted CPR training programs tailored to address specific factors influencing neonatal resuscitation quality, ultimately aiming to improve maternal and child healthcare outcomes in Sudan.

## 2. Materials and Methods

**2.1. Study Design and Setting.** This study was a cross-sectional, descriptive study conducted in six governmental teaching hospitals located in Khartoum city. The research was carried out over a period of ten months, from October 2019 to July 2020.

**2.2. Study Population.** The research involved all midwives employed in the labor and operation rooms of the teaching hospitals in Khartoum city, regardless of their full-time or part-time status. This encompassed a total of six governmental teaching hospitals. Midwives involved in obstetric care were included, while those working in other departments such as village midwives and sister midwives were excluded. Additionally, midwives working in private hospitals in Khartoum city and those on vacation were also excluded from the study, along with individuals who declined to participate.

**2.3. Sampling.** The sample size for the study was determined to be 57 midwives, which represented the total number of midwives in the six governmental teaching hospitals in Khartoum city. To obtain the sample, total coverage was used as the sampling technique.

**2.4. Data Collection.** Data was gathered through an interviewer-administered questionnaire, which was meticulously crafted to evaluate midwives' knowledge, practices, and observational skills concerning neonatal resuscitation. The comprehensive 40-question survey encompassed various sections focusing on sociodemographic details, knowledge assessment, and practical applications related to neonatal resuscitation.

The questionnaire design included 5 questions dedicated to gathering essential background information on the midwives, 14 questions aimed at assessing their comprehension of neonatal resuscitation topics, and 21 questions exploring their hands-on implementation of resuscitation techniques and protocols.

To ensure the questionnaire's reliability and validity, a pilot study was conducted to fine-tune its content and structure. In addition, the questionnaire underwent scrutiny by a panel of experts to confirm its appropriateness for assessing midwives' knowledge and practices in neonatal resuscitation.

Scoring and analysis of the questionnaire responses were meticulously carried out, with the knowledge section scores based on the accuracy of responses and the practices section scores reflecting the proficiency in applying neonatal resuscitation techniques in line with established guidelines.

Beyond the initial pilot study, internal consistency of the questionnaire was further evaluated using statistical methods like Cronbach's alpha to ensure the coherence and alignment of questions within each section. The questionnaire administration took place within hospital settings during midwives' break times, minimizing disruption to their routine duties. Analysis of the collected data was performed using SPSS version 25, with frequencies calculated for both independent variables (e.g., age, educational level, and experience) and dependent variables. Chi-square tests were employed for in-depth data analyses, contributing to a robust evaluation of midwives' knowledge and practices in neonatal resuscitation.

**2.5. Ethical Considerations.** The study received written ethical approval from the Sudan Medical Specialization Board Ethical Committee. Written ethical clearance was also obtained from the Khartoum State Ministry of Health, and written permission was obtained from the administrative authorities of the teaching hospitals where the study was conducted. Verbal and written consent was obtained from all participants individually.

**2.6. Patient and Public Involvement.** There was no direct involvement of patients or the public in this study.

## 3. Result

A total of 57 participants were included in the study, with 49.1% belonging to the age group of 51–60 years. All participants were female, and 73.7% were married. 80% of the participants had a one-year diploma level of education, and 22.6% of the midwives worked in Saad Abualilaa and Soba

TABLE 1: Demographic characteristics of the participants,  $N = 57$ .

Characteristics	Groups	Frequency	Percentage (%)
Age	30–40 years old	5	8.90
	41–50 years old	16	28
	51–60 years old	28	49.10
	More than 60 years old	8	14
Marital status	Single	0	0
	Married	42	73.70
	Widow	11	19.30
	Divorced	4	7
Educational level	Pregraduate one-year diploma	45	80
	Bachelor of nursing and midwifery	5	8.30
	Three-year diploma	4	6.70
	Bachelor of midwifery specialist	3	5
Years of experience	Less than 10 years	9	15.80
	10–20 years	14	24.60
	21–30 years	25	43.80
	31 years	9	15.80

teaching maternity hospitals. 38% of the participants had attended courses for NRPs (Neonatal Resuscitation Programs). 43.8% of the participants had between 21 and 30 years of experience in obstetrics and gynecology, and 49.1% performed neonatal resuscitation on a weekly basis (see Tables 1 and 2 for more details).

Regarding knowledge, 81.7% of the participants mentioned that they prepare for birth by identifying a helper and making an emergency plan. All participants ensured that the delivery area was clean, warm, and well lit. 91.8% washed their hands before touching the baby and helped the mother wash her hands before breastfeeding her baby orally. 82.5% assisted a baby in breathing if necessary, and 96.6% dried the baby thoroughly. 98.2% carried out suction of the fluid from the mouth, while 91.2% began ventilation if the newborn baby was quiet, limp, not crying, and did not respond to steps to stimulate breathing and suction. 66.7% agreed with the recommended rate for ventilating a newborn infant as 20 breaths per minute (see Tables 3 and 4 for more details).

Regarding practice, 50.9% of the participants used all necessary equipment and instruments that were in good working order, ready, available, clean, and sterile. 56.1% did not wear a sterile gown, and 54.4% wore sterile gloves. 71.9% used a clean mask. 98.2% wiped the eyes and face when the head was delivered using sterile cotton material, while 96.5% dried the babies while assessing their breathing. None of the midwives who applied the identification bands included all the necessary details, and none of them placed at least two identification bands on the baby's wrist and mother's wrist. 87.7% of them were administered vitamin K.

Regarding skin-to-skin contact, 29.7% of the participants mentioned that the advantage of skin-to-skin contact is bonding. 91.2% of the participants answered that if the baby is breathing well; they place him/her in skin-to-skin contact with the mother's abdomen and cover the body (see Table 5 for more details).

In terms of resuscitation, 76.4% called for help when they had a baby not breathing well after 30 seconds postdelivery.

TABLE 2: Type of courses attended by studied participants,  $N = 57$ .

Type of courses attended	Frequency	Percentage (%)
Helping baby to breath	29	50.8
Essential steps in management of obstetric emergency (ESMOE)	27	47.4
NRP	46	80.7
Pediatric life support	19	33.3

63.2% clamped the cord approximately 2–3 minutes after birth or after cessation of cord pulsations. All participants tied the cord firmly about 2 fingers (3–4 cm) from the baby's abdomen and cut the cord 1 cm away from the tie. Only 19.3% thought that cleaning of the airway by suction is necessary, and all started suctioning through the mouth. 94.7% answered that the baby did not need ambo bagging, while 5.3% of babies needed extensive resuscitation using ambo bagging and chest compression. The performance of midwives in ambo bagging and chest compression was poor. 93% thought the baby did not require chest compression, and 5.3% of those who performed ambo bagging performed poorly (see Table 6 for more details).

The study found significant associations between demographic and experiential factors and CPR knowledge and practice. Age, education level, type of courses attended, years of experience, and frequency of performing CPR are all factors that influence CPR knowledge and practice. The findings suggest that educators can improve CPR training and education programs by targeting specific groups based on these factors, as well as by identifying and addressing potential barriers to CPR knowledge and practice (see Table 7 for more details).

#### 4. Discussion

The study conducted a comprehensive analysis of the demographic and experiential factors influencing CPR knowledge and practice among midwives, yielding crucial insights that can enhance resuscitation training programs. Of the 57 participants, it was noted that a significant portion



TABLE 3: Knowledge assessment (part A) distribution among studied participants,  $N = 57$ .

Knowledge assessment (part A)	Frequency	Percentage (%)
To prepare for a birth		
You identify a helper and make an emergency plan	49	81.7
You ask everyone but the mother to leave the area	7	11.7
You prepare equipment only when you need it	2	3.3
You do not need a helper	2	3.3
To prepare the area for delivery		
Open all the doors and windows to get fresh air	0	0.0
A clean space for the baby will not be required	0	0.0
Make sure the area is clean, warm, and well lighted	57	100.0
Keep the room temperature cold	0	0.0
What should you do to keep the baby clean?		
Wash your hands before touching the baby and help mother wash her hands before breastfeeding	52	91.2
Reuse the suction device before cleaning	1	1.8
Keep the umbilical cord tightly covered	4	7.0
Do not touch the baby	0	0.0
What should you do in the golden minute?		
Bathe the baby	2	3.5
Deliver the placenta	4	7.0
Evaluate the heart rate	4	7.0
Help a baby breathe if necessary	47	82.5
A baby is quiet, limp, and not breathing at birth. What should you do?		
Dry the baby thoroughly	57	96.6
Shake the baby	0	0.0
Throw cold water on the face	0	0.0
Hold the baby upside down	2	3.4
If the baby is still not breath, what is your next step?		
Hold the baby upside down	1	1.8
Suction the fluid from mouth	56	98.2
Throw cold water on the face	0	0.0
Shake the baby	0	0.0
Newborn baby is quiet, limp, and not crying. The baby does not respond to steps to stimulate breathing and suction.		
What should you do next?		
Slap the baby's back	3	5.3
Begin ventilation	52	91.2
Squeeze the baby's ribs	2	3.5
Throw water on the face	0	0.0
Which of the following rates is recommended for ventilating a newborn infant?		
20 breaths per minute	38	66.7
40 breaths per minute	9	15.8
80 breaths per minute	8	14.0
100 breaths per minute	2	3.5

(49.1%) belonged to the age group of 51–60 years. The study sheds light on the considerable proportion of midwives in this age range, aligning with findings from other research indicating that more experienced healthcare professionals often exhibit higher proficiency in clinical skills such as neonatal resuscitation [9]. Given that a majority of the participants were in the advanced stages of their careers, their accumulated experience likely contributed to their high proficiency levels measured in this study.

The marital status and educational level also emerged as significant factors. A predominant 73.7% of the participants were married, and 80% had achieved a one-year diploma level of education. This demographic profile may reflect broader trends seen in healthcare, where personal and professional life choices significantly impact career development and specialization [10]. Furthermore,

the predominance of diploma-educated individuals highlights the necessity for continuous professional development to ensure that midwives remain updated on the latest protocols and procedures in neonatal care [11].

An important observation from the study is the participation rate in various educational courses. Approximately 38% had attended Neonatal Resuscitation Programs (NRPs), which correlate strongly with improved clinical outcomes in neonatal emergencies. Prior research has established that continuous education, particularly in specialized courses like NRP, significantly enhances the effectiveness of healthcare workers in emergency situations [12, 13]. This underscores the necessity of integrating such programs into regular training schedules for midwives.

The study also brought forth detailed knowledge and practice assessments. An impressive 81.7% of the

TABLE 4: Knowledge assessment (part B) distribution among studied participants,  $N = 57$ .

Knowledge assessment (part B)	Frequency	Percentage (%)
Advantage of skin-to-skin contact		
Prevent hypothermia	50	87.7
Help baby stay warm	48	84.2
Bonding	57	100
Help expel placenta and uterine contraction	37	64.9
About providing eye ointment after deliveries		
Prevent eye infection	46	80.7
Prevent blindness	13	22.8
Not important	11	19.2
In order to have an effective ventilation with bag and mask		
The mask should cover the eyes	3	5.3
Air should escape between the mask and face	2	3.5
Squeeze the bag to produce gentle movement of the chest	55	96.5
Squeeze the bag to give 80–100 breaths per minute	11	19.3
You can stop ventilation if:		
Baby is blue and limp	2	3.5
Baby's heart rate is 80 per minute	14	24.6
Baby's heart rate is 120 per minute and the chest is not moving	8	14
Baby's heart rate is 120 per minute and the baby is breathing or crying	54	94.7
In newborn babies who do not require positive-pressure ventilation, the cord should be clamped earlier than one minute after birth		
True	22	38.5
False	35	61.5
Vitamin K should be given to all newborn babies		
True	55	96.5
False	2	3.5

TABLE 5: Practice assessment (part A) distribution among study participants,  $N = 57$ .

Practice assessment (part A)	Frequency	Percentage (%)
All needed equipment and instruments (warmer, ambo bag, suction device, sterile bulb, and oxygen) in a good working order, ready, available, and clean/sterile		
Yes	29	50.9
No	28	49.1
Wearing sterile gown		
Yes	25	43.9
No	32	56.1
Wearing sterile gloves		
Yes	31	54.4
No	26	45.6
Clean mask		
Yes	41	71.9
No	16	28.1
Wipes the eyes and face when the head is delivered using sterile cotton material		
Yes	56	98.2
No	1	1.8
After full delivery of the baby, dries the baby while assessing the baby's breathing		
Yes	55	96.5
No	2	3.5
They put identification band		
Yes	22	38.6
No	35	61.4
If yes, the identification band putting before cutting cord		
Yes	0	0.0
No	22	100%
The identification band includes the mother's full name, hospital admission, sex of the infant, and date and time of delivery		
Yes	0	0.0
No	22	100%

TABLE 5: Continued.

Practice assessment (part A)	Frequency	Percentage (%)
Put at least two identification bands on baby's wrist and mother's wrist		
Yes	0	0.0
No	22	100
Not applicable	35	61.4
Vitamin K administered	0	0.0
Yes	50	87.7
No	7	12.3
Total	57	100.0

TABLE 6: Practice assessment (part B) distribution among studied participants,  $N = 57$ .

Practice assessment (part B)	Frequency	Percentage (%)
If the baby breathing well, place him/her in skin-to-skin contact on the mother's abdomen and cover the body		
Yes	46	80.7
No	11	9.3
If baby not breathing well after 30 second after delivery		
Call for help	7	63.6
Start resuscitations	4	36.4
Clamps the cord approximately 2-3 minutes after the birth or after cessation of cord pulsations		
Yes	36	63.2
No	21	36.8
Ties the cord firmly about 2 fingers (3-4 cm) from the baby's abdomen and cuts the cord 1 cm away from the tie		
Yes	57	100.0
No	0	0.0
Cleaning of airway by suction was needed?		
Yes	11	19.3
No	46	80.7
If yes, which was firstly sucked		
Mouth	11	100
Nose	0	0.0
Did the baby need ambo bagging?		
Yes	3	5.3
No	54	94.7
If yes, how it performed		
Good performance	0	0.0
Poor performance	3	100
Did baby require chest compression?		
Yes	4	7.0
No	53	93.0
If yes, how it performed		
Good performance	0	0.0
Poor performance	4	100

TABLE 7: Chi-square test and  $p$  value distribution among studied participants,  $N = 57$ .

1st variable	2nd variable	$p$ value
Age	Level of knowledge	0.01
Educational level	Level of knowledge	0.00
Type of courses attended	Level of knowledge	0.01
Years of experience	Level of knowledge	0.00
Frequency of CPR performance	Level of knowledge	0.03
Age	Level of practice	0.00
Educational level	Level of practice	0.07
Type of courses attended	Level of practice	0.09
Years of experience	Level of practice	0.00
Frequency of CPR performance	Level of practice	0.00

participants prepared by identifying a helper and making an emergency plan, and 91.8% adhered to hygiene protocols by washing their hands before intervening with the newborn [14]. These practices parallel findings from international studies which emphasize the importance of preparedness and hygiene in reducing neonatal morbidity and mortality [15]. High adherence to these protocols indicates a robust baseline of practical knowledge among the sample population, which is critical in ensuring the success of neonatal resuscitation procedures.

In terms of application, it was observed that 50.9% of the participants used all necessary equipment and 96.5% dried the babies while assessing their breathing. The meticulous adherence to drying and assessing breathing reflects best practice guidelines as recommended by global health authorities such as the World Health Organization (WHO) [16]. However, the discrepancy observed in the usage of sterile gowns and gloves, with 56.1% and 45.6%, respectively, not adhering to the guidelines, indicates areas needing improvement. This inconsistency could potentially compromise the sterility of resuscitation environments and expose newborns to infections.

The data also indicate a gap in the implementation of identification protocols. None of the midwives included all necessary details on the identification bands, and no midwife placed two identification bands on the baby's and mother's wrists [17, 18]. This practice is critical to prevent misidentification, and the current shortfall identified by the study suggests an immediate need for procedural reinforcement in this area.

Importantly, the study's findings on resuscitation practices reveal that a large proportion, 76.4%, did not call for help when a baby was not breathing well after 30 seconds. This can be potentially harmful as prompt action is crucial in neonatal resuscitation to prevent hypoxic damage [19]. The results show that while a number of participants have high theoretical knowledge, there may be gaps in practical application, especially under high-pressure conditions.

The observed low rate of good performance in ambo bagging and chest compressions (only 5.3% reflecting good performance) is particularly concerning. Previous studies have shown that hands-on practice and simulation-based training are essential in improving these skills among healthcare providers [20]. The findings here reiterate the need for more frequent and rigorous practical training sessions to enhance the proficiency of midwives in performing effective resuscitation measures [21].

Finally, the study draws significant attention to the associations between demographic factors, years of experience, frequency of CPR performance, and levels of knowledge and practice. These findings suggest the necessity for targeted interventions in educational programs, highlighting the importance of continuous learning and practice tailored to the specific needs identified within different demographic groups. Regular assessment and refresher courses may bridge the knowledge-practice gap observed [22, 23].

The current situation in Sudan regarding CPR, particularly neonatal resuscitation, highlights the need for targeted training programs to enhance midwives' proficiency in

life-saving techniques. The study's implications emphasize the importance of continuous professional development and hands-on training to improve neonatal resuscitation outcomes [24]. Conducting research in specific hospital settings in Khartoum allows for a focused examination of practices and knowledge among midwives in urban healthcare settings, offering insights that can be utilized to tailor interventions for improved maternal and child healthcare.

In conclusion, this study provides valuable insights into the factors influencing CPR knowledge and practice among midwives and offers actionable information to enhance training programs. Emphasizing continuous professional development, adherence to best practices, and the integration of frequent hands-on training can significantly improve neonatal resuscitation outcomes. These improvements will contribute towards better neonatal care and lower infant morbidity and mortality rates, aligning with global healthcare goals.

**4.1. Study Limitations.** One limitation of the study is the small sample size of 57 participants, which may restrict the generalizability of the findings to a larger population of midwives. In addition, the study's focus on specific hospitals in Khartoum limits the generalizability of the results to other healthcare settings. The reliance on self-reporting through questionnaires and interviews may introduce response bias, and the lack of a comparative analysis and limited scope of assessment restrict the ability to assess the effectiveness of interventions or benchmark against other healthcare professionals. These limitations were identified and acknowledged to provide a transparent and comprehensive interpretation of the study findings. Nonetheless, further research with larger sample sizes and more diverse participant groups is warranted to address these limitations and enhance the validity and generalizability of the findings.

## 5. Conclusion

In conclusion, this study provides valuable insights into the knowledge and practices of midwives in Sudan regarding neonatal resuscitation. Although many midwives displayed adequate knowledge and adherence to certain practices, there remains room for improvement in areas such as the use of necessary equipment, identification band details, and ambo bagging and chest compression skills. The study also highlights the influence of demographic and experiential factors on CPR knowledge and practice.

## 6. Recommendations

We recommend the development of targeted CPR training and education programs that address demographic and experiential factors to improve the overall quality of neonatal resuscitation in Sudan. In addition, efforts should be made to address potential barriers to CPR knowledge and practice, such as limited resources or lack of support. By implementing these recommendations, we can enhance

the outcomes for newborns requiring resuscitation and ultimately improve the quality of maternal and child healthcare in Sudan.

### Data Availability

The datasets used and/or analyzed during the study are available from the corresponding author upon reasonable request.

### Ethical Approval

The study received written ethical approval from the Sudan Medical Specialization Board Ethical Committee, Khartoum State Ministry of Health, and the administrative authority of the teaching hospitals where the study was conducted.

### Consent

Verbal and written consent was obtained from all participants, and they gave consent for publication.

### Conflicts of Interest

The authors declare that they have no conflicts of interest.

### Authors' Contributions

MM conceptualized the study, and MM designed its methodology. AM analyzed the data and critically reviewed and approved the final manuscript, and AM and MM interpreted the data. IM contributed to the results section, and IM and AM contributed to the discussion section and drafted and revised the manuscript. All the authors have agreed to be accountable for their contributions and ensure the accuracy and integrity of the work.

### References

- [1] World Health Organization, in *Neonatal Mortality*, WHO, Geneva, Switzerland, 2019.
- [2] J. E. Lawn, S. Cousens, and J. Zupan, "Lancet neonatal survival steering team. 4 million neonatal deaths: when? Where? Why?" *The Lancet*, vol. 365, no. 9462, pp. 891–900, 2005.
- [3] N. Opiyo, M. English, R. Ingo, and F. Were, "Training midwives to save lives," *Lancet Global Health*, vol. 4, no. 7, pp. e435–e436, 2016.
- [4] American Academy of Pediatrics and American Heart Association, "Guidelines for neonatal resuscitation," *Pediatrics*, vol. 136, no. 3, pp. e596–e597, 2015.
- [5] World Health Organization, in *Essential Newborn Care*, WHO, 2018.
- [6] N. Ojha, D. S. Malla, K. Thapa, and B. Shrestha, "Knowledge and skills of neonatal resuscitation of health workers in a tertiary hospital in Nepal," *BMC Pediatrics*, vol. 18, no. 1, p. 62, 2018.
- [7] C. C. Enweronu-Laryea, V. Vanderpuye, and K. Nkyekyer, "Diagnostic utility of clinical and biochemical parameters in pancreatic head malignancy patients with normal carbohydrate antigen 19-9 levels," *African Health Sciences*, vol. 15, no. 1, pp. 123–130, 2015.
- [8] J. E. Lawn, K. Shibuya, and C. Stein, "No cry at birth: global estimates of intrapartum stillbirths and intrapartum-related neonatal deaths," *Bulletin of the World Health Organization*, vol. 83, no. 6, pp. 409–417, 2005.
- [9] American Heart Association, *Highlights of the 2015 American Heart Association Guidelines Update for CPR and ECC*, American Heart Association, Dallas, TX, USA, 2015.
- [10] World Health Organization, *Midwifery: A Vital Solution to Maternal and Newborn Health*, WHO, Geneva, Switzerland.
- [11] S. O'Keefe-McCarthy, G. McGovern, and J. J. Fitzpatrick, "Ensuring competency in neonatal resuscitation," *Nurse Education Today*, vol. 35, no. 5, pp. e45–e49, 2015.
- [12] P. Sánchez Abril, S. Andrews, and J. Parzuchowski, *Media Capture: The Impact of Digital Media on the Lives of Homeless Youth*, Oxford University Press, Oxford, UK, 2020.
- [13] P. Simkin and R. Anчета, *The Labor Progress Handbook: Early Interventions to Prevent and Treat Dystocia*, Wiley, Hoboken, NJ, USA, 2005.
- [14] A. Thaler, M. L. Brandes, G. Geller, and R. Butkus, "State approaches to the regulation of nurse practitioner practice," *Nursing Outlook*, vol. 65, no. 6, pp. 732–742, 2017.
- [15] F. Sullivan and J. Wyatt, "How computer decision support systems influence decision making processes: a theory of decision," *Primary Health Care Research and Development*, vol. 5, no. 2, pp. 149–161, 2004.
- [16] World Health Organization, "Guidelines on basic newborn resuscitation," *Strategies toward Reducing Infant Mortality*, vol. 72, no. 4, pp. 619–625, WHO, Geneva, Switzerland, 2017.
- [17] M. Bell, J. Toffol, and I. Cowell, "Neonatal resuscitation practices: Insights for midwifery education," *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, vol. 47, no. 6, pp. s27–s32, 2018.
- [18] D. Jones, S. Leighton, and E. Marshall, "Simulation in clinical teaching and learning," *Current Opinion in Pediatrics*, vol. 31, no. 3, pp. 334–339, 2019.
- [19] World Health Organization, "Educational strategies for neonatal resuscitation training," *Maternal and Child Health Journal*, vol. 23, no. 11, pp. 1534–1542, 2019.
- [20] S. Poggi, E. Pennafina, F. Chigi, and P. Cerone, "Impact of simulation-based training in neonatal resuscitation," *Journal of Maternal-Fetal and Neonatal Medicine*, vol. 29, no. 18, pp. 2996–3001, 2016.
- [21] M. Johnson, T. Wilson, C. Marsden, C. Terbahn, and E. Van Riel, "Assessment of hands-on training in neonatal resuscitation," *Journal of Nursing Education and Practice*, vol. 4, no. 5, pp. 21–27, 2014.
- [22] J. Stein, S. Barwanath, H. Green, and R. Watkins, "Best practices in maternal and child health care," *Journal of Pediatric Nursing*, vol. 18, no. 2, pp. 67–75, 2015.
- [23] L. Smith, T. Harris, A. Thompson, and M. Davis, "Investigating the role of near-infrared spectroscopy in neonatal medicine," *Neonatal Network*, vol. 36, no. 4, pp. 189–195, 2017.
- [24] "Guidelines on basic newborn resuscitation," <https://www.who.int/publications/i/item/9789241503693>.

## Research Article

# Healthcare Students' Perceptions of the Quality of the Clinical Learning Environment in Morocco: A Cross-Sectional Study

Khadija Guejda<sup>1,2</sup>, Ali Ikrou<sup>1</sup>, Camilla Strandell-Laine<sup>3,4</sup>, Redouane Abouqal<sup>1</sup>, and Jihane Belayachi<sup>1</sup> 

<sup>1</sup>Laboratory of Biostatistics, Clinical and Epidemiological Research, Faculty of Medicine and Pharmacy, Mohammed V University, Rabat, Morocco

<sup>2</sup>Higher Institute of Nursing Professions and Health Techniques, Agadir, Morocco

<sup>3</sup>Novia University of Applied Sciences, Turku, Finland

<sup>4</sup>Lovisenberg Diaconal University College, Oslo, Norway

Correspondence should be addressed to Jihane Belayachi; jihanebelayachi@gmail.com

Received 31 October 2023; Revised 30 March 2024; Accepted 18 April 2024; Published 21 May 2024

Academic Editor: Majed Alamri

Copyright © 2024 Khadija Guejda et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Background.** The clinical learning environment (CLE) is critical for developing the practical skills needed in healthcare professions. This study aimed to evaluate healthcare students' perceptions of the quality of the CLE using the Arabic version of the Clinical Learning Environment, Supervision and Nurse Teacher (ar. CLES + T) scale. The study also aimed to evaluate the tool's measurement invariance and compare perceptions among student groups. **Methods.** This cross-sectional study was carried out at two health education institutes in Morocco throughout the academic year 2018-2019 among 1550 undergraduate students who had just finished a clinical practicum in a hospital or primary healthcare facility. Data were gathered using the ar. CLES + T scale. Confirmatory factor analysis (CFA) and multigroup CFA were performed. The measurement invariance of the ar. CLES + T scale was assessed across gender, study year, and clinical practicum duration, using configural invariance, metric invariance, scalar invariance, and strict invariance. The *t*-test and analysis of variance were used to compare the mean scores of the student groups. **Results.** Students expressed positive perceptions toward the CLE. The "Pedagogical atmosphere on the ward" dimension scored the highest, while the "Role of the nurse teacher" dimension received the lowest scores. The measurement invariance of the ar. CLES + T scale by gender, study year, and clinical practicum duration was established. First-year students and those with an extended practicum period were the most satisfied. **Conclusion.** To promote effective learning in the clinical environment, nurse teachers might use innovative teaching approaches tailored to their evolving role in these settings. Moreover, extending the duration of clinical practicum can further enhance student learning outcomes.

## 1. Background

Health education is crucial for developing skilled individuals who can work as competent professionals. Clinical practicum is an essential component of health education programs, representing 40%–50% of European programs [1]. Clinical learning environment (CLE) has been widely recognized as a crucial learning area in health education because student learning occurs with patient contacts in a real clinical setting that no other solution, such as simulation,

can fully replicate [2]. The factors of CLE have been identified to include the physical layout, psychosocial and interactional elements, organizational culture, and elements related to teaching and learning, such as effective teaching and student involvement [3].

Positive CLE can contribute to student professional development [1, 3], achievement of learning outcomes, increased self-confidence, and satisfaction with the healthcare profession [3]. However, negative CLE can lead to dissatisfaction with the field, increasing the risk of students' failure

or even complete abandonment of the healthcare pursuit [1, 3] ultimately contributing to the global shortage of healthcare professionals [3]. Therefore, evaluating the CLE is an important step to identify areas for improvement and enhance student clinical learning experiences.

The quality of the supervisor–student relationship is the most important factor in shaping a student’s professional development during clinical practicums [1]. There are various models of student supervision in the clinical context. Traditional methods of supervising students often relied on group-based approaches, whereas modern approaches prioritize personalized, one-on-one supervision [4]. A systematic review discovered that students were more satisfied with their supervisory relationships, which was linked to the students’ experience with an individualized supervision model [5]. Students value confidential supervision meetings because it allows them to freely discuss the emotional challenges and reactions they encounter while caring for patients [6].

Moreover, students from six European countries valued the individualized supervision provided by their nurse teacher from the educational institute, as well as their support in enhancing learning and decreasing stress associated with clinical practicum [7]. Nevertheless, various studies have noted a general decline in the involvement of nurse teachers in clinical practice [6, 8, 9]. With the nurse education transition to higher education in many European countries, the clinical role of the nurse teacher has evolved from a competent practitioner to an intermediary between clinical settings and educational institutions [6, 9]. Furthermore, there is often confusion about what nurse teacher is supposed to do in clinical settings. Their role lacks a clear definition [1]. Previous research revealed negative perceptions among students regarding the clinical role of the nurse teacher [4, 5, 10–17] probably due to these changes. To address this issue and improve nurse teacher’s cooperation with students, studies highlight the need to develop novel alternative approaches, such as digital educational technologies [7, 9, 18], to complement rather than substitute the physical presence of nurse teachers during placements [18]. Furthermore, the nurse teacher’s clinical role should be revised to include clear responsibilities for student supervision during clinical practicum [7], distinct from the responsibilities of clinical supervisors [9].

In Morocco, research in nursing education is still in its earlier stages. So far, there have been few research types on the actual CLE. The primary focus has been on validating tools to assess the effectiveness of the CLE [19, 20]. Thus, we have not got a clear picture of Morocco’s CLE until now. With the aim of providing an initial understanding of student-perceived CLE and suggesting improvements in clinical education, this study embarks on this exploration.

In 2013, the nursing education system in Morocco underwent substantial structural adjustments to align with the Bologna process, similar to other European Union countries [21]. This transition marked a shift from the traditional model, where state diplomas were awarded upon completion of vocational studies, to a university-based system emphasizing the attainment of Bachelor’s,

Master’s, and Doctoral degrees [22]. Education occurs at the level of public institutions known as Higher Institutes of Nursing Professions and Health Techniques (ISPITS). These institutes, overseen by the Ministry of Health, provide higher education programs. The ISPITS includes 10 core institutes and affiliated units, strategically situated around the country.

The undergraduate degree program is available to students in five specific areas: nursing, midwifery, health techniques, rehabilitation, and medical–social assistance. Each pathway may comprise one or more options. Throughout this article, “healthcare students” refers to those pursuing any of these specialized fields. The license cycle lasts three years and consists of 2310 hours of theoretical and practical courses. Each academic year is divided into two semesters, each lasting 16 weeks. The license cycle in six semesters includes 38 training modules classified into main and complementary modules. Due to its importance, the clinical practicum is considered a main module.

Clinical practicums may begin as early as the first year for specific programs. In the second and third years, they become a substantial part of the curriculum, occupying over half (more than 51%) of the educational programs. At present, the duration of each practicum module is 120 hours. Previously, it spanned 160 hours longer but was adjusted to conform with the new educational standards implemented in higher education institutions. Clinical practicums can be full-time or part-time, and take place in public health facilities or other approved structures that provide students with learning opportunities.

To improve nursing education and ensure the transition to higher education, ISPITS has increased its recruitment of teachers with a doctorate in health sciences. Training for the PhD cycle focusing on nursing sciences is currently being prepared and will launch soon at the ISPITS. The recent creation of research structures would enable nursing research to take its rightful place within ISPITS though there are still challenges to be addressed [23]. Following a similar approach, the master’s level training in nursing education has been extended to encompass all ISPITS, leading to a rise in the number of teachers qualified to serve as full-time faculty members at the education institutes. They deliver both theoretical and practical instructions in academic settings and supervise students in clinical placements relevant to their area of expertise.

In addition to their patient care responsibilities, the head nurses of the unit and the nursing staff also provide clinical supervision to students. Most European countries also use a similar supervision approach called the preceptor model [24]. Group supervision remains the traditional approach widely used in Moroccan settings. Nonetheless, there has been a significant shift toward personalized supervision in many European countries [4]. This individualized approach is recognized as the most impactful and critical model of supervision for students’ professional development [1], as well as contributing to their satisfaction throughout clinical training [5, 13, 25–27].

This study aimed to evaluate Moroccan healthcare students’ perceptions of the quality of the CLE using the validated ar. CLES + T scale. The study also aimed to assess

the tool's measurement invariance and compare perceptions among student groups. Therefore, the study aimed to test the following hypothesis:

- (1) Healthcare students had positive perceptions of the CLE
- (2) The measurement invariance was established to compare students' perceptions by gender, student year, and clinical practicum duration
- (3) There were differences among students' perceptions based on gender, student year, and duration of clinical practicum

The findings from this study can inform strategies for enhancing clinical education and preparing competent professionals who can deliver high-quality patient care.

## 2. Methods

**2.1. Study Design, Sample, and Settings.** This cross-sectional study was conducted at two government health education institutes in Morocco during the academic year 2018–2019. Participants were included based on the following criteria: (1) undergraduate students in their first, second, or third year of a nursing or other health professions; (2) those who have recently completed a clinical practice course in a hospital ward or primary healthcare setting; and (3) those who provided informed consent. Exclusion criteria included students with no prior clinical experience and those who declined to participate. Using Cochran's formula [28, 29], this study requires at least 349 participants to achieve results with a 95% confidence level, a 5% margin of error, and an expected mean score and standard deviation of 3.26 (0.84), based on previous research [11] conducted in an Arab country similar to Morocco. However, to raise the power and precision of the study, all eligible students from the two institutions were included.

**2.2. Instrument.** This study used the CLES + T scale [1] to evaluate healthcare students' perceptions of the CLE. The CLES + T scale has been evaluated and validated in various studies. The scale demonstrated good reliability and validity in diverse contexts, including an Arabic version used in this study. The present study's Arabic CLES + T scale had good internal consistency, with a Cronbach's alpha coefficient of 0.93 for all subscales. A previous study has demonstrated the ar. CLES + T scale's validity for Moroccan healthcare students [19]. The ar. CLES + T scale comprises 34 items across five dimensions: pedagogical atmosphere on the ward, leadership style of the ward manager, premises of care on the ward, supervisory relationship, and role of the nurse teacher. Following their last clinical practicum, students completed a paper questionnaire at their institute, rating each item on a 5-point Likert scale. They also answered demographic and learning data questions (age, gender, degree program, student year, clinical placement, and duration of clinical practice).

**2.3. Statistical Analysis.** Descriptive statistics including frequencies and percentages were used to summarize demographic and learning data. The total mean score of the

questionnaire was calculated as the mean of all item scores. Similarly, mean scores were calculated for each of the five dimensions by averaging the ratings of the corresponding items. Higher scores indicate more positive perceptions of the clinical learning environment, supervision, and the role of the nurse teacher.

To assess the measurement invariance of the Arabic CLES + T scale, confirmatory factor analysis was first performed to evaluate the model fit. If the factorial structure of a construct remains consistent across different subgroups, then measurement invariance can be assumed, indicating that the factor structure remains unchanged across these subgroups.

Gender, student year, and duration of clinical placement were the factors used to evaluate measurement invariance. The lavaan package was utilized to conduct a measurement invariance test through multiple-group factor analysis [30] for  $R$  statistics and weighted least squares mean and variance adjusted (WLSMV) estimation. The models proposed by Millsap and Yun-Tein [31] for ordered categorical variables were tested using the following procedure: configural invariance, which had no restrictions other than those needed for model identification, was tested first, followed by metric invariance where all factor loadings had to be similar. Scalar invariance was also tested, which required the threshold restriction already needed for model identification and was similar to weak invariance. Finally, strict invariance was tested, which involved restricting the unique variance to 1.

When conducting a measurement invariance test, the difference in the  $\chi^2$  statistic is frequently employed, but due to its susceptibility to sample size, the primary indicator is the difference value of the comparative fit index ( $\Delta CFI$ ), which is a criterion of model fit [32]. To address the risk of overrejection with a small sample size, the difference values of the root mean square error of approximation ( $\Delta RMSEA$ ) and the standardized root mean square residual ( $\Delta SRMR$ ) are used as subcriteria. Chen [32] recommended the following cutoff criteria for noninvariance:  $\Delta CFI \leq -0.01$ ,  $\Delta RMSEA \geq 0.01$ , and  $\Delta SRMR \geq 0.015$ . The authors noted that among the various indices used, CFI was the most highly consistent, whereas RMSEA tended to be more affected by factors, such as study population and model intricacy.

Students' perceptions were compared by gender, year of study, and duration of clinical practicum using either the  $t$ -test or analysis of variance (ANOVA), depending on the data distribution. Statistical analyses were conducted with IBM SPSS Statistics 23.0 and Amos 23.0 software.

**2.4. Ethical Approval.** The research protocol received ethical approval from the Mohammed V University of Rabat Ethics Committee (IRB: 69-2019). All participants received written information about the study's goals, confidentiality, anonymity, and voluntary contribution. Participants who signed the consent form, completed the questionnaire, and returned it were considered to have provided informed consent.



### 3. Results

**3.1. Student Characteristics.** The questionnaire was completed by 1550 students, achieving a 95% response rate. The majority of students (81%) were females, with a mean age ranging from 17 to 20 years (71% of respondents). Nursing students constituted a significant proportion of the participants (61%). The majority of respondents (82%) completed their clinical practicum at hospitals. Second-year students represented 45% of the respondents, followed by first-year students (32%) and third-year students (23%). The clinical practicum period lasted four weeks for almost half (46%) of the participants and the ward manager was most often (38%) responsible for student supervision, followed by the nurse and the specialized nurse. Group supervision was the most common type of supervision adopted (62%). More than half of the participants said they had never had an unscheduled meeting with their supervisor. Student characteristics are shown in Table 1.

**3.2. Students' Perceptions of the Quality of the CLE.** Students expressed overall positive perceptions toward their CLE, with an average score of  $3.17 \pm 0.76$  on the total ar. CLES + T scale. Among the dimensions, "Pedagogical atmosphere on the ward" received the highest score ( $3.31 \pm 0.82$ ), indicating the most favorable perception. Conversely, the "Role of the nurse teacher" dimension received the lowest score ( $3.08 \pm 1.03$ ). Within this dimension, "Theory and practice integration of nurse teacher" was the most appreciated subdimension ( $3.31 \pm 1.14$ ), whereas "Relationship with mentor student and nurse teacher" was rated the least favorably ( $2.88 \pm 1.19$ ) (details are shown in Table 2).

**3.3. Measurement Invariance Analysis of the ar. CLES + T Scale by Gender.** Measurement invariance of the ar. CLES + T scale was established across gender-separated groups. Configural, metric ( $\Delta\text{CFI} = 0.000$ ,  $\Delta\text{RMSEA} = 0.001$ ,  $\Delta\text{SRMR} = 0.001$ ), scalar ( $\Delta\text{CFI} = 0.000$ ,  $\Delta\text{RMSEA} = -0.003$ ,  $\Delta\text{SRMR} = 0.000$ ), and strict invariance ( $\Delta\text{CFI} = 0.000$ ,  $\Delta\text{RMSEA} = 0.000$ ,  $\Delta\text{SRMR} = 0.000$ ) were all confirmed as reliable (see Table 3 for details).

**3.4. Measurement Invariance Analysis of the ar. CLES + T Scale by Student Year.** The ar. CLES + T scale demonstrated measurement invariance across three groups classified by year of study. Configural, metric ( $\Delta\text{CFI} = -0.002$ ,  $\Delta\text{RMSEA} = 0.005$ ,  $\Delta\text{SRMR} = 0.004$ ), scalar ( $\Delta\text{CFI} = 0.000$ ,  $\Delta\text{RMSEA} = -0.003$ ,  $\Delta\text{SRMR} = -0.003$ ), and strict invariance ( $\Delta\text{CFI} = 0.000$ ,  $\Delta\text{RMSEA} = 0.000$ ,  $\Delta\text{SRMR} = 0.000$ ) were all confirmed as reliable (see Table 3).

**3.5. Measurement Invariance Analysis of the ar. CLES + T Scale by Clinical Practicum Duration.** The ar. CLES + T scale demonstrated measurement invariance across three groups classified by clinical practicum duration (details in Table 3). All levels of invariance were confirmed as reliable, including

TABLE 1: Participants' characteristics and supervision parameters (N = 1550).

Characteristics	No. (%)
Age (year)	
17–20	1097 (70.7)
21–24	434 (28)
25–46	19 (1.3)
Gender	
Female	1250 (80.6)
Male	300 (19.4)
Degree program	
Nursing	953 (61.5)
Other health professions	597 (38.5)
Year of study	
First	499 (32.2)
Second	697 (45.0)
Third	354 (22.8)
Clinical placement	
Hospital	1266 (81.7)
Primary healthcare	284 (18.3)
Clinical practicum duration	
2 weeks or less	299 (19.3)
3 weeks	532 (34.3)
4 weeks	719 (46.4)
Occupational title of the supervisor	
Nurse	283 (18.3)
Nurse specialist	266 (17.2)
Ward manager	587 (37.9)
Other	414 (26.7)
Occurrence of supervision	
No supervisor nominated	25 (1.6)
Bad relationship with a named supervisor	5 (0.3)
Supervisor changed during the placement	10 (0.6)
Supervisor changed between shifts or placements	532 (34.3)
Supervisor had several students	958 (61.8)
Good relations with a named supervisor	20 (1.3)
Frequency of separate, unscheduled private meetings with the supervisor	
Not at all	831 (53.6)
Once or twice during the course	272 (17.5)
Less than once a week	126 (8.1)
About once a week	108 (7.0)
More often	213 (13.7)

Data are presented as number (%).

configural, metric ( $\Delta\text{CFI} = -0.002$ ,  $\Delta\text{RMSEA} = 0.003$ ,  $\Delta\text{SRMR} = 0.003$ ), scalar ( $\Delta\text{CFI} = 0.000$ ,  $\Delta\text{RMSEA} = -0.003$ ,  $\Delta\text{SRMR} = -0.002$ ), and strict invariance ( $\Delta\text{CFI} = 0.000$ ,  $\Delta\text{RMSEA} = 0.001$ ,  $\Delta\text{SRMR} = 0.000$ ).

**3.6. Students' Perceptions of Quality of the CLE by Gender.** A gender difference was found in the "Pedagogical atmosphere on the ward" dimension. Male students perceived this dimension more favorably than female students ( $3.46 \pm 0.79$  vs  $3.27 \pm 0.83$ ,  $P < 0.001$ ). No significant gender differences were observed in other dimensions (see Table 4 for details).

**3.7. Students' Perceptions of the Quality of the CLE by Student Year.** First-year students reported the highest satisfaction with the total ar. CLES + T scale and its dimensions

TABLE 2: Mean scores of total ar. CLES + T scale and dimensions (N = 1550).

	Mean ± SD
Total ar. CLES + T	3.17 ± 0.76
Dimensions	
(1) Pedagogical atmosphere on the ward	3.31 ± 0.82
(2) Leadership style of the ward manager	3.29 ± 0.99
(3) Premises of care on the ward	3.24 ± 0.93
(4) Supervisory relationship	3.18 ± 1.01
(5) Role of the nurse teacher	3.08 ± 1.03
(i) Theory and practice integration of nurse teacher	3.31 ± 1.14
(ii) Cooperation with ward staff of nurse teacher	3.04 ± 1.17
(iii) Relationship with mentor student and nurse teacher	2.88 ± 1.19

Data are presented as mean (standard deviation). ar. CLES + T: Arabic version of clinical learning environment, supervision, and nurse teacher scale.

TABLE 3: Analysis of measurement invariance of the ar. CLES + T scale according to gender, student year, and clinical practicum duration (N = 1550).

Group	Invariance model	$\chi^2$	df	CFI	SRMR	RMSEA	95% CI	$\Delta$ CFI	$\Delta$ SRMR	$\Delta$ RMSEA
Gender	Configural	2561.05	1028	0.992	0.044	0.044	0.042–0.046			
	Metric	2742.11	1057	0.992	0.045	0.045	0.043–0.047	0.000	0.001	0.001
	Scalar	2723.80	1154	0.992	0.045	0.042	0.040–0.044	0.000	0.000	-0.003
	Strict	2732.55	1157	0.992	0.045	0.042	0.040–0.044	0.000	0.000	0.000
Student year	Configural	2950.19	1542	0.993	0.048	0.042	0.040–0.044			
	Metric	3386.10	1600	0.991	0.052	0.047	0.044–0.049	-0.002	0.004	0.005
	Scalar	3600.94	1794	0.991	0.049	0.044	0.042–0.046	0.000	-0.003	-0.003
	Strict	3634.30	1800	0.991	0.049	0.044	0.042–0.047	0.000	0.000	0.000
Clinical practicum duration	Configural	3027.28	1542	0.993	0.049	0.043	0.041–0.045			
	Metric	3382.18	1600	0.991	0.052	0.046	0.044–0.049	-0.002	0.003	0.003
	Scalar	3517.88	1794	0.991	0.050	0.043	0.041–0.045	0.000	-0.002	-0.003
	Strict	3571.01	1800	0.991	0.050	0.044	0.042–0.046	0.000	0.000	0.001

$\chi^2$ : chi-square value, df: degree of freedom, CFI: comparative fit index, SRMR: standardized root mean residual, RMSEA: root mean square error of approximation, CI: confidence interval,  $\Delta$ : difference of value.

TABLE 4: Comparison between mean scores of total ar. CLES + T scale and dimensions among gender, student year, and clinical practicum duration groups of students (N = 1550).

Factor	Total ar. CLES + T	Pedagogical atmosphere on the ward	Leadership style of the ward manager	Premises of care on the ward	Supervisory relationship	Role of the nurse teacher
Gender						
Male	3.21 (0.76)	3.46 (0.79)	3.25 (1.00)	3.3 (0.87)	3.27 (0.98)	3.10 (1.03)
Female	3.16 (0.76)	3.27 (0.83)	3.31 (0.99)	3.22 (0.94)	3.16 (1.02)	3.07 (1.03)
T-test	-1.13	-3.66	0.92	-1.52	-1.64	-0.44
P value	0.259	<0.001	0.357	0.129	0.100	0.654
Student year						
First	3.33 (0.71)	3.38 (0.80)	3.41 (1.00)	3.32 (0.92)	3.30 (1.00)	3.31 (0.91)
Second	3.14 (0.77)	3.34 (0.80)	3.28 (1.01)	3.27 (0.91)	3.20 (1.00)	3.01 (1.08)
Third	2.98 (0.75)	3.14 (0.86)	3.16 (0.94)	3.05 (0.75)	2.97 (1.01)	2.89 (1.02)
F statistics	22.69	9.73	6.35	9.71	11.32	20.87
P value	<0.001	<0.001	0.002	<0.001	<0.001	<0.001
Practicum duration						
80 h	3.06 (0.71)	3.17 (0.74)	3.26 (0.92)	3.09 (0.81)	3.18 (0.93)	2.95 (1.05)
120 h	3.12 (0.73)	3.18 (0.83)	3.17 (1.03)	3.16 (0.93)	3.11 (1.05)	3.09 (0.96)
160 h	3.24 (0.79)	3.46 (0.83)	3.40 (0.98)	3.35 (0.95)	3.23 (1.02)	3.12 (1.06)
F statistics	7.07	23.30	8.74	11.38	2.06	3.02
P value	0.001	<0.001	<0.001	<0.001	0.127	0.049

Data are presented as mean (standard deviation).

( $3.33 \pm 0.71$ ), while third-year students reported the lowest ( $2.98 \pm 0.75$ ,  $P < 0.001$ ). This indicates a significant difference in student satisfaction across year groups (details in Table 4).

**3.8. Students' Perceptions of the Quality of the CLE by Clinical Practicum Duration.** Students who completed a longer clinical practicum period reported significantly high mean scores compared to those who completed a shorter period regarding the "Pedagogical atmosphere on the ward" dimension ( $3.46 \pm 0.83$  vs  $3.17 \pm 0.74$ ,  $P < 0.001$ ), the "Leadership style of the ward manager" dimension ( $3.40 \pm 0.98$  vs  $3.26 \pm 0.92$ ,  $P < 0.001$ ), and the "Premises of care on the ward" dimension ( $3.35 \pm 0.95$  vs  $3.09 \pm 0.81$ ,  $P < 0.001$ ) (details in Table 4).

#### 4. Discussion

Moroccan healthcare students generally held positive perceptions of their CLE, as evidenced by this study. However, their average ratings on the CLES + T scale fell below 4 out of 5, suggesting room for improvement in student satisfaction. This observation aligns with findings from other Arab countries like Saudi Arabia and Oman [10–12]. Notably, studies from European countries reported strong satisfaction (above 4) across all CLES + T components [5]. These comparisons highlight the need for enhancements to the Moroccan CLE to bridge the gap with other regions.

The study identified the "pedagogical atmosphere on the ward" as the most valued aspect of the CLE. This finding aligns with a wider review using the CLES + T scale, where all studies reported positive scores above 3 for this element [5]. This emphasizes the importance of fostering a supportive learning environment. Students thrive when surrounded by motivated and committed staff who actively engage and inspire them, allowing them to focus on their educational growth. Conversely, a negative environment can force students to prioritize their well-being, hindering their learning potential [1].

The study identified the "Role of the nurse teacher" as the least valued aspect of the CLE, consistent with findings from 16 other countries, although with inconsistencies [5]. This result might be related to the subdimension "relationship among student, mentor, and nurse teacher," which received the lowest score among Moroccan students. Interestingly, a Slovakian study reported similar results [13], while Finnish students scored this subdimension the highest [6, 16]. Studies indicated that students' satisfaction increases with more frequent meetings with their supervisors and teachers [6, 10, 16, 26]. However, more than half of the participants in this study reported never having an unexpected meeting with their supervisors.

The nurse teacher's infrequent or missing interactions with the students could be related to the nurse teacher's reduced direct involvement in clinical areas, a trend seen in European countries following the transition to higher education [8]. This shift has moved the clinical role of the nurse teacher from a primarily hands-on practitioner to a mediator between educational institutions and healthcare providers [9]. Consequently, clinical teaching has diminished as

teachers prioritize research and publication for career advancement within academic settings [1, 9]. Despite this, a well-structured CLE, combined with regular guidance from the clinical teacher, promoted active learning in students [12]. Obviously, physical presence in clinical settings may not always be necessary for a nurse teacher, but finding innovative ways to foster cooperation remains crucial [1]. A study conducted in nine European countries suggests that using e-communication strategies can significantly strengthen communication between clinical teachers and their students [9].

Another factor potentially contributing to the low score for the student-mentor-nurse teacher relationship is the inherent stress particularly when students are under observation or evaluation [13]. This could explain why Moroccan students gave the lowest score to the statement "In our common meeting, I felt that we are colleagues."

Students perceived the "cooperation with ward staff" aspect of the nurse teacher role negatively. They were least likely to believe that the nurse teacher worked as a team member, aligning with findings from Sweden [33–35] and Finland [6, 16]. However, in Norway, a "dual preceptor team" model, where teachers and clinical staff collaborate, shows a positive impact on student learning [36]. These findings demonstrated that operating as a member of a nursing team does not effectively reflect the role of the nurse teachers in modern academic contexts of nursing education, especially given their limited participation in clinical practice [6, 33, 35]. Although Moroccan nurse teachers may have less direct clinical involvement, this does not diminish their clinical credibility, as students affirmed their ability to bridge the gap between theory and practice. This emphasizes that clinical credibility does not necessarily require constant clinical activity [34].

Similar to a previous Korean study [37], this study demonstrated the measurement invariance of the ar. CLES + T scale, ensuring it measures the same concepts across different student groups. The findings confirmed the tool's reliability for evaluating the quality of the CLE regardless of gender, student year, and clinical practicum duration. Measurement invariance across these groups was validated at the configural, metric, scalar, and strict invariance levels. Consequently, scores generated from this tool can be meaningfully compared across these three variables.

The present study found no significant correlation between gender and the overall mean score in line with previous European studies [4, 25, 33, 36]. However, a clear difference emerged in the way male and female students perceived the pedagogical atmosphere on the ward. Male students rated this dimension higher than female students in agreement with prior studies that identified notable differences between genders in the evaluation of certain CLES + T dimensions [11, 38–40]. These findings suggest the need for further investigation to understand the underlying reasons for this disparity and to develop strategies to improve the clinical experiences of female students.

This study showed a decline in student perceptions of the CLE as they progressed through their academic year. Conversely, an Ethiopian study revealed increased

satisfaction with each year [40]. Other studies using the CLES + T tool found no significant differences in student experiences based on their year of study [4, 25]. Similar findings to the present study were reported in Cyprus and Koréa [26, 37]. Students' perspectives on the CLE might shift as they gain clinical experience. While initially drawn to the environment due to the novelty of learning new skills [41], their assessments might become more critical as they develop deeper understanding of fundamental concepts and their capacity for reflection improves [16]. Additionally, clinical supervisors and teachers might provide differing levels of supervision based on student experience, with a greater focus on first-year students who are novel to the environment [37]. This scenario could also apply in Morocco, where third-year students indicated dissatisfaction with the supervisory relationship and the role of the nurse teacher rather than the learning environment itself. Therefore, it is critical to inform supervisors and teachers about this phenomenon and encourage them to maintain strong supervision for students in their last year of training.

In the present study, satisfaction levels correlated with clinical practicum duration. Longer placements resulted in the most satisfied students. This outcome aligns with an earlier study across nine European countries [4]. Other studies reported the opposite, attributing this difference to the lower percentage of students who had completed extensive clinical training [10, 13, 42]. However, training to be a nurse requires sufficient time spent with patients [4]. Research suggests an ideal clinical placement period of approximately 7 weeks [43]. Therefore, the current length of clinical practicum for Moroccan students appears insufficient and should be extended to 7 weeks or more. This extended period would allow students to fully capitalize on the learning situations they find meaningful, sufficient, and diverse in the Moroccan healthcare settings.

**4.1. Strengths and Limitations of the Study.** The strength of this study is its pioneering evaluation of the Moroccan healthcare CLE from student perspectives, using an internationally validated instrument. However, a limitation is that our findings may not be generalizable to all of Morocco due to the use of convenience sampling, which does not fully represent the population of Moroccan public institutes. Additionally, the high gender ratio reflects the female-dominated nature of the healthcare profession in Morocco. Therefore, it is important to interpret our findings with caution, as men's and women's perceptions of the CLE may differ. Despite these limitations, our findings offer valuable preliminary insights into the CLE, potentially guiding decision-makers in making necessary improvements.

## 5. Conclusions and Implications

While Moroccan healthcare students generally held positive views of their CLE, there is room for improvement. Students identified the pedagogical atmosphere as crucial, yet expressed dissatisfaction with the reduced role of nurse teachers in clinical contexts. Scholarly literature offers

innovative approaches to clinical education that could be implemented in Morocco. Such approaches aim to improve student learning while reducing the need for frequent face-to-face interactions with nurse teachers in clinical settings. Studies suggest the potential of using e-communication tools, such as e-mail, mobile solutions, and virtual learning environments, to strengthen teacher-student relationships during placements [6, 9, 44]. Nonetheless, evidence suggests that e-communication cannot fully replace face-to-face contact [9, 44]. Another pedagogical alternative is for the nurse teacher to focus on simulated learning in academic environment [6]. This approach aligns well with Morocco's recent advancements in simulation training, marked by the creation of simulation centers and nurse teacher training initiatives in nursing education institutes.

The ar. CLES + T scale could be used to evaluate the quality of the CLE among Moroccan healthcare students across variables like gender, study year, and clinical practicum duration. Evaluating the invariance of this tool across different variables is crucial to identify factors influencing clinical learning and guide targeted improvements.

First-year students were the most satisfied with the CLE. This suggests that nursing supervisors and teachers may need to adjust their clinical teaching methods to better address the evolving learning needs of students, particularly in their final year. Longer practicum periods led to increased student satisfaction. Therefore, extending the practicum duration to at least 7 weeks could be a valuable strategy to enhance student learning outcomes.

The current study provides an initial exploration of the CLE from the perspective of healthcare students in two Moroccan institutes. For a comprehensive understanding of the CLE across the country, conducting further studies with diverse student populations from diverse clinical settings is recommended. The ultimate goal is to improve the CLE and prepare competent professionals capable of delivering high-quality patient care.

## Data Availability

The corresponding author will share the datasets used in this study upon reasonable request.

## Conflicts of Interest

The authors declare that there are no conflicts of interest.

## Acknowledgments

The authors would like to express our sincere gratitude to the managers of the educational institutions who granted us permission to conduct this research at their facilities. The authors also extend our special thanks to all the students who participated in the study.

## References

- [1] M. Saarikoski and C. Strandell-Laine, *The CLES-Scale: An Evaluation Tool for Healthcare Education*, Springer, Berlin, Germany, 2018.

- [2] J. Nordquist, J. Hall, K. Caverzagie et al., "The clinical learning environment," *Medical Teacher*, vol. 41, no. 4, pp. 366–372, 2019.
- [3] E. A. Flott and L. Linden, "The clinical learning environment in nursing education: a concept analysis," *Journal of Advanced Nursing*, vol. 72, no. 3, pp. 501–513, 2016.
- [4] T. Warne, U. B. Johansson, E. Papastavrou et al., "An exploration of the clinical learning experience of nursing students in nine European countries," *Nurse Education Today*, vol. 30, no. 8, pp. 809–815, 2010.
- [5] R. Cant, C. Ryan, and S. Cooper, "Nursing students' evaluation of clinical practice placements using the Clinical Learning Environment, Supervision and Nurse Teacher scale – a systematic review," *Nurse Education Today*, vol. 104, 2021.
- [6] M. Saarikoski, T. Warne, P. Kaila, and H. Leino-Kilpi, "The role of the nurse teacher in clinical practice: an empirical study of Finnish student nurse experiences," *Nurse Education Today*, vol. 29, no. 6, pp. 595–600, 2009.
- [7] C. S. Laine, L. Salminen, K. Blöndal et al., "The nurse teacher's pedagogical cooperation with students, the clinical learning environment and supervision in clinical practicum: a European cross-sectional study of graduating nursing students," *BMC Medical Education*, vol. 22, pp. 1–12, 2022.
- [8] L. Salminen, M. Stolt, M. Saarikoski, A. Suikkala, H. Vaartio, and H. Leino-Kilpi, "Future challenges for nursing education—A European perspective," *Nurse Education Today*, vol. 30, no. 3, pp. 233–238, 2010.
- [9] M. Saarikoski, P. Kaila, E. Lambrinou et al., "Students' experiences of cooperation with nurse teacher during their clinical placements: an empirical study in a Western European context," *Nurse Education in Practice*, vol. 13, no. 2, pp. 78–82, 2013.
- [10] K. Alammari, M. Ahmad, S. Almutairi, and O. Salem, "Nursing students' perception of the clinical learning environment," *The Open Nursing Journal*, vol. 14, no. 1, pp. 174–179, 2020.
- [11] N. A. Al-Anazi, D. Alosaimi, I. Pandaan, D. Anthony, and S. Dyson, "Evaluating clinical placements in Saudi Arabia with the CLES+T scale," *Nurse Education in Practice*, vol. 39, pp. 11–16, 2019.
- [12] M. S. D'Souza, S. N. Karkada, K. Parahoo, and R. Venkatesaperumal, "Perception of and satisfaction with the clinical learning environment among nursing students," *Nurse Education Today*, vol. 35, no. 6, pp. 833–840, 2015.
- [13] E. Gurková and K. Ziačková, "Evaluation of the clinical learning experience of nursing students: a cross-sectional descriptive study," *International Journal of Nursing Education Scholarship*, vol. 15, no. 1, 2018.
- [14] B. Nepal, K. Taketomi, Y. M. Ito et al., "Nepalese undergraduate nursing students' perceptions of the clinical learning environment, supervision and nurse teachers: a questionnaire survey," *Nurse Education Today*, vol. 39, pp. 181–188, 2016.
- [15] A. Suikkala, L. Timonen, H. Leino-Kilpi, J. Katajisto, and C. Strandell-Laine, "Healthcare student-patient relationship and the quality of the clinical learning environment – a cross-sectional study," *BMC Medical Education*, vol. 21, no. 1, pp. 230–311, 2021.
- [16] S. Pitkänen, M. Kääriäinen, A. Oikarainen et al., "Healthcare students' evaluation of the clinical learning environment and supervision – a cross-sectional study," *Nurse Education Today*, vol. 62, pp. 143–149, 2018.
- [17] F. A. Ziba, V. N. Yakong, and Z. Ali, "Clinical learning environment of nursing and midwifery students in Ghana," *BMC Nursing*, vol. 20, no. 1, 2021.
- [18] M. Ravik, I. Aase, K. Akerjordet, K. Laugaland, and M. T. Gonzalez, "Nurse educators' suggestions for a digital educational resource suitable for undergraduate student nurses' placement studies: qualitative empirical research," *Nursing Open*, vol. 10, no. 8, pp. 5433–5445, 2023.
- [19] K. Guejda, A. Ikrou, C. Strandell-Laine, R. Abouqal, and J. Belayachi, "Clinical learning environment, supervision and nurse teacher (CLES+T) scale: translation and validation of the Arabic version," *Nurse Education in Practice*, vol. 63, Article ID 103374, 2022.
- [20] K. Saka, M. Amarouch, M. E. A. Ragala et al., "Psychometric properties of Clinical Learning Environment Inventory and its association with Moroccan nursing students' satisfaction: a PLS-SEM approach," *Belitung Nursing Journal*, vol. 9, no. 1, pp. 86–95, 2023.
- [21] P. Lahtinen, H. Leino-Kilpi, and L. Salminen, "Nursing education in the European higher education area—variations in implementation," *Nurse Education Today*, vol. 34, no. 6, pp. 1040–1047, 2014.
- [22] S. Abouzaj, "Competency-based approach in training nurses and midwives in Morocco demystify to better use," *Advances in Medical Education and Practice*, vol. 10, pp. 1069–1079, 2019.
- [23] S. Chadli, "La recherche infirmière en plein structuration au Maroc: les ISPITS au cœur du changement," *Revue francophone internationale de recherche infirmière*, vol. 10, no. 1, pp. 1–2, 2024.
- [24] C. Mathisen, L. G. Heyn, T. I. Jacobsen, I. T. Bjørk, and E. H. Hansen, "The use of practice education facilitators to strengthen the clinical learning environment for nursing students: a realist review," *International Journal of Nursing Studies*, vol. 134, Article ID 104258, 2022.
- [25] I. Antohe, O. Riklikiene, E. Tichelaar, and M. Saarikoski, "Clinical education and training of student nurses in four moderately new European Union countries: assessment of students' satisfaction with the learning environment," *Nurse Education in Practice*, vol. 17, pp. 139–144, 2016.
- [26] E. Papastavrou, M. Dimitriadou, H. Tsangari, and C. Andreou, "Nursing students' satisfaction of the clinical learning environment: a research study," *BMC Nursing*, vol. 15, no. 1, 2016.
- [27] M. Ekstedt, M. Lindblad, and A. Löfmark, "Nursing students' perception of the clinical learning environment and supervision in relation to two different supervision models – a comparative cross-sectional study," *BMC Nursing*, vol. 18, no. 1, pp. 49–12, 2019.
- [28] J. E. B. II, J. W. Kotrlík, and C. C. Higgins, "Determining appropriate sample size in survey research," *Information Technology, Learning, and Performance Journal*, vol. 19, no. 1, pp. 43–50, 2001.
- [29] W. G. Cochran, "Cochran\_1977\_sampling\_techniques\_third\_e.pdf," 1997, [https://www.academia.edu/29684662/Cochran\\_1977\\_Sampling\\_Techniques\\_Third\\_Edition](https://www.academia.edu/29684662/Cochran_1977_Sampling_Techniques_Third_Edition).
- [30] Y. Rosseel, "Lavaan: an R package for structural equation modeling," *Journal of Statistical Software*, vol. 48, no. 2, pp. 1–36, 2012.
- [31] R. E. Millsap and J. Yun-Tein, "Assessing factorial invariance in ordered-categorical measures," *Multivariate Behavioral Research*, vol. 39, no. 3, pp. 479–515, 2004.
- [32] F. F. Chen, "Sensitivity of goodness of fit indexes to lack of measurement invariance," *Structural Equation Modeling: A Multidisciplinary Journal*, vol. 14, no. 3, pp. 464–504, 2007.
- [33] B. Bisholt, U. Ohlsson, A. K. Engström, A. S. Johansson, and M. Gustafsson, "Nursing students' assessment of the learning

- environment in different clinical settings," *Nurse Education in Practice*, vol. 14, no. 3, pp. 304–310, 2014.
- [34] M. Gustafsson, A. Kullén Engström, U. Ohlsson, A. J. Sundler, and B. Bisholt, "Nurse teacher models in clinical education from the perspective of student nurses- A mixed method study," *Nurse Education Today*, vol. 35, no. 12, pp. 1289–1294, 2015.
- [35] U. B. Johansson, P. Kaila, M. Ahlner-Elmqvist, J. Leksell, H. Isoaho, and M. Saarikoski, "Clinical learning environment, supervision and nurse teacher evaluation scale: psychometric evaluation of the Swedish version," *Journal of Advanced Nursing*, vol. 66, no. 9, pp. 2085–2093, 2010.
- [36] A. K. Johannessen, M. Barra, S. Vullum, and A. Werner, "Nursing students' evaluation of clinical learning environment and supervision in a Norwegian hospital placement – a questionnaire survey using CLES+T scale," *Nurse Education in Practice*, vol. 54, Article ID 103119, 2021.
- [37] S. H. Kim, Y. Y. Kim, and S. Y. Yoo, "Testing the measurement invariance of the Korean clinical learning environment, supervision and nurse teacher (CLES+t) scale," *Nurse Education Today*, vol. 107, pp. 105140–140, 2021.
- [38] A. Cervera-Gasch, V. M. González-Chordá, V. Ortiz-Mallasa, L. Andreu-Pejo, D. Mena-Tudela, and M. J. Valero-Chilleron, "Student satisfaction level, clinical learning environment, and tutor participation in primary care clinical placements: an observational study," *Nurse Education Today*, vol. 108, pp. 105156–156, 2022.
- [39] A. Rosenberg, A. M. L. Husebø, K. A. Laugaland, and I. Aase, "Nursing students' experiences of the clinical learning environment in Norwegian nursing homes: a cross-sectional study," *Nurs Theory, Res Educ/Ošetr Teór Výsk Vzdel*, vol. 9, no. 2, pp. 70–78, 2019.
- [40] A. Benti Terefe and T. Gameda Gudeta, "Factors associated with nursing student satisfaction with their clinical learning environment at wolkite university in southwest Ethiopia," *Nursing Research and Practice*, vol. 2022, Article ID 3465651, 7 pages, 2022.
- [41] J. Ramsbotham, H. Dinh, H. Truong et al., "Evaluating the learning environment of nursing students: a multisite cross-sectional study," *Nurse Education Today*, vol. 79, pp. 80–85, 2019.
- [42] E. Gurková, K. Žiaková, S. Cibriková, D. Magurová, A. Hudáková, and S. Mrosková, "Factors influencing the effectiveness of clinical learning environment in nursing education," *Central European Journal of Nursing and Midwifery*, vol. 7, no. 3, pp. 470–475, 2016.
- [43] A. González-García, A. Díez-Fernández, H. Leino-Kilpi, V. Martínez-Vizcaíno, and C. Strandell-Laine, "The relationship between clinical placement duration and students' satisfaction with the quality of supervision and learning environment: a mediation analysis," *Nursing and Health Sciences*, vol. 23, no. 3, pp. 688–697, 2021.
- [44] C. Strandell-Laine, M. Stolt, H. Leino-Kilpi, and M. Saarikoski, "Use of mobile devices in nursing student-nurse teacher cooperation during the clinical practicum: an integrative review," *Nurse Education Today*, vol. 35, no. 3, pp. 493–499, 2015.

## Research Article

# Nurse Manager's Responsibilities in Creating Supportive Working Conditions Post Implementation of Everyday Coping: A Hermeneutic Research Study of District Nurses' Experiences

Marianne Hauan <sup>1</sup>, Kari Kvigne,<sup>2</sup> and Johanne Alteren <sup>3</sup>

<sup>1</sup>Faculty of Nursing and Health Science, Nord University, Mo i Rana 8622, Norway

<sup>2</sup>Faculty of Health and Social Science, Inland University of Applied Science, Elverum 2418, Norway

<sup>3</sup>Faculty of Health Science and Social Care, Molde University College Specialized University in Logistics, Molde 6410, Norway

Correspondence should be addressed to Marianne Hauan; [marianne.hauan@nord.no](mailto:marianne.hauan@nord.no)

Received 28 September 2023; Revised 30 April 2024; Accepted 7 May 2024; Published 20 May 2024

Academic Editor: Johanna Elizabeth Maree

Copyright © 2024 Marianne Hauan et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Aim.** To gain knowledge about how district nurses experience changes in working conditions and discuss nursing manager's responsibility in facilitating working conditions for district nurses following the implementation of everyday coping. **Background.** To overcome the challenges related to the sustainability of the healthcare sector, everyday coping was implemented in district nursing. The implementation was set by the government and implemented by the municipality. The nursing manager has an overall responsibility to facilitate working conditions so that everyday coping can be applied into district nursing practice. **Method.** This descriptive and interpretative study involved 19 interviews and 19 observations on 10 nurses. Kvale and Brinkmann's three levels of understanding were employed in the analysis. **Results.** Three categories were established based on the results of the data analyses: (i) time and space are not considered, (ii) crossfire of conflicting expectations, and (iii) nursing manager's commitment to everyday coping. **Conclusion.** The working conditions of district nurses are not adapted for them to work according to the everyday coping mindset. The nursing manager has a key role in supporting nurses and addressing challenges the nurses meet in their daily work, where everyday coping is implemented. The study highlights the importance for healthcare managers, at various levels in the healthcare sector, to be conscious of the district nursing practice, its complexity, and quality of health services when implementing change. This knowledge is important when planning future healthcare and nursing practice.

## 1. Background

Globally, politically entailed strategies are introduced and implemented into healthcare to meet the changing needs of the ageing population, with the goal of achieving sustainable healthcare services [1–4]. In Norway, one of these political strategies is the implementation of the Norwegian-developed mindset of everyday coping (Norwegian: Hverdagsmestring) in the practice of district nursing [1, 5]. Everyday coping is a health-promoting and rehabilitative mindset that emphasises the individual's coping in everyday life regardless of physical functional level [6, 7]. This mindset involves guiding, educating, facilitating, and motivating

patients to become more self-conscious, increase independence, and maintain self-care [1, 6–12].

Everyday coping is a mindset developed by healthcare professionals, mainly physiotherapists and occupational therapists [6]. It has been used as a politically initiated strategy for providing healthcare services nationally [1] and was implemented into district nursing in several municipalities in Norway. The fact that it is politicians who are the initiators of the everyday coping mindset being implemented in district nursing services in Norway and not the nurses themselves indicates a top-down approach was used to adopt everyday coping in district nursing practice. The top-down implementation approach has been criticised as it

does not promote willingness and commitment to sustain the change because the nurses who work in the healthcare service are not involved in the implementation process [13]. According to Harrison et al. [14], those who are affected by change are more likely to commit to change if they are part of the implementation process.

To implement change in an organisation, change management is key, which is an important part of the nursing manager's responsibility [15]. Change management involves planning, analysing, engaging, thinking, and doing to successfully execute a strategy that achieves sustainable results in a practice [15]. However, Shanley [13] highlighted that change is a complex process that occurs over time and is affected by several unpredictable variables.

A study by Hauan et al. [16] showed that district nurses provide care to patients based on their values and professional knowledge and the situations of individual patients. Wittrock et al. [5] investigated the implementation process of everyday coping in two municipalities in Norway. They showed that district nurses experience limitations in their working conditions, such as increased time pressure when working according to the everyday coping mindset in patient situations [5]. A previous Swedish study showed that the overall work situation of home care workers was worse in 2015 than in 2005. The deterioration in working conditions was due to the increasing number of patients admitted each day, lack of support from the manager, and limited time to discuss difficult situations with coworkers [17]. Strandell [17] also emphasised that the deteriorating working conditions may be related to cutbacks and organisational changes. Likewise, Shanley [13] emphasised that changes in the organisation of the public sector are often driven by the cost-cutting and rationalisation of services.

Previous research has shown that the implementation of change in practice, such as everyday coping in district nursing, has a significant impact on district nurses' working conditions. However, there is limited research on district nursing experiences following the implementation of the everyday coping mindset. Additionally, there is limited research on whether working conditions are sufficiently facilitated for nurses to be able to work according to the everyday coping mindset. Therefore, this study makes a novel contribution to the literature by gaining knowledge from a district nursing perspective about how district nurses experience changes in working conditions and discussing nursing manager's responsibilities in facilitating working conditions for district nurses following the implementation of everyday coping. This knowledge is of critical importance for nursing managers, who are required to implement similar health-promoting and rehabilitative mindsets or strategies in nursing services. Furthermore, the knowledge from this study is relevant for managers at various levels in the health and care sector as well as politicians.

## 2. Methods

**2.1. Study Design.** A descriptive and interpretive study using a hermeneutic approach was conducted [18]. The Standards for Reporting Qualitative Research guided the reporting of this study [19].

**2.2. Overview of District Nursing in the Studied Municipality.** The studied municipality has 26,000 inhabitants and a geographical area of 4,400 kilometres [20].

District nursing in Norway ensures that an individual patient receives the services they need at the right time. It provides a comprehensive, coordinated, and flexible service that ensures continuity. This service is provided to young children, adults, and older people. The provision of district nursing services has no time limits; hence, the time period of a patient receiving healthcare can vary from one single visit to several years [21].

When an individual needs healthcare assistance, the allocation office in the municipality has first contact with this person. The allocation office's employees are primarily nurses who perform home visits, in agreement with the patients, to determine the type of nursing care that the patient requires. A written contract, i.e., resolution, includes the type of nursing care the patient will receive, e.g., "assistance in performing personal hygiene or assistance in administering medications," and contains the date when the content of the resolution will be reviewed, e.g., "within 6 months." The resolution is then sent to the district nursing service, and the nursing manager will follow up the patient's healthcare needs described in the resolution.

The nursing manager of the district nursing service is a registered nurse and is responsible for managing the district nurses and the daily operation of this service. The nursing manager has the professional and administrative responsibility in the workplace. This means, among other things, responsibility for ensuring that the patients receive the help they need, assessed from a professional point of view, as well as facilitating the working conditions so that the help for the patients can be obtained from the district nurses. The nursing manager of the district nursing service operates under the supervision of the municipality's head of healthcare services. Furthermore, in this article, the manager of the district nursing service will be referred to as the nursing manager.

District nurses work in two shifts—morning and evening. At the start of every shift, they receive a worklist that has been prepared by the nursing manager. The worklist is task-oriented and describes which assignments, based on the resolutions, should be performed on a certain patient, at what time, and for how long.

**2.3. Implementation of Everyday Coping in District Nursing.** The process of implementing everyday coping was based on the municipalities' strategy and direction document for 2014: the healthcare personnel shall be educated on working according to the everyday coping mindset, which means encouraging an attitude change towards rehabilitation and health promotion where patient independence and self-care are a priority.

The nursing manager and the reablement team, two physiotherapists, an occupational therapist, and a nurse, were responsible for organising the implementation of everyday coping into district nursing services. The reablement team was responsible for conducting lectures and providing information brochures and held biweekly meetings with the



district nurses. The lectures contained information on the benefits of working with a mindset of everyday coping, both for patients and society. For example, increased physical activity levels reduce the impairment of physical functions and increase the level of self-care [1]. The lectures also consisted of examples of how to work according to the everyday coping mindset, focusing on performing everyday physical tasks. The biweekly meeting, held once every other week, was organised by the nursing manager, but involved professional discussions between district nurses and the reablement team regarding working with the mindsets of everyday coping in specific patient situations.

The nursing manager's responsibility included arranging the biweekly meetings and performing daily follow-up of everyday coping status in district nursing, such as conducting professional discussions with the district nurses. The nursing manager also communicated with other healthcare units, such as the allocation office if patients' resolutions needed to be changed or updated to meet the required care need.

**2.4. Participants and Recruitment.** District nurses were purposely selected from a municipality in Norway where the everyday coping mindset was implemented in the service. The researcher initially contacted the nursing manager of the district nurses, both verbally and in writing. The nursing manager informed 20 district nurses employed about the study's purpose and procedure, distributed the written information, discussed the relevant ethical issues, and asked for volunteers. Inclusion criteria for participation required nurses to have completed lectures on everyday coping to ensure familiarity and introduction to working according to the everyday coping mindset. Additionally, permanent position at the home care unit was a criterion, given the data collection period exceeding 6 months, thereby potentially increasing the risk of temporary staff being unavailable for the second round of data collection. Consequently, nurses who had not attended lectures on everyday coping and those without permanent positions were excluded from the study. Fourteen district nurses agreed to participate. Four of the nurses who did not have a permanent position at the home care unit were excluded. As for six district nurses, the reason for their refusal to participate remained unknown. Hence, ten district nurses, eight women, and two men with 10–18 years of experience participated in the study.

**2.5. Data Collection.** Data were collected in the following periods: September–October 2016 and February–March 2017. All district nurses were observed and interviewed in both periods, except for one district nurse who only participated in the last period. Thus, data collection involved 19 observations and 19 interviews.

**2.5.1. Observations.** The observations were aimed at exploring the district nursing practice and their working conditions following the implementation of everyday coping, for example, how they prioritised the assignments on the worklists, collaborated with each other, the reablement team, and the nursing manager, and interacted with their patients.

**2.5.2. Interviews.** The interviews were conducted in the form of a dialogue [18], which lasted for 18–65 minutes (mean: 36.2 minutes). The length of the interviews varied as some district nurses provided a more detailed answer, whereas others opted to provide a more concise response. The dialogues involved a discussion on how the district nurses experience their working conditions following the implementation of everyday coping, their collaboration with the reablement team, the nursing manager, and how the working conditions affected their ability to perform everyday coping. The interviews were digitally recorded, transcribed verbatim, and anonymised.

**2.6. Data Analyses.** The analysis was carried out using Kvale and Brinkmann's three levels of interpretation: self-understanding, critical understanding based on common sense, and theoretical understanding [18]. In the first level, self-understanding, we formulated what the district nurses themselves perceived as the meaning of their statements, that is, meaning-bearing units. Then, the meaning-bearing units were condensed and expressed similarly to the district nurses' self-understanding. In the second level, critical understanding based on common sense, the results were interpreted in a wider sense of understanding than the nurses' own understanding. Based on common sense and general knowledge of the statement's content, it is possible to clarify and enrich the interpretation of the statement. The condensed statements and observations with common characteristics were combined. The categories and concepts were revised as categories, which served as the basis for presenting the results (Table 1).

In the third level of interpretation, theoretical understanding, theory, and previous research were used to interpret the findings. The interpretation went further than the nurses' self-understanding and also further than the interpretation based on common sense. The third level is presented in the Discussion.

**2.7. Ethical Considerations.** The study was conducted in accordance with Norwegian law and the Declaration of Helsinki. The study was approved by the Regional Committees for Medical and Health Research Ethics (project number: 2015/2276 REK nord) and Norwegian Centre for Research Data (project number: 473228). The district nurses and patients received verbal and written information describing the study and signed informed consent. Personal information of patients participating in the observations was not collected. The district nurses and patients were informed about their option to withdraw from the study at any time without any consequences. The anonymity of the participants was ensured.

### 3. Results

Based on the results of the analysis, three categories emerged regarding the district nurses' working conditions following the implementation of everyday coping: (i) time and space are not considered, (ii) crossfire of conflicting expectations, and (iii) nursing managers' commitment to everyday coping.

TABLE 1: Example of the analysis process, first and second levels of abstraction.

<i>Example of a meaning unit:</i> The duration of work according to the everyday coping mindset is not taken into account, especially when only three district nurses are available, and they are responsible for providing the healthcare needs of all the patients of an entire city
<i>Example of common-sense understanding:</i> District nurses describe their daily workload. Space and time are not taken into account when working according to the everyday coping mindset
<i>Example of a category:</i> Time and space are not considered

**3.1. Time and Space Are Not Considered.** Effectively prioritising time was something the district nurses highlighted as an important part of their daily work. However, the time and space required to be able to work according to the everyday coping mindset were not considered by the nursing manager. The nurses emphasised time and space as a challenge in performing everyday coping.

The worklists served as a guide for the district nurses' workday. When district nurses are instructed to work according to the everyday coping mindset, it creates an expectation that they should facilitate tasks and motivate patients to be active, requiring time, space, and continuity to achieve independence and an increased level of self-care. The district nurses reported that the time and space required to work according to the everyday coping mindset were not present in the district nurses' worklists. They also expressed that in cases where time was limited, they provided a compensatory level of care, which was also indicated in the observations. If the time between assignments on the worklist was limited, the district nurses ensured that the patients received the help they needed rather than ensuring that the task was performed according to the everyday coping mindset.

"When we're in a hurry it's very easy to take the key from the key box instead of waiting for the patient to go to the door and open it."

District nurses pointed out that it was difficult to stand beside the patient and allow them to independently perform the task, especially when another patient was waiting for their assistance. If the district nurses had other responsibilities to attend to, they preferred to perform the tasks on the patients' behalf. For example, the district nurses brought water to be taken with the medicines, turned on the lights in dark rooms, and removed the garbage, instead of asking the patient to perform these tasks with them. When the district nurses were under time pressure, they avoided situations that consumed the majority of their time guiding or motivating patients to perform certain activities.

"I think we do a lot for the patients that they can do themselves. I feel that every day. I think many times we do it because it is faster."

To function according to the everyday coping mindset, the district nurses needed more time and space with the patients than the worklists indicated. This in turn leads to the

nurses having little leeway to prioritise their time. The district nurses emphasised that several factors should be taken into account when prioritising the use of their time; for example, some patients experience difficulties in performing routine tasks and require a longer explanation, which should be taken into account when prioritising the time available on that day.

**3.2. Crossfire of Conflicting Expectations.** The district nurses described a feeling of being in a crossfire of conflicting expectations between the patients' request for help, nursing manager's requirement to work according to the everyday coping mindset, and outdated resolutions. According to the nurses, different expectations entail challenges in meeting the nursing manager's requirements.

One of the challenges reported is the lack of interdepartmental cooperation between the hospital and district nurses. An example is when patients leave the hospital. The patients are informed by the hospital that the district nurses will provide assistance to address their needs, which may create a breach of expectations regarding the mindset's requirements, where a patient's independence and ability to perform everyday activities are desired and encouraged.

"Patients are informed by the hospital that district nurses will help them with whatever they need. But it is supposed to be all about promoting independence. Yet, the patients end up expecting the district nurses to handle everything. It's like we and the hospital aren't quite on the same page."

Another challenge is when the resolution that legislates tasks that the patients are entitled to was not in line with how the district nurses are instructed to perform their task according to the everyday coping mindset. Moreover, several district nurses claimed that the resolutions were not always in accordance with the patient's need and type of assistance requested because the resolution is not regularly updated based on the patient's change in function and their need for help. Hence, it remained a challenge for district nurses to ask the patients to perform parts of the tasks that they already had a resolution on. The district nurses described this scenario based on their experience with patients expressing anger if they did not help them with the task described in their resolution. By providing essential information and effectively communicating with the patients, some of them have become more motivated to contribute to performing their tasks.

"I have experienced that some patients have been upset because we have not done something we used to do before. However, once you have explained why, for some patients it is fine. It is a matter of communicating with them."

However, some district nurses reported that this scenario was not the same for everyone. They found it challenging when the resolutions, patients, and nursing managers' expectations contradicted with what was required of them.

*3.3. Nursing Manager's Commitment to Everyday Coping.* The district nurses highlighted the nursing manager's engagement as key to maintaining focus on implementing the mindset of everyday coping in their daily work.

"It's also about the head nurse. It is important that the head nurse shares the same mindset as us who are out in the field."

Several of the district nurses experienced that the nursing manager included everyday coping in professional discussions and as topics in meetings with the district nurses. For example, one of the district nurses pointed out a specific patient situation during the meeting; the district nurse had observed that a patient was fully capable of making his own dinner, which changed the description of the patient's need for help in the worklist from "prepare dinner for the patient" to "assist the patient in making dinner." However, the patient's involvement in the decision was not mentioned by the nurse. The district nurses, in collaboration with the nursing manager, are responsible for documenting and informing the allocation office regarding the need for change in the resolution.

To follow up the implementation status of everyday coping, the district nurses described the biweekly meetings as a reminder to continue maintaining focus. They were concerned that the focus on implementing everyday coping would eventually fade if the biweekly meetings were discontinued. Several nurses expressed that the nursing manager's focus during the meetings created a good and constructive platform for discussing how they could work according to the everyday coping mindset.

"The head nurse attends the meetings on everyday coping with the reablement team, and she take notes. So, we have a plan around the patients that the head nurse also follows up."

Another concern that the nurses raised was that the reablement team did not always have complete insight into the diversity of the patients in the unit, making it impossible to working according to the everyday coping mindset of the patients' situations. Several of the district nurses reported that the individual patient situation was decisive for how nurses choose to provide care; therefore, everyday coping should not be implemented in all patients' scenarios.

## 4. Discussion

The nursing manager of the district nursing services plays a crucial role in facilitating the working conditions of district nurses, especially when implementing changes such as everyday coping in district nursing. One key responsibility of managers in change management is to adapt the service working conditions for nurses to handle and adjust to change when delivering high-quality care to their patients. Nevertheless, our findings show that district nurses' working conditions are not sufficiently facilitated for the nurses to be able to work according to the everyday coping mindset in

patient situations. In this study's third level of interpretation, theoretical understanding, we will interpret our findings with existing theory and research to discuss nursing managers' responsibility in facilitating nurses' working conditions in relation to implementation of the everyday coping mindset.

To implement the everyday coping mindset into district nursing, a great deal of responsibility was given to the nursing manager. This was attempted by having biweekly meetings with the reablement team, in addition to an engaged and committed nursing manager, who included the district nurses in professional discussions. The district nurses found this to be very important and decisive for maintaining focus on everyday coping when practising district nursing. A committed manager who meets the staff regularly is also shown by Fläckman et al. [22] as an important factor for nurses when undergoing change. This finding is further supported by Strandell [17], who stated that a lack of support from the manager may lead to deteriorated working conditions for home care workers. Although the nursing manager was engaged and committed in our study, the district nurses still faced several challenges related to their working conditions.

The lack of time and space to work according to the everyday coping mindset was highlighted as a challenge in the district nurses' working conditions. When district nurses had limited time, working according to the everyday coping mindset was de-prioritised, and a more hands-on type of care was chosen. The contradictions between the time-pressured worklists and the time and space required of the mindset remained a challenge to district nurses in performing their daily work. Hjelle et al. [23] stated that having sufficient time to apply professional knowledge when supervising and supporting older persons in everyday activities is significant when helping patients improve their ability to perform daily activities. When it comes to arranging daily working conditions for the district nurses, the nursing manager has a central responsibility, since it is the nursing manager who has the overall responsibility for change management in the service [15]. Previous research on nurses' experiences with change management shows that nurses stated that managers made some mistakes during the implementation process, such as lack of planning, where changes are made in a hurry [24]. Insufficiently adapted worklists may cause district nurses to be uninspired to continue working according to the everyday coping mindset.

Our findings show that nurses are unable to work according to the everyday coping mindset continuously if their working conditions are not sufficiently facilitated. Therefore, everyday coping as a political strategy to prevent a reduction in physical function, improve health, promote independence in performing daily activities, and limit the use of resources, economic resources, and healthcare personnel [1, 5, 7, 8] was unsuccessful. This may be a consequence of the top-down implementation process of everyday coping, in which district nurses are not involved in the implementation process, and therefore, the complexity of the district nursing context and their working conditions may not be taken into consideration [13, 25]. Davidson [15]

highlighted that political actors often misunderstand the complexity of the healthcare system and have reorganised the services to improve power and structure rather than enhance the care and quality. Therefore, the nursing manager has a particular responsibility and opportunity to include nurses' opinions and experiences in the implementation process, to better adapt nurses' working conditions to make it possible to work according to the everyday coping mindset. Harrison et al. [14] reported that those directly or indirectly affected by change are more likely to commit to change when they are involved in making decisions and professional contributions to change, which can improve patient and staff experiences. Therefore, the nursing manager, who has daily connections with the district nurses, should include them in the planning and implementing of changes in nursing practice, such as new mindsets or strategies.

Furthermore, this study shows that nurses find it challenging when resolutions and patients' expectations contradict with the mindset of everyday coping that they are instructed to incorporate into their daily work. For example, patients express anger if the district nurse does not help with their task. The distinction between "doing for" and "letting the patients do as much as possible by themselves" may be related to the fact that a huge part of nursing is "hands-on" and "take part in" type of work. Therefore, it is not usual nor justifiable to work with a "hands-off" type of attitude in nursing, which is essential to consider when implementing everyday coping into nursing practice [10, 26]. The same trend is shown in Hauan et al. research [16], which showed that nurses do not work according to everyday coping with all patients. The district nurses always consider the individual patient's situation before deciding how to perform professional nursing for every patient [16]. The nursing manager has a responsibility to address these conflicts to ensure that patient care is not compromised. This may be done by encouraging open communication and promoting a culture of collaboration. To ensure that district nurses can manage situations where there are conflicting expectations, it is crucial for nursing managers to provide them with training and support. This will not only help the district nurses address these types of conflicts, but also provide emotional and psychological support to help district nurses with any stress or anxiety associated with their working conditions. Shanley [13] stated that management literature does not sufficiently consider the personal and emotional aspects of change management, thereby causing stress, low morale, disorientation, mistrust, and lack of commitment among staff.

Although the theory of everyday coping states that the mindset should suit everyone [7], our findings and Hauan et al. research [16] show that everyday coping does not suit all patients who receive district nursing. It is essential that the workplace culture and district nurses' working conditions facilitate discussions about which patients the mindset suits and who it does not, so that patients receive the right care. The nursing manager has the overall responsibility to ensure that patients receive the right care when they need it. The discussion about to whom the mindset should be

prioritised (the professional discussion) and how this should be facilitated in the service (the administrative discussion) should also take place at a management level, among other managers in nursing services and with the municipality's head of healthcare services. Additionally, these discussions should be based on the experiences of district nurses and patients. It is surprising that the mindset about everyday coping in theory has a strong focus on user participation; however, from our findings, it is not clear how patients are involved in the decision-making process regarding their resolution that constitutes their right to nursing services.

More research is needed to better understand the mindset of everyday coping within a nursing practice, and the consequences that the everyday coping mindset has for patients receiving nursing services.

**4.1. Strengths and limitations.** In this qualitative study, efforts have been made to ensure trustworthiness by providing a sufficient description of the district nurses' working conditions following the implementation of everyday coping. Two methods have been used in the data collection: interviews and observations. These methods complement each other, as the district nurses in the interviews discussed and elaborated their practice more than observations or interviews alone can manage. During the interviews, the researcher summarised the essence of the conversation to ensure that the content was correctly understood [27]. The interviews contained open questions that provided the district nurses the opportunity to share how they experience practising professional nursing following the implementation of everyday coping [18]. All researchers participated in the analysis process, which strengthened the validity of the analysis. A limitation might be that no data were collected from the nursing managers, only from the district nurses' perspective on the nursing manager. Furthermore, studies could explore nursing managers' experiences with change management and implementation of the everyday coping mindset.

## 5. Conclusions

Our study illustrates the importance of management when implementing changes in nursing practice, such as everyday coping. The nursing manager must provide nurses with facilitated working conditions for the nurses to be able to work according to the everyday coping mindset. This includes addressing challenges such as lack of time and space and promoting communications and a culture of collaboration. Nursing manager's intermediary role allows them to communicate challenges and needs effectively upward to a higher organisational level within the healthcare system and to local politicians, addressing challenges such as time constraints and conflicting expectations.

Moreover, the utilisation of the everyday coping mindset is not universally applicable across all patient scenarios. In this context, the nursing manager could facilitate discussions concerning the possibilities of the everyday coping mindset, involving an examination of both feasible and less feasible patient demographics.

In addition, the nursing manager should include the district nurses in the implementation process and ensure district nurses are emotionally and psychologically prepared for the implementation of everyday coping. The nurse manager can actively involve district nurses in decision-making processes and guide their contributions. Ultimately, the nursing manager bear the overarching responsibility for the home care provided, highlighting the importance of their proactive engagement in ensuring conducive working conditions and quality of care.

## Data Availability

The datasets generated and/or analysed during the current study are not publicly available due to permission, which has not been applied for from neither the participants nor due to Norwegian privacy legislation and the form signed by the participants about the study's privacy. The data generated are available from the corresponding author upon reasonable request.

## Disclosure

The funding institutions did not make decisions regarding study design, data collection, analysis, interpretation, or writing of the manuscript.

## Conflicts of Interest

The authors declare that they have no conflicts of interest with respect to the research, authorship, and/or publication of this study.

## Acknowledgments

The authors would like to acknowledge and thank all nurses who participated in the study. This study was funded by the Nord University, Inland University of Applied Science, and Molde University College Specialized University in Logistics.



## References

- [1] Ministry of Health and Care Services, *Leve Hele Livet- En Kvalitetsreform for Eldre [Live Your Whole Life- A Quality Reform for the Elderly]*, Ministry of Health and Care Services, Oslo, Norway, 2018.
- [2] Ministry of Health and Care Services, *Fremtidens Primærhelsetjeneste- Nærhet Og Helhet [The Primary Health and Care Services of Tomorrow- Localised and Integrated]*, Ministry of Health and Care Services, Oslo, Norway, 2015.
- [3] Ministry of Health and Care Services, *Morgendagens Omsorg [Future Care]*, Ministry of Health and Care Services, Oslo, Norway, 2013.
- [4] World Health Organization, *Ageing and Health*, World Health Organization, Geneva, Switzerland, 2022.
- [5] C. Wittrock, M. H. Ingelsrud, and R. Norvoll, "Ledelse og organisering av innovasjonsprosesser i Gran og Lunner kommuner. En casestudie av implementering av hverdagsmestring i helse og omsorg Management and organization of innovation processes in Gran and Lunner municipalities," *A Case Study of the Implementation of Everyday Coping in Health and Care*.
- [6] N. E. Ness, T. Laberg, and M. Haneborg, *Hverdagsmestring Og Hverdagsrehabilitering [Everyday Coping and Reablement]*, 2012.
- [7] H. Tuntland and N. E. N. Hverdagsrehabilitering, Gyldendal Akademisk, Oslo, Norway, 1st edition, 2014.
- [8] F. Aspinall, J. Glasby, T. Rostgaard, H. Tuntland, and R. G. Westendorp, "New horizons: reablement- supporting older people towards independence," *Age and Ageing*, vol. 45, no. 5, pp. 574–578, 2016.
- [9] T. A. Hartviksen and B. M. Sjølie, *Hverdagsrehabilitering- Kvalitetsforbedring I Norske Kommuner [Reablement- Quality Improvement in Norwegian Municipalities]*, Cappelen Damm Akademisk, Oslo, Norway, 2017.
- [10] N. E. Ness, "Hverdagsmestring" [everyday coping]," *Ergoterapeuten*, no. 1, pp. 32–37, 2016.
- [11] M. E. Tinetti, P. Charpentier, M. Gottschalk, and D. I. Baker, "Effect of a restorative model of posthospital home care on hospital readmissions," *Journal of the American Geriatrics Society*, vol. 60, no. 8, pp. 1521–1526, 2012.
- [12] E. Langeland, H. Tuntland, B. Folkestad, O. Førland, F. F. Jacobsen, and I. Kjekken, "A multicenter investigation of reablement in Norway: a clinical controlled trial," *BMC Geriatrics*, vol. 19, no. 1, p. 29, 2019.
- [13] C. Shanley, "Management of change for nurses: lessons from the discipline of organizational studies," *Journal of Nursing Management*, vol. 15, no. 5, pp. 538–546, 2007.
- [14] R. Harrison, S. Fischer, R. L. Walpola et al., "Where do models for change management, improvement and implementation meet? A systematic review of the applications of change management models in healthcare," *Journal of Healthcare Leadership*, vol. 13, no. 13, pp. 85–108, 2021.
- [15] J. Davidson, "What's all the buzz about change management?" *Health Management Forum*, vol. 28, no. 3, pp. 118–120, 2015.
- [16] M. Hauan, K. Kvigne, and J. Alteren, "Politically engaged mindset of everyday coping in relation to nursing values: a phenomenological-hermeneutic study of district nurses' experiences," *SAGE Open Nursing*, vol. 9, 2023.
- [17] R. Strandell, "Care workers under pressure- A comparison of the work situation in Swedish home care 2005 and 2015," *Health and Social Care in the Community*, vol. 28, no. 1, pp. 137–147, 2020.
- [18] S. Brinkmann and S. Kvale, *InterViews: Learning the Craft of Qualitative Research Interviewing*, Sage, Thousand Oaks, CA, USA, 3rd edition, 2015.
- [19] B. C. O'Brien, I. B. Harris, T. J. Beckman, D. A. Reed, and D. A. Cook, "Standards for reporting qualitative research: a synthesis of recommendations," *Academic Medicine*, vol. 89, no. 9, pp. 1245–1251, 2014.
- [20] Statistics Norway, *Municipality Facts (The Municipality Is Anonymised in This Reference)*, 2020.
- [21] Helse Norge, "Home nursing and other healthcare services in the home 2019".
- [22] B. Fläckman, G. Hansebo, and A. Kihlgren, "Struggling to adapt: caring for older persons while under threat of organizational change and termination notice," *Nursing Inquiry*, vol. 16, no. 1, pp. 82–91, 2009.
- [23] K. M. Hjelle, O. Skutle, O. Førland, and H. Alvsvåg, "The reablement team's voice: a qualitative study of how an integrated multidisciplinary team experiences participation in reablement," *Journal of Multidisciplinary Healthcare*, vol. 9, no. 9, pp. 575–585, 2016.

- [24] O. Celebi Cakiroglu, G. Ulutas Hobek, and A. K. Harmanci Seren, "Nurses' views on change management in health care settings: a qualitative study," *Journal of Nursing Management*, vol. 30, no. 2, pp. 439–446, 2022.
- [25] P. Nilsen, "Making sense of implementation theories, models and frameworks," *Implementation Science*, vol. 10, no. 1, p. 53, 2015.
- [26] M. Hauan, K. Kvigne, and J. Alteren, "Fremtidens helse- og omsorgstjenester fra et hverdagsmestringsperspektiv [The health and care services of the future from an everyday coping perspective]," *Klinisk Sygepleje*, vol. 35, no. 4, pp. 289–303, 2021.
- [27] M. Sandelowski and J. Barroso, "Finding the findings in qualitative studies," *Journal of Nursing Scholarship*, vol. 34, no. 3, pp. 213–219, 2002.

## Research Article

# Undergraduate Nursing Students' Experiences of Virtual Learning during the COVID-19 Pandemic: A Qualitative Study

Zahra Asgari Tapeh <sup>1,2</sup> and Azar Darvishpour <sup>2,3</sup>

<sup>1</sup>Department of Nursing, Faculty of Nursing and Midwifery, Iran University of Medical Sciences, Tehran, Iran

<sup>2</sup>Department of Nursing, Zeynab (P.B.U.H) School of Nursing and Midwifery, Guilan University of Medical Sciences, Rasht, Iran

<sup>3</sup>Social Determinants of Health (SDH) Research Center, Guilan University of Medical Sciences, Rasht, Iran

Correspondence should be addressed to Azar Darvishpour; darvishpour3@gmail.com

Received 3 April 2023; Revised 6 February 2024; Accepted 6 May 2024; Published 15 May 2024

Academic Editor: Eric B. Bauman

Copyright © 2024 Zahra Asgari Tapeh and Azar Darvishpour. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Background.** With the emergence of the COVID-19 pandemic, schools and universities were closed, and virtual education replaced face-to-face classes. This learning method was a new and different experience for nursing students. Perceiving their experiences could help improve the quality of medical education. Therefore, the present study aimed to describe nursing students' experiences of virtual learning during the COVID-19 pandemic. **Materials and Methods.** This study involved qualitative descriptive research that was conducted in 2022. The participants included 25 undergraduate nursing students studying at the School of Nursing and Midwifery in East Guilan in northern Iran who had experienced virtual learning due to the COVID-19 pandemic. Purposeful sampling was applied until data saturation. Qualitative content analysis with a conventional approach was performed based on the model proposed by Graneheim and Lundman (2004). Coding was performed with MAXQDA 2007 software. **Results.** The data analysis led to the emergence of 110 primary codes and two main categories entitled “positive experiences” and “negative experiences.” The first main category was “positive experiences” (included 1 subcategory (benefits of virtual learning) with 3 subsubcategories (saving time, saving money, and increasing the possibility of daily planning)). The second main category was “negative experiences” (included 4 subcategories (reducing quality of education, physical effects, psychological effects, and different exams)). **Conclusion.** Nursing students had both positive and negative experiences with virtual learning during the COVID-19 pandemic and were facing multiple educational challenges. The findings of this study could be considered by managers and relevant officials in educational planning to improve the quality of nursing education.

## 1. Background

The first reported COVID-19 outbreak occurred in China in December 2019. The World Health Organization declared COVID-19 a pandemic on March 11, 2020 [1]. One month later, two confirmed cases were reported in Iran on February 19, 2020 [2]. The COVID-19 pandemic has had significant impacts on students' life and work, as well as their social life, financial status, and emotional health [3], and has led to numerous educational challenges [4]. This pandemic has also affected future visions of education [5]. Naturally, the pandemic has influenced nursing education [4]. A large number of countries have used quarantine and isolation as methods of treating this disease [6]. Many businesses and

organizations were locked down at the beginning of this pandemic, and higher education institutions were no exception [4]. Educational institutions face a greater risk of nCoV spread due to crowded classrooms and strict protective measures [7]. This condition enabled education reforms focused on emerging technology [4]. In Iran, with the rapid spread of COVID-19, the Ministry of Health and Medical Education established policies to limit the further spread of this infection. The decision was made to replace face-to-face classes with virtual education [2, 8]. It is necessary to mention that virtual education, which can involve offline or online learning activities, was first offered offline, after which online education was added [9, 10]. Various virtual education software and systems are utilized globally,

including spaces for sharing materials, dialogs, discussions, surveys, exams, and reporting [11, 12]. During the COVID-19 pandemic, Iranian medical universities used Navid software, developed for university learning and supported by the Smart University of Medical Sciences [11].

Online medical education is not new, and studies worldwide confirm the effectiveness of e-learning, which is widely adopted by learners globally [13, 14]. However, considering the acceptance of e-learning by students as a crucial factor contributing to the success of e-learning systems within the realm of education technology [9], during the COVID-19 pandemic, virtual learning replaced traditional classrooms, created a unique and compulsory experience for students, and left no alternate routes for education [15]. Research on virtual education during the COVID-19 pandemic has shown that students were primarily concerned about the impact of COVID-19 on medical education [16], and a major impact of the pandemic is the extension of academic terms [17]. Despite these educational challenges, this exceptional situation provides a great opportunity for nursing students to learn, take initiative, and be creative [18]. Although e-learning was crucial for education during the COVID-19 pandemic, Iranian medical students favor face-to-face or hybrid (mixed online and on-site) courses [19] for improved knowledge, skills, and social ability [9]. Tabatabai et al. discussed the impact of COVID-19 on medical education, virtual medical education, and the promotion of digital learning. They stated that new innovative strategies need to be used in the medical education system to support continuous education and assessment [20, 21]. Online education offers advantages over traditional methods, but monotonous monologs, lack of participation, logistical issues, and repetitive tasks in classes can cause boredom [22, 23]. As the unanticipated transition from face-to-face education to virtual education was challenging for students and educators in Iran, it is important to analyze the benefits, obstacles, potential changes, and development plans of online education from the perspective of medical students and educators [24, 25]. In addition, nursing students had to address global health issues [9], and their theoretical and clinical education was disrupted unexpectedly by the COVID-19 pandemic [4]. Despite the importance of nursing students' experiences with virtual learning, which could help improve the structure and use of online education in nursing, there are few reports on how COVID-19 has impacted nursing students' experiences with online learning. However, in some quantitative studies, nursing students' satisfaction with the quality of courses and virtual learning during the COVID-19 pandemic has been investigated [26, 27], but fewer qualitative studies have been conducted in this area. Therefore, this study aimed to describe nursing students' experiences with virtual learning during the COVID-19 pandemic.

## 2. Materials and Methods

**2.1. Study Design and Participants.** This study involved qualitative descriptive research that was conducted in 2022. Qualitative research is the best method for exploring the ideas and values of various groups [28].

The participants included 25 undergraduate nursing students studying at the Zeynab (P.B.U.H.) School of Nursing and Midwifery in East Guilan in northern Iran who had experienced virtual learning due to the COVID-19 pandemic. A homogeneous sampling technique was used in the present study. Homogenous sampling is a purposive sampling technique that aims to achieve a homogeneous sample. This technique is commonly used when the research topic is specific to the features of a particular population [29].

The selection of participants was based on the inclusion criteria, and the sampling was continued until data saturation. The inclusion criteria included studying for a bachelor's degree in nursing, having a history of at least one semester of virtual learning, and having rich experiences and the ability to communicate and express experiences. The data were saturated with 22 students, and 3 others were interviewed for more certainty.

**2.2. Data Collection.** This study was approved by the ethics committee of Guilan University of Medical Sciences (Approval Number: IR.GUMS.REC.1399.598). The aim of the study was explained to all of the participants. Written informed consent was obtained from the participants. The participants were assured that they could withdraw from the research whenever they wished, and all their information would remain confidential.

Semistructured interviews were conducted in an in-depth manner to gather information. The duration of each interview was 30–45 minutes. The interviews were conducted individually in one of the classes of the nursing faculty.

Interviews began with questions such as “What is your experience of online learning during the quarantine due to the COVID-19 pandemic?”, “What are the main differences between online and attendance classes?”, “What factors are affecting your learning during the COVID-19 pandemic?”, “What are the advantages and disadvantages of virtual learning?”, “What are the barriers to virtual learning?”, and “Would you like the virtual learning to be continued?” There were also exploratory and follow-up questions such as “What do you mean?”, “How?”, and “Can you explain more about that?” for further collection of details. The researcher used field notes to record observations, interactions, communication, and nonverbal gestures. Each interview was recorded with the participant's permission, implemented verbatim, and then analyzed on the same day. The data collection lasted 5 months.

**2.3. Data Analysis.** The data were analyzed via conventional qualitative content analysis following the recommendations of Graneheim and Lundman [30]. Content analysis, as a valid research method for data analysis [31], is a systematic and purposeful way to describe a phenomenon [32]. Qualitative content analysis is a common method used in nursing studies and is suitable for various contexts and data [33]. By using coding and classification of data techniques, this type of analysis aims to discover large quantities of



textual information and examine its patterns, relationships, structures, and communication discourses [34].

For the data analysis, the transcripts were read several times. The identification of meaningful units was performed by reviewing all the participant descriptions and statements. Related sentences and expressions are underlined, and each significant phrase is assigned a code. In this way, meaning units were identified. Then, the meaning units were compressed. The codes were summarized and categorized according to their similarities and differences, after which the main categories emerged. The data were analyzed with MAXQDA 2007 software.

**2.4. Ethics.** The study was approved by the Ethical Committee of the Guilan University of Medical Sciences. Participation in the interview was completely voluntary. The participants were informed that the interview would be recorded and that the data collected would not be disclosed. Written informed consent was obtained from the participants. The participants were assured that they could withdraw from the research whenever they wished and that all their information would remain confidential.

**2.5. Rigor.** Rigor in qualitative analysis belongs to the process and its trustworthiness. It is essential for researchers to “immerse” themselves in data to explore all the possible nuances and relationships. Trustworthiness is considered a more appropriate criterion for evaluating qualitative studies [35].

In qualitative research, the concepts of credibility, dependability, and transferability have been used to describe various aspects of trustworthiness. Credibility deals with the focus of the research and refers to confidence in how well the data and processes of analysis address the intended focus [30]. There are many strategies for addressing credibility, including “prolonged engagement” and member checks [35]. In the present research, the most suitable method for collecting the data and the amount of data used were chosen, the participants were carefully chosen, their long-term contact with them was encouraged, and their trust was gained. Additionally, researchers’ engagement with the data and continuous comparisons were used to ensure credibility.

Dependability is the degree to which data change over time and alterations are made in the researcher’s decisions during the analysis process [30]. This process was described in sufficient detail to help another researcher repeat the work [35]. To ensure dependability, continuous reviews and comparisons of the data and categories were performed in terms of similarities and differences. Researchers referred to the findings and extracted codes to the participants for confirmation or correction. The authors also checked the findings with experts and informed researchers.

As with quantitative research, qualitative inquiry seeks to expand understanding by transferring findings from one context to another [36]. Transferability refers to the extent to which the findings can be transferred to other settings or groups [30]. Because qualitative research is specific to

a particular context, a “thick description” of the particular research context is important because it allows the reader to assess whether it is transferable to their situation [35]. To meet these criteria, the researcher tried to provide detailed and rich descriptions of the research for the readers.

### 3. Results

Among the 25 participants, 16 were female and 9 were male, ranging in age from 20 to 24 years. In terms of years of education, 9 students were in their fourth year, 12 were in their third year, and 4 were in their second year.

The data analysis led to the emergence of 110 primary codes and two main categories, “positive experiences” and “negative experiences,” with 5 subcategories and 15 sub-subcategories, which are described in the following section. A diagram of the main categories and subcategories is shown in Figure 1. Table 1 shows how to form the first main category, entitled “Positive experiences.”

**3.1. First Category: Positive Experiences.** This category included 1 subcategory entitled “*benefits of virtual learning*” with 3 sub-subcategories (saving time, saving costs, and increasing the possibility of daily planning), which are explained as follows.

**3.1.1. Benefits of Virtual Learning.** Participants stated that their most positive and effective experience with virtual education during the COVID-19 pandemic was that the education process became simpler and easier; in other words, it made it easier for them to learn lessons. This subcategory included 3 subsubcategories entitled “saving time,” “saving costs,” and “increasing the possibility of daily planning,” which are explained as follows.

During interviews, students repeatedly highlighted the effectiveness of online training in reducing the amount of time they spent receiving instruction on the same topic compared with in-person classes. This time includes class time, which is shorter in virtual classrooms, and travel time to the university, which is eliminated in online classes.

“In the online class, if something special happens to the internet or the online system of the university, the online classes start and end on time. Interestingly, all the teachers taught faster in online classes.” (P9, a 21-year-old female)

“It is true that in the face-to-face class, we may have more fun with our friends, but the truth is that the deviant discussions in the class or the interclass breaks make the class time longer, while teachers always complain that they were not able to teach the desired amount of lessons.” (P3, a 24-year-old male)

“I used to go to university 3 times a week; in fact, I’m on the road for 4 hours a week to get from home to school or vice versa. There is always traffic, but since the virtual classes are started, the total time for these courses could be 4 hours, which is great.” (P1, a 23-year-old female)

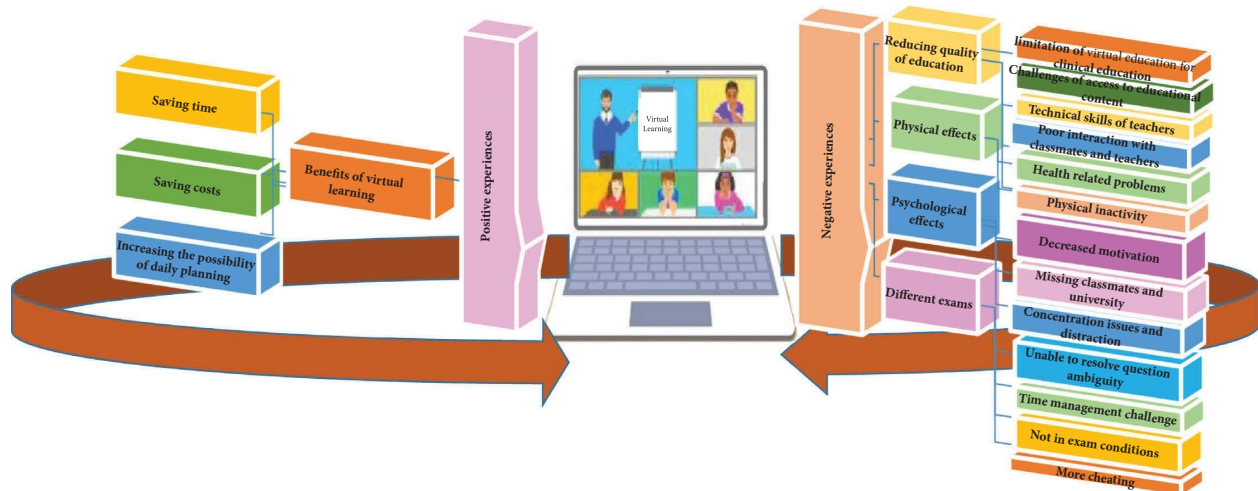


FIGURE 1: Diagram of the main categories and subcategories.

The participants highlighted the cost-reducing impact of online education. According to them, online education reduces financial burdens and saves money, especially during the COVID-19 pandemic, by eliminating travel, food, books, and other costs.

“The COVID-19 pandemic has hurt everyone financially, except students. The participants were asked to go to college, order food weekly, copy professors’ handouts, and spend money with friends. All of this has been taken away by COVID-19.” (P5, a 22-year-old male)

“In my opinion, one of the main benefits of COVID-19, at least for me, is the reduction in transportation costs to and from college.” (P10, a 22-year-old female)

Participants stressed daily planning when discussing the benefits of saving time and money. Students reported that online education saves time and energy compared with face-to-face education, giving them more opportunities to plan and carry out daily personal affairs.

“During this pandemic, I have been able to practice guitars again. I just had the time and motivation and adjusted my schedule during the day to practice between online classes. It makes me feel better.” (P11, a 25-year-old female)

“You’re home after the class, which is a very important feature. Because you have enough energy to perform your favorite activities after the class.” (P25, a 23-year-old male)

**3.2. Second Category: Negative Experiences.** This category included 4 subcategories entitled “reducing the quality of education,” “physical effects,” “psychological effects,” and “different exams,” which are explained as follows.

**3.2.1. Reducing the Quality of Education.** Despite some positive experiences, online education in Iran has also presented challenges and negative experiences for nursing

students. One of the negative experiences of the participants with virtual education was the decrease in quality of education, which was identified in 4 subsubcategories entitled “limitation of virtual education for clinical education,” “challenges of accessing educational content,” “technical skills of teachers,” and “poor interaction with classmates and teachers.” In the following, we will describe these issues.

Participants welcomed the opportunity to be away from hospital environments due to concerns about contracting and transmitting COVID-19 to their family members. However, they were concerned about the impact of being away from actual clinical fields such as hospitals on their learning. They considered it a lost opportunity to gain knowledge and practical skills about different treatments and procedures. They emphasized that although virtual education can cover theoretical education, the applications of digital technology in clinical education are limited, which means that it cannot replace clinical education. In their opinion, this negative experience impacted the quality of nursing education in their academic course during the COVID-19 pandemic. Some of the participants’ statements in this regard are stated as follows:

“No matter how many photos, videos, slides, and theoretical training we see, we still have to see patients up close and perform procedures in person to know what is going on.” (P10, a 22-year-old female)

“I enjoy clinical internships. The pandemic was an exception, and reducing the time to attend the internship.” (P5, a 22-year-old male)

“The quality of our learning in this pandemic period was different from that of the students in previous courses. Virtual rounds and the presentation of cases in virtual form, etc., cannot replace clinical training. It was not a pleasant experience at all.” (P17, a 24-year-old female)

Students mentioned the challenges of accessing educational content as another factor affecting the quality of virtual education. Access to educational content for students

TABLE 1: Some meaning units, primary codes, and subcategories of the first main category, entitled “positive experiences.”

Main category	Subcategories	Sub-subcategories	Primary codes	Meaning units
Positive experiences	Benefits of virtual learning	Saving time	(i) Timely start and end of online classes	“In the online class, if something special happens to the internet or the online system of the university, the online classes start and end on time. What is interesting is that all teachers teach faster in online classes.” “I used to go to university 3 times a week; in fact, I’m on the road for 4 hours a week to get from home to school or vice versa. There is always traffic, but since the virtual classes are started, the total time for these courses could be 4 hours, which is great”
			(ii) Faster teaching by all teachers in online classes	
			(iii) Elimination of traffic times and commuting from home to university	
			(iv) The financial hurt of the COVID-19 pandemic on everyone except students	
		Saving costs	(i) Saving the cost of commuting to the university	“The COVID-19 pandemic has hurt everyone financially, except students. Going to college, ordering food weekly, copying professors’ handouts, and spending money with friends. All of this has been taken away by COVID-19”
			(ii) Saving money due to not having to eat in college	
			(iii) Saving money due to no need to copy professors’ handouts	
			(iv) Saving the money spent on being with friends	
	Increasing the possibility of daily planning		(i) Having time to do what you want to do	“During this pandemic, I have been able to practice guitar again. I just had the time and motivation and adjusted my schedule during the day to practice between online classes. It makes me feel better”
			(ii) Having motivation	
			(iii) Setting a daily schedule	
			(iv) Practicing the desired program among online classes	

depended on factors such as teachers' workloads, upload and download speeds, and university systems, which posed challenges. The participants said that virtual education heavily depends on teachers accessing educational content. Teachers sometimes did not realize that they should upload content on time, and students might wait until the end of the semester to make them available. This problem wastes time learning and increases exam stress. The situation was even worse for students who enrolled in courses without online classes and who received training entirely through videos prepared by their teachers. Additionally, the speed of the Internet affects not only students' participation in online classes but also their access to the content. Some students had high-speed Internet, but some students complained about Internet problems, dropping and reconnecting online, and slow download speeds. Sometimes, the system introduced by the university has technical issues, causing problems for teachers and students. Some of the participants' statements are mentioned as follows:

"Some professors are not interested in uploading the teaching files on time, and for online classes that are not saved, we have to make a screen record or take pictures during the class because we know that we do not have any files to read until the end of the semester." (P15, a 22-year-old male)

"In the face-to-face class, most of the professors gave us the PowerPoint slides of that session after each class session, but this is not the case in the online class. I do not know what the reason is. Perhaps uploading files is difficult or time-consuming. After several sessions, they upload files, which is not very useful for students." (P21, a 23-year-old female)

"When they give us the educational content that has been taught for several months at the end of the semester, how should we read them for the exam? One of the professors uploaded the educational files just a few days before the exam." (P12, a 23-year-old female)

"Most of the time, the education system is fine, but sometimes it is annoying. Like when it kicks us out and we cannot get in, or when the teacher disconnects. Until you want to report the problem to the IT official and follow up, you have practically missed that class." (P10, a 22-year-old female)

"For a quality online class, high-speed internet in an area with a strong signal is necessary." (P1, a 23-year-old female)

Another factor that negatively affects the quality of online education according to the participants is its dependence on the technical skills of teachers. Students believe that some teachers are not suitable for online education and that the quality of their instruction is better in face-to-face classes. Some teachers' inability to create engaging audio and video content for online courses highlights their lack of preparedness for teaching in a virtual classroom, resulting in their one-way lectures in online classes.

Students say that teachers are classified into three groups: teachers reliant on blackboards and able to teach only in person; skilled teachers adept at creating engaging slide content with sound and images and capable of effectively teaching online; and teachers who teach similarly in person and virtually.

"All professors are not suited for the online class. For a professor whose face-to-face class lasted at least 2 hours, his/her virtual class hardly reached 45 minutes. Why? Because he/she cannot produce distance education content. This is to the detriment of students. Especially when it is about an important lesson." (P13, a 22-year-old male)

Participants mentioned poor interaction with classmates and teachers in virtual classes as a negative factor affecting the quality of education. Online class communication happens only through a chat space on the page and is dependent on the teacher's attention on student comments and questions. The possibility of audio and video communication also exists, depending on the teacher's permission. This problem negatively affects students' interaction with their professor, ability to ask or answer questions, ability to solve problems, ability to interact with classmates, ability to create harmony in class, and, ultimately, the quality of education. In other words, in virtual education, group education is not induced, and education is individual.

"In face-to-face classes, when we have problems, the teacher solves them immediately, but in online classes, no matter how much we write on the chat box, he/she either does not see or read it until the end of the class. Therefore, he/she often does not have time to answer." (P6, a 22-year-old female)

"Despite initially being glad that face-to-face classes had closed due to virtual classes, now I prefer being in the class atmosphere, sitting next to my friends and seeing the whiteboard and hearing the professors' voices up close for education." (P11, a 25-year-old female)

**3.2.2. Physical Effects.** Repeated use of mobile devices has led to health problems and inactivity in students, raising mental concerns for both students and parents. While students have standard classroom seating, there is no such space in the virtual classroom. Most participants complained of neck pain, eye fatigue, and headache after attending several hours of online classes. The students emphasized eye fatigue more. However, before and after face-to-face classes, students were more active on the university campus, which was lessened in virtual classes due to being at home. This subcategory included 2 subsubcategories (health problems and physical inactivity). Some of the participants' statements in this regard are stated as follows:

"I tend to spend a lot of time on my phone. Since classes have gone virtually, I spend most of the day looking at my phone in bed or chair, and lately, I feel like my eyes are tired or weak." (P1, a 23-year-old female)

“Seating at the laptop table for hours causes neck pain and headaches despite changing positions frequently.” (P19, a 23-year-old female)

**3.2.3. Psychological Effects.** In addition to its physical impact, online education had significant psychological effects. Decreased motivation, missing classmates and universities, and concentration issues and distractions were emphasized by the students during the interviews. As the quality of online teaching depends on several factors, some virtual classrooms are boring because of the teacher’s teaching style, the slow speed of the online teaching platform, and the problems associated with uploading files; consequently, students are not motivated to attend class. This subcategory included 3 subsubcategories (decreased motivation, missing classmates and the university, and concentration issues and distraction). Some of the participants’ statements in this regard are stated as follows:

“The frequent sound interruptions are annoying, causing me to avoid class” (P7, a 23-year-old female)

“Some teachers’ classes are so monotonous that I fall asleep.” (P15, a 22-year-old male)

One of the limitations of virtual education for students is the lack of communication with classmates and teachers, as well as the distance from the classroom and university environment. This made them feel like they were missing from university and class, socializing with their classmates, friends, and teachers. This issue may affect students’ social skills, competition, academic progress, and self-esteem.

“I miss the pleasure of seeing classmates, joking, eating together, and walking on the beautiful campus of the university.” (P9, a 21-year-old female)

The challenge of student concentration and distractions in virtual classes is a significant psychological effect of online education. Participants attributed this to the possibility of doing several tasks during online classes, for example, chatting, browsing, watching movies, talking with family at home, and eating.

“I cannot concentrate on the class and stare at the screen; I have to play with my phone at the same time and check it all the time” (P24, a 24\3-year-old male)

“Unfortunately, my family does not care at all that I am in an online class. There is constant movement in my room, which distracts me.” (P23, a 22-year-old male)

**3.2.4. Different Exams.** Face-to-face and online education differs not only in the teaching process but also in the process of evaluating learners and exams. In face-to-face education, exam papers are provided to students, and they write the answers on the exam paper. During online education, students took exams using a virtual system provided by the university. The participants viewed the questions and

then marked the answers or typed the descriptive answers within the allotted time. Virtual and in-person exams posed major challenges, mostly negative for participants. Differences included being unable to resolve question ambiguity, time management challenges, not being in exam conditions, and more cheating. In-person exams have the course teacher briefly available to address student inquiries. During the virtual exam, students could not clarify any ambiguity or speak to the professor, which was a downside. This subcategory included 3 sub-subcategories (unable to resolve question ambiguity, time management challenge, not in exam conditions, and cheating). Some of the participants’ statements in this regard are mentioned as follows:

“In the exam of one of the courses, 2 questions were out of the book, and we could not do anything about it; we had to answer it because time was running out.” (P4, a 21-year-old female)

“Some questions are ambiguous, and it is not possible to understand the meaning. The professors should spend a few minutes and clear the ambiguities.” (P16, a 21-year-old female)

Students also objected to virtual exam timing. Exam times vary based on teachers’ opinions, which are often set less than students’ expectations. Despite the Internet’s speed being a factor in virtual exams, descriptive virtual exams require typing, and students have different typing speeds. Therefore, VTE stress increased due to time management issues. However, on classic exams, students had more time to answer the questions.

“Teachers consider the exam time to be very short to prevent cheating, while in a face-to-face test, we never ran out of time.” (P10, a 22-year-old female)

“Rather than trying to answer the exam questions thoroughly, I was trying to do it as quickly as possible so that I would finish the exam on time.” (P1, a 23-year-old female)

In-person exams included an entrance card, assigned seating, preexam conversations, and silent answer writing. However, on the online exam, students wait at home to log in to the exam page through their computer, mobile, or tablet. The interviews revealed that home conditions differ from exam settings, causing distractions such as traffic, noise, and other factors that lead to students deviating from exam conditions during virtual exams.

“My room and closed door did not block out the noise from inside and outside the house or on the streets. My concentration was completely disrupted, making it feel like I was not even taking an exam” (P7, a 23-year-old female).

Some of the participants stated that they cheated during the virtual exams and were satisfied with the process of holding the exams online. However, some of the students were displeased by others cheating and considered the

virtual exam and the resulting scores to be incorrect and unfair. The possibility of finding answers from books and pamphlets, chatting, and sharing answers were among the most important issues mentioned under the title of cheating in interviews. However, during face-to-face examinations, cheats are more difficult due to the presence of several invigilators and the prohibition of mobile phones, smart-watches, and other audio systems.

“Virtual training has caused a strange situation where students with previously low grades are now achieving high grades on exams. This puts those who genuinely study at a disadvantage” (P12, a 23-year-old female).

“The truth is that during the exams, we had a small group that shared the answers in the test exams. I do not think it is a bad thing. The exam should not be a giant. It is important to understand the lesson during the semester.” (P13, a 22-year-old male)

#### 4. Discussion

The present study was conducted to describe nursing students' experiences with virtual learning during the COVID-19 pandemic. The nursing students' experiences led to the emergence of two main categories entitled “positive experiences” and “negative experiences.” Participants described that virtual training was associated with saving time and costs and improving the ability to plan and manage their daily schedules. Multiple studies, including that of Przymuszała et al., have shown that online classes are highly preferred by medical and health students in Poland. This preference stems from the convenience of not having to commute and the ability to utilize time more efficiently [37]. Additionally, one study in Iran demonstrated that virtual education and exams are especially advantageous during the COVID-19 pandemic, as they offer flexibility and accessibility while accommodating more students and saving resources [17]. Dental students in Taiwan have also found online education to be effective for time management and convenience [38]. However, in Dung's research at Hong Bang International University, students faced difficulties following study schedules and lacked self-discipline while taking online courses [39].

The second main category, titled “negative experiences,” included 4 subcategories entitled “reducing the quality of education,” “physical effects,” “psychological effects,” and “different exams.” From the point of view of students, the limitations of virtual education in clinical education, limited access to online content, limited technical skills, and poor interaction with classmates and instructors can reduce the quality of nursing education. The participants in the present study believed that virtual education could not provide sufficient support for clinical education, especially during crises such as the COVID-19 pandemic, where face-to-face education would be limited. In other words, when the pandemic shortened clinical training, virtual education was not able to compensate for this problem. These findings are consistent with previous research. For instance, Farsi et al.

reported that nursing students, instructors, and administrators in Iran emphasized the importance of continuing nursing education, even in the face of challenges such as the COVID-19 pandemic and disruptions to clinical and blended learning [4]. Similarly, through a large-scale online survey across the world, Aristovnik et al. highlighted the need for online educators to ensure that professors possess the necessary knowledge and skills for virtual instruction and have the appropriate ICT equipment [3]. Distance learning studies in Israel and Turkey have also emphasized the importance of teacher-learner interactions in promoting learning, yet virtual education poses challenges because instructors lack nonverbal feedback [40, 41]. Goodwin et al. in Ireland reported that challenging online interactions reduced the quality of learning for nursing students [42]. However, the results of the present study were inconsistent with the results of De Ponti et al.'s study conducted on 122 sixth-year medical students in Portugal [43]. This difference in the findings may be related to the type of application of virtual education in the clinical setting; the use of virtual education in De Ponti et al.'s study involved patient introduction, case-based education, and rethinking. The purpose of the participants in the current study was to learn about clinical procedures that must be performed on real patients, and virtual training cannot be a suitable substitute for these procedures.

The second subcategory of the second main category (negative experiences) was the *physical effects* of online education. The spread of COVID-19 has caused changes in people's lifestyles [44]. While staying at home is considered a safe action, it may have unintended negative consequences because it leads to a decrease in physical activity [45]. The prevalence of obesity and a reduction in the body's immune system have increased due to home quarantine and the need to stay at home [44]. A lack of physical activity due to quarantine weakens the body's immune system, which leads to physical and mental health problems [46]. In China, Li and Che declared that online classes can cause physical symptoms such as head, neck, and eye pain, as well as muscle pain and inactivity, due to extended periods of online classes [47]. Additionally, a study in China showed that learners may experience fatigue and burnout, while parents worry about their children's health [48]. A study by Guo et al. in Canada reported that a sedentary lifestyle, along with fear and anxiety, impaired the physical health of many participants [46].

The third subcategory of the second main category (negative experiences) was the *psychological effects* of online education. Online education led to reduced motivation and disconnection from classmates and universities, resulting in feelings of missing friends and campuses. Concentration was difficult due to classroom distractions. According to Esra and Sevilen's study in Turkey, students' motivation for learning may decrease due to a lack of interaction, mismatched expectations and content, and difficulties organizing the learning environment. These results are consistent with those of other studies [49]. According to a survey about online learning, many students missed socializing with classmates [50]. A study by Goodwin et al. stated that

distance education leads to distraction and inactivity in students [42]. In Martín-Sómer et al.'s study on student motivation during COVID-19 online classes in Spain, the majority believed that online education reduced learning and interest [51].

The fourth subcategory of the second main category (negative experiences) included the different exams. Students reported significant differences between virtual and in-person exams. Online exams had ambiguous questions, were harder to manage, and lacked exam conditions. Cheating was a major concern. These findings are consistent with the experiences of other groups from the virtual exam. Research in India has shown that online education presents challenges, including technical limitations, distractions, instructor competence, and learner well-being [52]. In their research in Oman, Sarrayrih and Ilyas mentioned that online tests require extensive preparation from both teachers and students. Student identification is crucial in online exams to prevent cheating and manage time. The system automatically logs out users after the allotted time and sends a warning [53]. In Yu-Fong Chang et al. study in Taiwan, dental students preferred traditional exams over online exams due to concerns about fairness and operational issues [38]. Abdelrahim in Bangladesh reported that during the COVID-19 pandemic, academic pressure, the ease of cheating, the desire to improve the grade point average, and the lack of monitoring led to increased cheating in virtual exams [54].

The COVID-19 pandemic has tremendously affected medical education and necessitated a dramatic pivot from in-person to virtual medical education. For example, online courses could be used as an alternative for students who cannot attend classes or benefit nursing students before they enter the clerkship stage; additionally, they could provide an opportunity for students to learn from the best lecturers in the world and expand their network for conducting research [20]. It is believed that all of the distresses caused by the COVID-19 pandemic can change e-learning practices in medical education forever [20]. However, special conditions and facilities are needed that could challenge medical educationists' ability to adapt to such unique situations [21].

Furthermore, the field of education is experiencing significant transformations, with advancements in medical sciences, technology, and educational tools emerging rapidly [5]. The speed of technological change will breakneck, creating high pressure to transform educational practices, institutions, and policies [55]. Many digital resources are now available for administrative and pedagogical support and enhancement in higher education. Today's students expect modern universities to provide appropriate digital infrastructure for teaching and learning [56]. Medical education must adapt to many new and different healthcare contexts, including digitalized healthcare systems and the world of artificial intelligence. The educational design needs to be adapted to the target learners, setting, and available resources [56]. To achieve these goals, the health education industry should prepare the necessary electronic infrastructure and revise its policy regarding the use of digital learning. Additionally, IT technicians and researchers must

enhance their use of online tools and databases [20]. To overcome educational challenges and maximize opportunities, effective planning, scientific management, decisive leadership, unified command, and strategic use of technology are essential. Additionally, developing coping mechanisms and providing comprehensive support to higher education institutions impacted by the COVID-19 pandemic are crucial to ensuring the continuity of the education process. To better equip future clinicians to practice during a pandemic, it would be beneficial for them to learn how to adapt to various situations, including a pandemic [21, 57].

After gathering feedback from nursing students about their online learning experiences, it is evident that a blend of virtual and in-person education is preferred, despite a few negative experiences. This valuable insight can be utilized in the development of online education policies for universities in the medical sciences. Given that this research generally highlights the problems of virtual education, specifically in the nursing discipline, future studies could compare problems in online and offline medical education or investigate the effect of blended learning on students' performance. Advancements in educational technologies can enhance the quality and efficiency of virtual education. As educational technology advances, addressing virtual education obstacles is a top priority for enhancing student efficiency and improving learning outcomes.

The present study is limited in its generalizability due to the nature of qualitative studies and differences in nursing students' learning challenges at different universities based on their culture and context. Further research should be conducted on students in different fields at other universities. It is suggested that other researchers conduct mixed methods studies in the field of virtual education. It is possible that some participants were not honest in their answers for several reasons. To gain their trust, the researcher provided sufficient explanations. Researchers used bracketing to prevent the effects of mental preconceptions on the data analysis.

## 5. Conclusion

During the COVID-19 pandemic, undergraduate nursing students experienced both positive and negative aspects of virtual education. While the pandemic has brought many challenges to education, virtual education can be valuable if it is implemented effectively. This study suggested that managers and officials should consider these findings to improve the quality of nursing education.

## Data Availability

The dataset generated in this study is available from the corresponding author upon reasonable request.

## Ethical Approval

This research was approved by the Ethics Committee of Guilan University of Medical Sciences (ethics ID

IR.GUMS.REC.1399.598) in Iran. The study was performed under the ethical standards established in the Declaration of Helsinki and its later amendments or comparable ethical standards.

### Consent

Written informed consent was obtained from all participants included in the study.

### Conflicts of Interest

The authors declare that there are no conflicts of interest associated with this manuscript.

### Authors' Contributions

All the authors participated in all the stages of the research, such as conceptualization, data collection, data analysis, data interpretation, final discussion, and review of the manuscript. Zahra Asgari Tapeh is a co-first author.

### Acknowledgments

The researchers thank all the nursing students who participated in the present study.

### References

- [1] World Health Organization, "WHO coronavirus (COVID-19) dashboard 2021," <https://COVID19.who.int/>.
- [2] M. Abdi, "Coronavirus disease 2019 (COVID-19) outbreak in Iran: actions and problems," *Infection Control and Hospital Epidemiology*, vol. 41, no. 6, pp. 754-755, 2020.
- [3] A. Aristovnik, D. Keržič, D. Ravšelj, N. Tomaževič, and L. Umek, "Impacts of the COVID-19 pandemic on life of higher education students: a global perspective," *Sustainability*, vol. 12, no. 20, p. 8438, 2020.
- [4] Z. Farsi, S. A. Sajadi, E. Afaghi et al., "Explaining the experiences of nursing administrators, educators, and students about education process in the COVID-19 pandemic: a qualitative study," *BMC Nursing*, vol. 20, no. 1, pp. 151-213, 2021.
- [5] G. Dewart, L. Corcoran, L. Thirsk, and K. Petrovic, "Nursing education in a pandemic: academic challenges in response to COVID-19," *Nurse Education Today*, vol. 92, Article ID 104471, 2020.
- [6] J. Yi, I.-H. Chen, C.-Y. Lin et al., "The effect of primary and middle school teachers' problematic internet use and fear of COVID-19 on psychological need thwarting of online teaching and psychological distress," *Healthcare*, vol. 9, no. 9, pp. 1199-1218, 2021.
- [7] F. Quattrone, A. Borghini, M. Emdin, and S. Nuti, "Protecting higher education institutions from COVID-19: insights from an Italian experience," *Journal of American College Health*, vol. 70, no. 5, pp. 1354-1355, 2022.
- [8] L. Doshmangir, A. Mahbub Ahari, K. Qolipour et al., "East asia's strategies for effective response to COVID-19: lessons learned for Iran," *Quarterly Journal of Management Strategies in Health System*, vol. 4, no. 4, pp. 370-373, 2020.
- [9] S. Maqbool, M. Farhan, H. Abu Safian et al., "Student's perception of E-learning during COVID-19 pandemic and its positive and negative learning outcomes among medical students: a country-wise study conducted in Pakistan and Iran," *Annals of medicine and surgery (2012)*, vol. 82, Article ID 104713, 2022.
- [10] B. M. Kyaw, N. Saxena, P. Posadzki et al., "Virtual reality for health professions education: systematic review and meta-analysis by the digital health education collaboration," *Journal of Medical Internet Research*, vol. 21, no. 1, 2019.
- [11] K. Katebi, "Challenges and opportunities of virtual education from the perspective of dentistry students during COVID-19 pandemic: a cross-sectional study," *Educational Research in Medical Sciences*, vol. 11, no. 2, 2023.
- [12] L. Pei and H. Wu, "Does online learning work better than offline learning in undergraduate medical education? A systematic review and meta-analysis," *Medical Education Online*, vol. 24, no. 1, 2019.
- [13] M. Burac, J. Fernandez, M. Cruz, and J. D. Cruz, Eds., "Assessing the impact of e-learning system of higher education institution's instructors and students," *IOP Conference Series: Materials Science and Engineering*, IOP Publishing, London, UK, 2019.
- [14] L. Vitoria, M. Mislinawati, and N. Nurmasiyah, Eds., *Students' Perceptions on the Implementation of E-Learning: Helpful or Unhelpful? Journal of Physics: Conference Series*, IOP Publishing, London, UK, 2018.
- [15] S. N. Mousavizadeh, "The experiences of nursing students using virtual education during the COVID-19 pandemic," *Journal of medicine and life*, vol. 15, no. 9, pp. 1090-1095, 2022.
- [16] H. Ahmed, M. Allaf, and H. Elghazaly, "COVID-19 and medical education," *The Lancet Infectious Diseases*, vol. 20, no. 7, pp. 777-778, 2020.
- [17] H. Rezaei, A. Haghdoost, H. Javar, R. Dehnavieh, S. Aramesh, N. Dehgani et al., "The effect of coronavirus (COVID-19) pandemic on medical sciences education in Iran," *Journal of Education and Health Promotion*, vol. 10, no. 136, pp. 1-8, 2021.
- [18] D. Ulenaers, J. Grosemans, W. Schrooten, and J. Bergs, "Clinical placement experience of nursing students during the COVID-19 pandemic: a crosssectional study," *Nurse Education Today*, vol. 99, no. 104746, 2021.
- [19] M. Jalali, V. Moradi, T. Babae, G. Aminian, P. Mojgani, and S. Shahabi, "Online education for prosthetics and orthotics students in the era of COVID-19 pandemic in Iran: challenges, opportunities, and recommendations," *BMC Medical Education*, vol. 23, no. 1, p. 342, 2023.
- [20] S. Tabatabai, "COVID-19 impact and virtual medical education," *Journal of Advances in Medical Education and Professionalism*, vol. 8, no. 3, pp. 140-143, 2020.
- [21] A. Ebrahimi, S. Ebrahimi, and S. Ashkani Esfahani, "How COVID-19 pandemic can lead to promotion of remote medical education and democratization of education?" *Journal of advances in medical education and professionalism*, vol. 8, no. 3, pp. 144-145, 2020.
- [22] A. Derakhshan, M. Kruk, M. Mehdizadeh, and M. Pawlak, "Boredom in online classes in the Iranian EFL context: sources and solutions," *System*, vol. 101, Article ID 102556, 2021.
- [23] M. Sadeghi, "A shift from classroom to distance learning: advantages and limitations," *International Journal of Research in English Education*, vol. 4, no. 1, pp. 80-88, 2019.
- [24] A. Salamzadeh, M. Hadizadeh, and S. S. Mortazavi, "Realization of online entrepreneurship education based on new digital technologies in Iran: a scenario planning approach,"



- Journal of Entrepreneurship and Development*, vol. 14, no. 3, pp. 481–500, 2021.
- [25] B. E. Zamani, A. Esfijani, and S. M. Abdollahi Damaneh, “Major barriers for participating in online teaching in developing countries from Iranian faculty members’ perspectives,” *Australasian Journal of Educational Technology*, vol. 32, no. 3, 2016.
- [26] Z. Farsi, E. Afaghi, A. Fournier, Y. Ahmadi, S. A. Sajadi, and S. H. Aliyari, “Investigating nursing students’ satisfaction with the quality of courses and virtual learning during the COVID-19 pandemic in 2020–2021,” *The Turkish Online Journal of Distance Education*, vol. 23, no. 3, pp. 103–117, 2022.
- [27] Z. Farsi, S. Aliyari, Y. Ahmadi, E. Afaghi, and S. A. Sajadi, “Satisfaction of the quality of education and virtual education during the covid-19 pandemic in nursing students of aja university of medical sciences in 2020,” *Journal of Military Medicine*, vol. 23, no. 2, pp. 174–185, 2021.
- [28] P. L. Munhall, *Nursing Research: A Qualitative Perspective*, Jones and Bartlett Publishers, Burlington, MA, USA, 2007.
- [29] F. B. Thomas, “The role of purposive sampling technique as a tool for informal choices in a social sciences in research methods,” *Just Agriculture e-Magazine*, vol. 2, no. 5, pp. 1–8, 2022.
- [30] U. H. Graneheim and B. Lundman, “Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness,” *Nurse Education Today*, vol. 24, no. 2, pp. 105–112, 2004.
- [31] S. Elo, M. Kääriäinen, O. Kanste, T. Pölkki, K. Utriainen, and H. Kyngäs, “Qualitative content analysis: a focus on trustworthiness,” *Sage Open*, vol. 4, no. 1, 2014.
- [32] S. Elo and H. Kyngäs, “The qualitative content analysis process,” *Journal of Advanced Nursing*, vol. 62, no. 1, pp. 107–115, 2008.
- [33] B. M. Lindgren, B. Lundman, and U. H. Graneheim, “Abstraction and interpretation during the qualitative content analysis process,” *International Journal of Nursing Studies*, vol. 108, Article ID 103632, 2020.
- [34] C. Grbich, *Qualitative Data Analysis: An Introduction*, SAGE Publications, Thousand Oaks, CA, USA, 2007.
- [35] C. Maher, M. Hadfield, M. Hutchings, and A. de Eyto, “Ensuring rigor in qualitative data analysis: a design research approach to coding combining NVivo with traditional material methods,” *International Journal of Qualitative Methods*, vol. 17, no. 1, 2018.
- [36] N. A. Stahl and J. R. King, “Expanding approaches for research: understanding and using trustworthiness in qualitative research,” *Journal of Developmental Education*, vol. 44, no. 1, pp. 26–28, 2020.
- [37] P. Przy muszała, Ł. Zielińska-Tomczak, M. Kłos et al., “Distance learning and assessment during the COVID-19 pandemic—perspectives of polish medical and healthcare students,” *Sage Open*, vol. 12, no. 1, 2022.
- [38] J. Yu-Fong Chang, L.-H. Wang, T.-C. Lin, F.-C. Cheng, and C.-P. Chiang, “Comparison of learning effectiveness between physical classroom and online learning for dental education during the COVID-19 pandemic,” *Journal of Dental Science*, vol. 16, no. 4, pp. 1281–9, 2021.
- [39] D. T. H. Dung, “The advantages and disadvantages of virtual learning,” *IOSR Journal of Research and Method in Education*, vol. 10, no. 3, pp. 45–8, 2020.
- [40] H. Sason and A. Kellerman, “Teacher-student interaction in distance learning in emergency situations,” *Journal of Information Technology Education: Research*, vol. 20, pp. 479–501, 2021.
- [41] S. Terzi and A. Çelik, “Teacher-student interactions in distance learning,” *Turkish Online Journal of Educational Technology-TOJET.*, vol. 4, no. 1, pp. 54–6, 2005.
- [42] J. Goodwin, C. Kilty, P. Kelly, A. O’Donovan, S. White, and M. O’Malley, “Undergraduate student nurses’ views of online learning,” *Teaching and Learning in Nursing*, vol. 17, no. 4, pp. 398–402, 2022.
- [43] R. De Ponti, J. Marazzato, A. M. Maresca, F. Rovera, G. Carcano, and M. M. Ferrario, “Pre-graduation medical training including virtual reality during COVID-19 pandemic: a report on students’ perception,” *BMC Medical Education*, vol. 20, no. 1, pp. 332–7, 2020.
- [44] A. H. Ahmadi Hekmatikar and M. Molanouri Shamsi, “Effect of exercise on immunological indicators during the COVID-19 pandemic,” *Journal of Arak University of Medical Sciences*, vol. 23, no. 5, pp. 584–603, 2020.
- [45] P. Chen, L. Mao, G. P. Nassis, P. Harmer, B. E. Ainsworth, and F. Li, “Coronavirus disease (COVID-19): the need to maintain regular physical activity while taking precautions,” *Journal of Sport and Health Science*, vol. 9, no. 2, pp. 103–4, 2020.
- [46] Y. Guo, Y. Lou, and E. Spring, “Mobility and immobility during COVID-19: a narrative inquiry into the wellness of international high school students in Canada,” *Educational Philosophy and Theory*, pp. 1–11, 2023.
- [47] J. Li and W. Che, “Challenges and coping strategies of online learning for college students in the context of COVID-19: a survey of Chinese universities,” *Sustainable Cities and Society*, vol. 83, no. 103958, 2022.
- [48] W. Zhu, Q. Liu, and X. Hong, “Implementation and challenges of online education during the COVID-19 outbreak: a national survey of children and parents in China,” *Early Childhood Research Quarterly*, vol. 61, 2022.
- [49] M. Esra and Ç. Sevilen, “Factors influencing EFL students’ motivation in online learning: a qualitative case study,” *Journal of Educational Technology and Online Learning*, vol. 4, no. 1, pp. 11–22, 2021.
- [50] D. Harvey, D. Greer, J. Basham, and B. Hu, “From the student perspective: experiences of middle and high school students in online learning,” *American Journal of Distance Education*, vol. 28, no. 1, pp. 14–26, 2014.
- [51] M. Martín-Sómer, J. Moreira, and C. Casado, “Use of Kahoot! to keep students’ motivation during online classes in the lockdown period caused by Covid 19,” *Education for Chemical Engineers*, vol. 36, pp. 154–9, 2021.
- [52] T. Muthuprasad, S. Aiswarya, K. S. Aditya, and G. K. Jha, “Students’ perception and preference for online education in India during COVID-19 pandemic,” *Social Sciences and Humanities Open*, vol. 3, no. 1, Article ID 100101, 2021.
- [53] M. A. Sarrayrih and M. Ilyas, “Challenges of online exam, performances and problems for online university exam,” *International Journal of Computer Science Issues (IJCSI).*, vol. 10, no. 1, p. 439, 2013.

- [54] Y. Abdelrahim, “How COVID-19 quarantine influenced online exam cheating: a case of Bangladesh University Students,” *Journal of Southwest Jiaotong University*, vol. 56, no. 1, pp. 1–10, 2021.
- [55] I. Tuomi, “The impact of artificial intelligence on learning, teaching, and education,” *Policies for the Future*, Publications Office of the European Union, Luxembourg, Luxembourg, 2018.
- [56] S. Filetti and L. Saso, Eds., *Innovative Medical Education in the Digital Era. E Book*, 2022, <https://www.unica-network.eu/wp-content/uploads/2022/01/eBook-Innovative-Medical-Education.pdf>.
- [57] G. Rodríguez-Abitia, S. Martínez-Pérez, M. S. Ramirez-Montoya, and E. Lopez-Caudana, “Digital gap in universities and challenges for quality education: a diagnostic study in Mexico and Spain,” *Sustainability*, vol. 12, no. 21, p. 9069, 2020.

## Research Article

# Perceptions of Patients and Nurses about Bedside Nursing Handover: A Qualitative Systematic Review and Meta-Synthesis

Huda Anshasi <sup>1</sup> and Zainab Abdullah Almayasi<sup>2</sup>

<sup>1</sup>Department of Nursing, College of Health Sciences, University of Fujairah, Fujairah, UAE

<sup>2</sup>CRN, Kalba Hospital, Kalba, UAE

Correspondence should be addressed to Huda Anshasi; anshasi\_6@yahoo.com

Received 4 March 2024; Revised 17 April 2024; Accepted 22 April 2024; Published 29 April 2024

Academic Editor: Santo Imanuel Tonapa

Copyright © 2024 Huda Anshasi and Zainab Abdullah Almayasi. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Background.** Bedside nursing handover is a recognized nursing practice that involves conducting shift change communication at the patient's bedside to enhance communication safety. Understanding the perceptions of both patients and nurses regarding bedside handover is crucial in identifying the key principles for developing and implementing effective bedside handover protocols. However, there is currently a lack of comprehensive evidence that summarizes and evaluates studies focused on qualitative approaches for gaining insights into the perceptions of both nurses and patients. **Purpose.** This meta-synthesis review aims to identify, synthesize, and evaluate the quality of primary qualitative studies on the perceptions of patients and nurses about bedside nursing handover. **Methods.** A meta-synthesis review was conducted to identify qualitative studies that reported patients and nurses' perceptions about bedside handover using seven electronic databases, including CINAHL, PsycINFO, Embase, Education Database (ProQuest), Web of Science, The Cochrane Library, and PubMed, from January 2013 to November 2023. The authors independently selected reviews, extracted data, and evaluated the quality of included studies using the 10-item JBI Qualitative Assessment and Review Instrument tool. **Results.** A total of 871 articles were retrieved, of which 13 met the inclusion and exclusion criteria. These studies identified three main themes: (1) facilitators of bedside nursing handover, (2) barriers to bedside nursing handover, and (3) strategies to maintain confidentiality during bedside handover. **Conclusion.** This study systematically reviewed and integrated the perceptions of patients and nurses about bedside handover. Based on nurses' perceptions, the combined findings highlight the facilitators of bedside handover, including developing partnership interaction between nurses and patients, promoting professionalism, and enhancing emotional communication among nurses. From the patients' viewpoint, the synthesized findings emphasize the facilitators of bedside handover, including acknowledging the expertise, professionalism, and humanity of the nursing profession, ensuring a sense of safety, satisfaction, and confidence in the care received, as well as promoting individualized nursing care. In the context of barriers to bedside handover, both nurses and patients perceive breaches of confidentiality and privacy violations as significant barriers. When it comes to maintaining confidentiality during bedside handovers, it is important to consider patients' preferences. Patients often prefer handovers to take place in a private setting. From the nurses' perspective, it is important to inquire with patients about their preference for the presence of caregivers, and to conduct private handovers for sensitive issues away from the bedside. **Relevance to Clinical Practice.** Clinicians should carefully evaluate the barriers and facilitators in this meta-synthesis prior to implementing bedside handover. **Study Registration.** This study is registered in PROSPERO with Protocol registration ID: CRD42024514615.

## 1. Introduction and Background

Effective communication is widely regarded as the cornerstone of healthcare systems, particularly within nursing practice [1], where nurses serve as frontline professionals

and key players in this intricate environment. In order to effectively practice and fulfill their ultimate mission of "patient care," nurses must master communication skills [2].

The transfer of patient care, commonly referred to as handoffs or handovers, is a crucial process in healthcare that

heavily depends on efficient communication [3]. During handovers, nurses communicate a wide range of information. This includes exchanging patient history, discussing treatments and procedures that need to be completed, and addressing special considerations such as medication allergies, among other important details. Effectively communicating this valuable information is essential for maintaining quality care, patient safety, and treatment continuity during transitions [4].

Nevertheless, numerous obstacles hinder this process, such as heavy workloads, time limitations, stress, critical situations, frequent disruptions, and inevitable noise in the intricate, multidisciplinary healthcare setting. These unavoidable elements can result in communication breakdowns, ultimately affecting patient well-being. The Joint Commission International (JCI) has stated that most medical errors arise from communication breakdowns during handovers [5]. This failure to communicate can result in serious consequences, including medication errors, misdiagnosis, delayed treatments, unnecessary procedures and tests, prolonged hospital stays, and increased costs [4, 6].

Handovers are typically conducted at nursing stations, which are consistently busy areas with frequent noise, including loud voices, alarms, beepers, and phone rings. As a result, distractions and interruptions can easily occur during the exchange of information. These disruptions significantly impact the handover process and contribute to its inefficiency.

To address this issue, bedside handover was introduced as a method to enhance focus, reduce errors, and promote patient safety and patient-centered care [7–10]. By involving the patient in their treatment plan and allowing them to listen to the exchange of information about their condition, they become more aware of their illness [11]. This involvement promotes their empowerment within interprofessional healthcare teams [12], ultimately leading to improved treatment compliance and prognosis. Furthermore, bedside handover leads to improved patient and family satisfaction, nursing quality, and patient safety compared to the traditional hand-off conducted outside the patient's room [13].

Despite the well-established benefits of bedside handoff, healthcare professionals in numerous hospitals still conduct handoffs in the traditional manner, away from the patient's bed [10]. Similarly, many hospitals worldwide persist in utilizing the traditional method of handoff, which can elevate the risk of preventable errors. It is essential for decision-makers to be informed by the latest evidence when considering the implementation of a new policy in this regard.

Exploring and gaining a better understanding of patients' and nurses' perceptions about bedside handover can help identify the principles that should be considered when designing and implementing bedside handover protocols, with a focus on respectfully considering the preferences of both nurses and patients. Numerous qualitative studies have already explored the perceptions of nurses and patients regarding bedside handover in

different clinical settings including acute care, medical-surgical ward, emergency department, maternity, and cardiothoracic surgery [14–19]. Despite numerous studies on this topic, only one meta-synthesis has been conducted to evaluate and summarize the existing evidence, specifically focusing on patients' perceptions [20]. To the best of our knowledge, no meta-synthesis has been conducted specifically focusing on the perceptions of both patients and nurses. Furthermore, some new studies have been conducted since the publication of the aforementioned meta-synthesis [11, 14, 21].

Therefore, this meta-synthesis aimed to identify, synthesize, and evaluate the methodological quality of primary qualitative studies on patients' and nurses' perceptions of bedside nursing handover. This meta-synthesis can be a useful tool to aid clinicians, policy-makers, and developers of clinical guidelines in making informed decisions. In addition, it helps identify knowledge gaps in the literature and formulates recommendations to enhance the methodological quality of future research in this area.

## 2. Methods

The meta-synthesis was conducted and reported according to the Enhancing Transparency in Reporting the Synthesis of Qualitative Research (ENTREQ) Statement guidelines and Joanna Briggs Institute's (JBI) method of meta-aggregation [22, 23]. The rationale for using the meta-aggregation approach is its ability to generate generalizable recommendations for policymakers [24].

This meta-synthesis was also conducted following the guidelines outlined by Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) [25]. The protocol of this meta-synthesis was registered in PROSPERO (CRD42024514615). No amendments were made to the protocol after its registration. The PRISMA/ENTREQ checklist is exhibited in Supplementary File 1.

**2.1. Research Question.** The research question is formulated using the population, exposure, and outcomes (PEO) criteria [26]: what evidence exists regarding the perceptions of patients and nurses about bedside nursing handover?

**2.2. Search Strategy.** The search strategy to identify relevant studies included key terms of “handover,” “handoff,” “nursing handover,” “nursing handoff,” “patient hand-off,” “patient handover,” “patient transfer,” “sign out,” “inter shift,” “shift report,” “change of shift,” “shift change,” “service change,” “transition of care,” “bedside report,” “bedside handover,” “patient round,” “shift-to-shift handover,” and “shift-to-shift handoff.” In addition to other terms relevant to the bedside setting, including “patient's room,” “patient participation,” “patient-centered care,” “nurse-patient relations,” and “bedside.” A comprehensive search was conducted to find primary qualitative articles on patients' and nurses' perceptions of bedside nursing handover, utilizing a three-step search strategy.

First, a preliminary search was conducted using multiple electronic databases including CINAHL, PsycINFO, Embase, Education Database (ProQuest), Web of Science, The Cochrane Library, and PubMed. After that, an analysis of the text words in the title and abstract, as well as the index terms used to describe the article was conducted. Then, another search was conducted utilizing the previously identified keywords and index terms across all databases included in the study. Then, the relevant articles were sought by examining the reference lists of the included studies. In addition, the Boolean operators (AND/OR) were applied to join the search terms in each database as required.

**2.3. Inclusion Criteria.** Inclusion and exclusion criteria were defined before initiating the search for studies. The PEO (population, exposure, and outcomes) framework was used to develop the basis of the literature search strategy [26]. The primary qualitative studies were selected for this meta-synthesis, if they met the following inclusion criteria: (1) in terms of population, studies including adult nurses and/or adult patients aged 18 years or above. All nurses, including registered nurses and enrolled nurses, were considered, regardless of their professional qualifications; (2) in terms of exposure, studies conducted in any hospital settings where patients and nurses have been exposed to bedside nursing handover; (3) in term of outcomes, studies that presented the perceptions of nurses and/or patients regarding bedside nursing handover in a hospital setting; (4) being published as a full-text research in peer-reviewed journals between November 2013 and November 2023; and (5) published in English language. Excluded from consideration were articles that did not specifically address bedside nursing handovers, multidisciplinary handovers, or the discussion of caregivers' perceptions.

**2.4. Screening and Selection of Included Studies.** All duplicates were removed from the references. The authors (AH and AZ) independently screened the identified study abstracts for potential eligibility in this meta-synthesis. Then, the full-text research was retrieved and carefully examined in detail to assess their eligibility and review relevant outcomes. The authors resolved disagreements by discussing the articles in question until reaching a consensus.

**2.5. Quality Assessment of the Included Studies.** The 10-item JBI Qualitative Assessment and Review Instrument (QARI) [27] software was used to evaluate the methodology quality of eligible qualitative studies. Each item in this tool is categorized into a standardized set of four possible responses: yes, no, unclear, or not applicable. Two authors independently appraised the quality of the studies, and any disagreements were resolved through consensus.

**2.6. Data Extraction.** The data were independently extracted by the two authors, focusing on the authors' names, publication years, study countries, phenomena of interest,

participant characteristics, data collection and analysis methods, and the main results. The authors' disagreements were resolved through discussion. No data were requested from the included study's authors.

**2.7. Data Synthesis.** The JBI Qualitative Assessment and Review Instrument (QARI) software was utilized to analyze and categorize findings as either unequivocal (supported by irrefutable data), credible (plausible within the context of the data), or not supported [28].

The findings, which were both "unequivocal" and "credible," were combined and organized into categories that shared similar meanings. In line with the JBI approach, a category was formed based on a minimum of 2 findings ((JBI), 2020). Inductive thematic content analysis was then performed to analyze the narratives. Two authors (AH and AZ) independently evaluated the categories created, and any disagreements were resolved through consensus.

In order to validate the credibility of the findings in this meta-synthesis, the synthesized results underwent a confidence assessment using the ConQual approach [29]. Created to aid clinical decision-making, this assessment approach categorizes the confidence level of qualitative evidence as high, moderate, low, and very low. All studies commence with a "high" ranking on a scale of high, moderate, low, to very low. Subsequently, they are downgraded depending on their dependability and credibility.

### 3. Results

**3.1. Study Search and Screening Results.** The search strategies produced 871 records, with 454 duplicates being identified and removed. After reviewing the titles and abstracts, the authors excluded 402 studies and proceeded to assess the full texts of the remaining fifteen studies. Two studies were not included due to one not being qualitative [30] and the other not addressing nurses' or patients' perceptions of bedside nursing handovers [31]. Finally, a total of thirteen studies met the inclusion criterion [11, 13–19, 21, 32–35]. Figure 1 illustrates the flowchart of the searching and selecting process.

**3.2. Characteristics of Included Studies.** The thirteen included studies were published between 2013 and 2021, and 7 (77.8%) of them were published after 2016. Six of these studies were conducted in Australia, three in Italy, two in the US, and the remaining four in Canada, Malaysia, Sweden, and Singapore. Ten of the studies included in this meta-synthesis examined nurses' perceptions [11, 13–16, 18, 19, 21, 33, 35], while three specifically investigated the perceptions of patients [17, 32, 34]. The participants, consisting of 383 nurses and 89 patients, were from various clinical settings including acute care, medical-surgical ward, emergency department, maternity, and cardiothoracic surgery. The characteristics of these twelve included studies are presented in Table 1

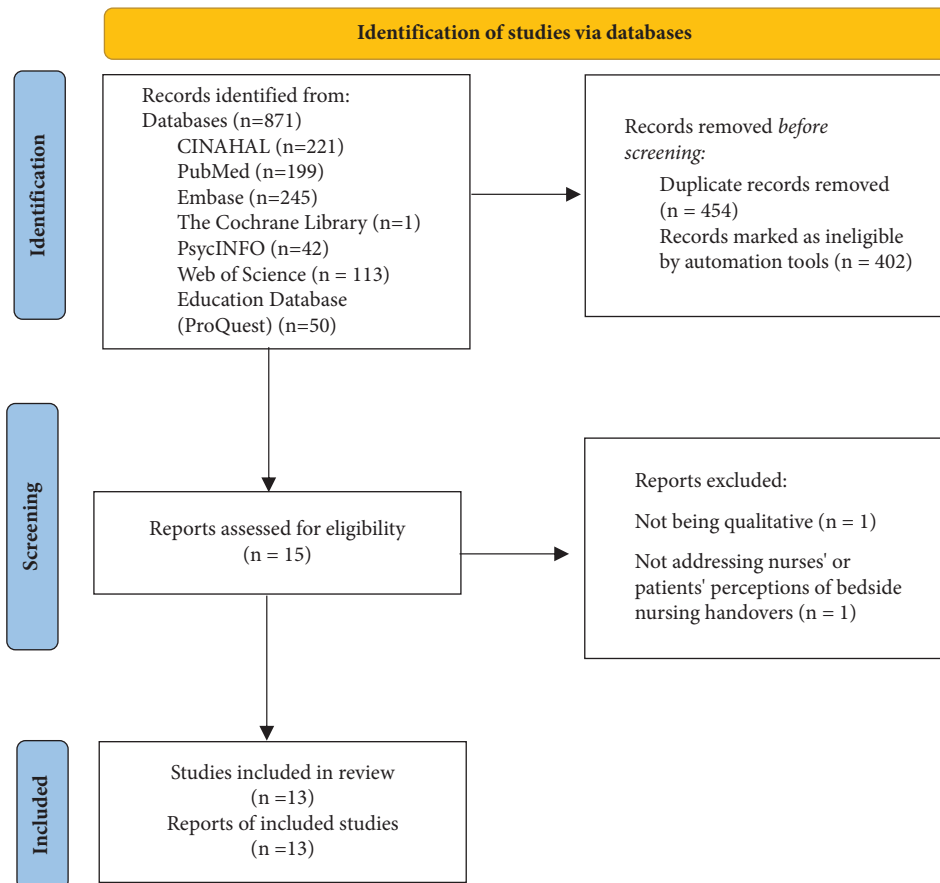


FIGURE 1: Flowchart of the searching and selecting process.

**3.3. Methodological Quality of the Included Studies.** All the included studies demonstrated congruity between the research methodology and the research questions, methods used to collect data, analysis, representation, and the conclusions from the data. However, all the included studies failed to clearly demonstrate alignment between the stated philosophical perspective and the research methodology. Furthermore, there is a lack of clear investigation into the influence of the researcher on the research, and vice versa. The authors' agreement on the study qualification ranged from 93% to 100% for each item, resulting in a high overall agreement of 95%. The study's quality details are outlined in Table 2.

The three themes received a moderate evidence quality score because the credibility was downgraded by one level. The details of the level of confidence of the included qualitative studies are presented in Table 3.

**3.4. Results of the Included Studies.** Thirteen studies were conducted to investigate the perspectives of patients or nurses on bedside handover [11, 13–19, 21, 32–35]. The meta-synthesis of thirteen studies resulted in the identification of three main themes: facilitators of bedside nursing handover, barriers to bedside nursing handover, and strategies to maintain confidentiality during bedside handover. These themes encompass fourteen subthemes

based on the perceptions of both patients and nurses. The themes and subthemes are shown in Table 4.

#### 3.4.1. Theme 1: Facilitators of Bedside Nursing Handover

**(1) Patients' Perceptions.** The synthesized findings on the facilitators of bedside handover have three subthemes from patients' perceptions which include the following:

(i) Acknowledging the expertise, professionalism, and humanity of the nursing profession

This subtheme highlights the shift in patients' perception of the nursing profession, as they increasingly recognize the knowledge, skill, and professionalism demonstrated by nurses. Patients have expressed feeling empowered by the nurses' in-depth understanding of their status and the care plan discussed during bedside handovers [32].

*"It also makes me more aware of what's going on in my health care. Sometimes they change things or do things throughout the day that maybe I'm not aware of, or maybe I am aware of it but didn't really pay attention when they were doing it. This just kind of bumps me up to speed" ([32], p. 152).*

TABLE 1: Characteristics of the studies included in the meta-synthesis.

Author (year)	Country	Phenomena of interest	Participants characteristics (n)	Data collection/data analysis	Main findings/themes
Johnson and Cowin (2013) [15]	Australia (Sydney)	To explore how nurses experienced the introduction of bedside handover and the use of written handover sheets	<ul style="list-style-type: none"> <li>(i) Registered nurses and enrolled nurses (similar to licensed practical nurses)</li> <li>(ii) Sample from medical and surgical wards at three major metropolitan hospitals</li> <li>(iii) Sample size: <math>n = 30</math></li> <li>(iv) Age: 21 yrs—50 yrs</li> <li>(v) Gender: male (5) and female (25)</li> </ul>	Focus groups/thematic analysis	“(1) Bedside handover strengths and weaknesses (most participants believed that confidentiality issues arising from handovers were minimal and easily managed within their current handover practice although permission is sometimes sought from patients and significant others); (2) patient involvement in handover; (3) good communication is about good communicators; and (4) three sources of patient information (handover, handover sheets, and nursing notes” [15]
Kerr et al. (2013) [34]	Australia	To explore the perspectives of patients about bedside handover by nurses in the emergency department	<ul style="list-style-type: none"> <li>(i) Patients from the emergency department (ED)</li> <li>(ii) Sample size: <math>n = 30</math></li> <li>(iii) Age: <math>\geq 18</math> yrs</li> <li>(iv) Gender: male (12) and female (18)</li> </ul>	Semistructured interviews/thematic content analysis	“(1) Patients perceive that participating in bedside handover enhances individual care and (2) maintaining privacy and confidentiality during bedside handover is important for patients (preference was expressed for handover to be conducted in the ED cubicle area to protect the privacy of patient information)” [34]
Kerr et al. (2014) [33]	Australia	To explore the perspectives of nurses and midwives towards the introduction of bedside handover	<ul style="list-style-type: none"> <li>(i) Nurses (registered nurse and enrolled nurse) and midwives</li> <li>(ii) Nurses sample from medical and surgical wards</li> <li>(iii) Sample size: registered nurse <math>n = 17</math>, enrolled nurse <math>n = 3</math>, and midwives <math>N = 10</math></li> <li>(iv) Gender: male (5) and female (25)</li> </ul>	Semistructured interviews/content analysis	“(1) Enhanced individual patient care and documentation, along with improved patient-clinician partnerships and (2) protection of confidentiality and privacy (private and/or sensitive information can be communicated by whispering, pointing at the information in the patient’s chart, or after asking visitors to leave the room)” [33]

TABLE 1: Continued.

Author (year)	Country	Phenomena of interest	Participants characteristics (n)	Data collection/data analysis	Main findings/themes
Jeffs et al. (2014) [32]	Canada (Toronto)	To explore patients' experiences and perceptions associated with the implementation of bedside nursing handover	(i) Patients from one acute care hospital (ii) Sample size: $n = 45$ (iii) Age: $\geq 18$ yrs  (iv) Gender: male (15) and female (30)	Semistructured interviews/ a directed content analysis	"(1) Creating a space for personal connection (patients described bedside nursing handover as an engaging, personal, and informative approach to shift handover); (2) bumping up to speed (patients described feeling less anxious about their care, having a sense of security, and experiencing greater satisfaction as a result of their participation in the bedside nursing handover); and (3) varying preferences (patients emphasized the importance of considering their clinical status as well as the preferences of each individual patient before performing bedside nursing handover)" [32]
Grimshaw et al. (2016) [13]	USA	To identify factors and acute care nurses' perceptions influencing the frequency of change-of-shift reports at the bedside	(i) Nurses from medical unit, surgical unit, and intensive care unit (ICU) (ii) Sample size: $n = 7$ (iii) Age: 19 yrs–59 yrs (iv) Gender: male (1) and female (6)	Semistructured interviews/ thematic analysis	"Five themes were identified from the collected data, which included the time factor, continuity of care, visualization, and challenges in the communication and discreet information" [13]
Lupieri et al. (2016) [17]	Italy	To explore the postoperative cardiothoracic surgical patient experience of nurses' bedside handovers	(i) Patients from a cardiothoracic ICU (ii) Sample size: $n = 14$ (iii) Age: $\geq 18$ yrs  (iv) Gender: male (10) and female (4)	Semistructured interviews/ Content analysis	"(1) Discovering a new nursing identity (patients getting to know the competence involved in the nursing profession leading to improved patients' satisfaction); (2) being apparently engaged in a bedside handover (limited patients' participation, patients prefer to be more involved); (3) experiencing the paradox of confidentiality (lack of privacy is a problem but did not represent a concern for patients and patients do not care if another patient know about their medical problems); and (4) having the situation under control (nurses were able to verify the information immediately and feeling sense of safety)" [17]



TABLE 1: Continued.

Author (year)	Country	Phenomena of interest	Participants characteristics (n)	Data collection/data analysis	Main findings/themes
Khuan and Juni (2017) [35]	Malaysia	To explore Malaysian nurses' opinions about patient involvement in relation to patient-centered care during bedside handovers	(i) Registered nurses from medical, surgical, and orthopedic wards (ii) Sample size: $n = 20$ (iii) Age: 26 yrs–40 yrs  (iv) Gender: male (6) and female (14)	Focus groups/content analysis	“(1) Superficial involvement related to a knowledge deficit, inexperience, and a task-oriented mindset; (2) patient-centered care (PCC) as interactive and respectful of patients' wishes and/or decisions; (3) impracticality of patient involvement in relation to time constraints, length of interaction, and hierarchy of nurse-patient communication; and (4) patient involvement as not representative of PCC due to violations of patient autonomy” [35]
Roslan and Lim (2017) [18]	Singapore	To explore nurses' perceptions of bedside clinical handover in an acute-care inpatient unit in Singapore	(i) Registered nurses, enrolled nurses, and nurse clinicians from an acute-care hospital (ii) Sample size: $n = 20$  (iii) Gender: male (1) and female (19)	Focus groups/Semistructured interviews/thematic analysis	“(1) Bedside clinical handover could compromise patient's confidentiality (potential confidentiality breach, demands for secrecy, and risk of information misinterpretation) and (2) disturbances during the handover (patient and/or their family members and environment are sources of constant interruptions and distractions)” [18]
Tobiano et al. (2017) [19]	Australia	To explore and understand barriers nurses perceive in undertaking bedside handover	(i) Registered nurses, enrolled nurses from medical wards (ii) Sample size: $n = 176$  (iii) Gender: male (18) and female (158)	Open-ended question/content analysis	“(1) Censoring the message showed that nurses were concerned about patients and third parties hearing sensitive information; (2) disrupting the communication flow, nurses perceived patients, family members, other nurses, and external sources interrupted the flow of handover and increased its duration; and (3) inhibiting characteristics demonstrated that individual patient and nurse views or capabilities hindered bedside handover” [19]

TABLE 1: Continued.

Author (year)	Country	Phenomena of interest	Participants characteristics (n)	Data collection/data analysis	Main findings/themes
Dellafiore et al. (2019) [11]	Italy	To explore the perceptions of nurses regarding a recent implementation of bedside nursing handover	(i) Nurses from cardiac surgery (ii) Sample size: $n = 16$  (iii) Age: 26 yrs–48 yrs	Focus groups/thematic analysis	“The main themes that were identified revolved around improving nursing care, greater professionalism, effective relationships, consequences for the patient, and obstacles to change. Moreover, we found that nurses perceive bedside nursing handover to be effective in promoting patient-centered care. The nurses in our study also felt that any difficulties with the implementation of a bedside nursing handover protocol (e.g., confidentiality) should be addressed through continued nursing education” [11]
Hada et al. (2019) [21]	Australia (Brisbane)	To systematically assess the barriers and facilitators to evidence-based nursing handover in a clinical environment, and to identify potential adopters and attributes of evidence-based nursing handover for translation into practice	(i) Registered nurses, enrolled nurses from medical wards (ii) Sample size: $n = 49$  (iii) Gender: male (8) and female (41)	Focus groups/content analysis	“(1) Content (information transferred); (2) process (steps used to transfer accountability and responsibility for care); and (3) environment (factors impacting safe handover). Participants identified barriers to effective nursing handover including variability of the handover content and process, uncertainty around sharing sensitive information, inconsistency around clarifying gaps through questioning during the handover, superficial patient involvement, time constraints, and environmental challenges. The key facilitators discussed during the focus groups were the use of integrated electronic medical records, support and clear expectations from the nursing leadership, and targeted handover education” [21]

TABLE 1: Continued.

Author (year)	Country	Phenomena of interest	Participants characteristics (n)	Data collection/data analysis	Main findings/themes
Jimmerson et al. (2021) [14]	USA	Experiences and opinions regarding bedside shift report	(i) Clinical nurses and their nursing supervisors from acute adult care inpatient units (ii) Sample size: clinical nurses (n = 22) and nursing supervisors (n = 12)  (iii) Age: ≥18 yrs	An in-depth face-to-face interview	“(1) Time constraints nurse’s workflow (more time is spent making the discussion professional because the patient is hearing, patients’ interruptions are time-consuming, and can increase the risk of missing important information); (2) modified approach needed (against full bedside handoff, rehearsal outside patient’s room can help, and patient presence restricts the type of information shared); (3) individualization of process and content to be meaningful (does not fit all size, problem lists and management should be the focus, and waking patient up for the handover is not good); (4) specific critical content that should be discussed inside the patient’s room (plan of care/goals for day and medication infusion); and (5) specific critical content that should be discussed outside the patient’s room (history and review of systems)” [14]

TABLE 2: Methodological quality of the qualitative studies included in the meta-synthesis.

Author (year)	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Overall score
Johnson and Cowin (2013) [15]	U	Y	Y	Y	Y	N	U	Y	Y	Y	7
Kerr et al. (2013) [34]	U	Y	Y	Y	Y	N	U	Y	Y	Y	7
Kerr et al. (2014) [33]	U	Y	Y	Y	Y	U	U	Y	Y	Y	7
Jeffs et al. (2014) [32]	U	Y	Y	Y	Y	N	U	Y	Y	Y	7
Grimshaw et al. (2016) [13]	U	Y	Y	Y	Y	U	U	Y	Y	Y	7
Lupieri et al. (2016) [17]	U	Y	Y	Y	Y	U	U	Y	Y	Y	7
Khuan & Juni (2017) [35]	U	Y	Y	Y	Y	U	U	Y	Y	Y	7
Roslan & Lim (2017)[18]	U	Y	Y	Y	Y	U	U	Y	Y	Y	7
Tobiano et al. (2017) [19]	U	Y	Y	Y	Y	U	U	Y	Y	Y	7
Kulberg et al. (2018) [16]	U	Y	Y	Y	Y	U	U	Y	Y	Y	7
Dellafore et al. (2019) [11]	U	Y	Y	Y	Y	U	U	Y	Y	Y	7
Hada et al. (2019) [21]	U	Y	Y	Y	Y	Y	U	Y	Y	Y	8
Jimmerson et al. (2021) [14]	U	Y	Y	Y	Y	Y	U	Y	Y	Y	8
Number of Y (%)	0 (0)	13 (100)	13 (100)	13 (100)	13 (100)	2 (15.38)	0 (0)	13 (100)	13 (100)	13 (100)	

Y = yes; N = no; U = unclear. JBI-QARI, Joanna Briggs Institute Qualitative Assessment and Review Instrument (JBI-QARI) critical appraisal tool; Q1. Is there a congruity between the stated philosophical perspective and the research methodology? Q2. Is there a congruity between the research methodology and the research question or objectives? Q3. Is there a congruity between the research methodology and the methods used to collect data? Q4. Is there a congruity between the research methodology and the representation and analysis of data? Q5. Is there a congruity between the research methodology and the representation and analysis of data? Q6. Is there a statement locating the researcher culturally or theoretically? Q7. Is the influence of the researcher on the research, and vice-versa, addressed? Q8. Are participants, and their voices, adequately represented? Q9. Is the research ethical according to the current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body? Q10. Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?

TABLE 3: Level of confidence of the qualitative studies included in the meta-synthesis.

Synthesized finding/themes	Type of study	Dependability	Credibility	ConQual score*
Facilitators of bedside nursing handover	Qualitative	Unchanged	Downgrade one level	Moderate
Barriers to bedside nursing handover	Qualitative	Unchanged	Downgrade one level	Moderate
Strategies to maintain confidentiality during bedside handover	Qualitative	Unchanged	Downgrade one level	Moderate

\*All studies commenced with a "high" ranking on a scale of high, moderate, low, to very low, and then downgraded based on their dependability and credibility.

Furthermore, the patients express gratitude for the humanity displayed by nurses during the information-sharing process at the bedside, which fosters a deeper connection between the nurses and patients [17].

*"I think that, as usual, human beings make the difference. I mean, for me the most important thing is to rely on a high-levelled staff, both defined by professionalism and humanity"* ([17], p. 32).

(ii). Promoting individualized nursing care

Patients perceived that bedside handover improved their individualized nursing care. This was due to the opportunity it provided for patients to clarify and give nurses extra information during the verbal handover exchange. Patients viewed bedside nursing handover as a chance to inquire, contribute to their care, and rectify any information with the incoming and outgoing nurses [34].

*"I think it's good. I think it's needed, because if there is something that's wrong, you can always pipe up (speak out). Just so that they've definitely got an understanding of what has happened to you and make sure that it is correct*

*rather than slightly off-key (incorrect). I think it's good and I prefer it"* ([34], p. 1689).

(iii) Ensuring a sense of safety, satisfaction, and confidence in the care received

This subtheme highlights how patients feel less anxious about their care, have a sense of security, and experience greater satisfaction as a result of their participation in the bedside nursing handover. Patients expressed feeling a sense of safety, as they were able to promptly verify information during the bedside handover [17]. In addition, the bedside handover provided reassurance to patients that everything was under control, especially during shift changes: *"I felt protected, safe"* ([17], p. 33).

Patients emphasized the importance of continuity of care. They preferred knowing that all their relevant information was being communicated to the nurses of the next shift. After participating in bedside handover, they felt assured that the transition of care was effectively managed between shifts.

*"So, it's good for me to hear what they've been doing to me, so the next person knows exactly what's been going on. So,*

TABLE 4: Synthesized themes according to the patients' and nurses' perceptions about bedside handover.

Themes	Subthemes/categories
Facilitators of bedside nursing handover	<p>Patients' perceptions</p> <ul style="list-style-type: none"> <li>(i) Acknowledging the expertise, professionalism, and humanity of the nursing profession</li> <li>(ii) Promoting individualized nursing care</li> <li>(iii) Ensuring a sense of safety, satisfaction, and confidence in the care received</li> </ul> <p>Nurses' perceptions</p> <ul style="list-style-type: none"> <li>(i) Developing partnership interaction between nurses and patients</li> <li>(ii) Promoting professionalism and emotional communication among nurses</li> </ul>
Barriers to bedside nursing handover	<p>Patients' perceptions</p> <ul style="list-style-type: none"> <li>(i) Breaching confidentiality and violating privacy from patients' perceptions</li> <li>(ii) Neglecting and excluding the patient during bedside handover</li> </ul> <p>Nurses' perceptions</p> <ul style="list-style-type: none"> <li>(i) Breaching confidentiality and violating privacy from nurses' perceptions</li> <li>(ii) Rising risk of overtime and unnecessary transmission of redundant information</li> <li>(iii) Contribute to decrease in the sense of collegiality and security</li> </ul>
Strategies to maintain confidentiality during bedside handover	<p>Patients' perceptions</p> <ul style="list-style-type: none"> <li>(i) Nurses should use discretion when handling sensitive issues</li> <li>(ii) Preference for handover to occur in the cubicle</li> </ul> <p>Nurses' perceptions</p> <ul style="list-style-type: none"> <li>(i) Inquiring with patients about their preference for the presence of caregivers</li> <li>(ii) Nurses should conduct private handovers for sensitive issues away from the bedside</li> </ul>

*it's a smooth transition so, I wouldn't have to re-explain myself again"* ([34], p. 1689).

(2) *Nurses' Perceptions*. The synthesized findings on the facilitators of bedside handover have two subthemes from nurses' perceptions which include the following:

(iv) Developing partnership interaction between nurses and patients

This subtheme highlights a key facilitator that is consistently mentioned in the majority of studies: the development of a partnership interaction between nurses and patients during bedside handover [11, 33, 35]. This partnership ensures a safer care process and enhances confidence in the care provided. Nurses perceived that bedside handover increased patients' awareness of their care and strengthened their connection with the nursing staff, enabling them to actively participate in their own care [11]. Bedside handover also provided an avenue for patients to voice concerns about care and allowed nurses to confirm the completeness of the information exchanged, enabling prompt adjustments when necessary [16, 18, 21].

(v) Promoting professionalism and emotional communication among nurses

This subtheme highlights another commonly cited facilitator: the promotion of professionalism and emotional communication among nurses during bedside handovers. Nurses have reported that bedside handover promotes the delivery of thorough explanations of clinical information and enables them to communicate with confidence using appropriate language [17]. In addition, nurses have reported that observing their colleagues during bedside handover has provided them with valuable opportunities for mutual learning and teaching, thus strengthening the relationships among the nurses involved in planning and care [16, 21].

### 3.4.2. Theme 2: Barriers to Bedside Nursing Handover

(1) *Patients' Perceptions*. The synthesized findings on the barriers of bedside handover have two subthemes from patients' perceptions which include the following:

i) Breaching confidentiality and violating privacy from patients' perceptions

From the patients' perspective on the violation of their privacy and confidentiality, there is a paradox concerning confidentiality. While patients view respect for privacy as fundamental, most do not express concern during bedside handovers [17]. However, some patients consider their medical information sensitive, especially details about sexually transmitted diseases or addiction, which they perceive as discriminatory. As a result, they prefer that these issues not be discussed during bedside handover [17, 34].

*"Nurses should be sensitive when discussing gynecology issues that should be a bit more private"* ([34], p. 1690).

Some patients have raised concerns with the volume of nurses' communication during the bedside nursing handover, the disclosure of their full name, and the sharing of information about their condition [32].

*"To be honest, I think something like that (bedside nurse handover) would probably phase out or disappear over a course of 2 days, because after a day or 2 you've heard their bed report, they have heard your bed report"* ([32], p. 152).

(ii) Neglecting and excluding the patient during bedside handover

This subtheme highlights the patients' feelings of being excluded or neglected by nurses during the bedside handover process. Patients have described feeling left out due to the use of medical jargon, lack of involvement of the patient during handover, and insufficient attention paid to the fact that the patient is listening [17, 34].

The use of medical jargon or complex medical language often left patients feeling excluded from important conversations, even when the discussions directly related to their well-being [17]. It appeared that patients were frequently uninformed about their own medical circumstances, despite their belief in their right to understand their diagnosis and treatment plan [17].

Patients prefer to be more involved during the process, as nurses often talked to each other neglecting that the patient was listening to them: *"they don't tell you anything; I get that they have to talk to one another, but they should involve the patient if there's something concerning him"* ([17], p. 32).

*"They should have answered my questions well, they answered actually but they generally don't pay too much attention to the fact that the patient is listening and would like to know something while they report"* ([17], p. 32).

Furthermore, patients have occasionally expressed concerns about their understanding during handover, which can lead to anxiety. This problem may be particularly significant for patients whose first language is not English.

*"Well, I understand some things-just simple things. But in very few words-if [nurses] talk too many words, I don't know what (they are) talking about"* ([34], p. 1690).

(2) *Nurses' Perceptions*. The synthesized findings on the barriers of bedside handover have three subthemes from nurses' perceptions which include the following:

(iii) Breaching confidentiality and violating privacy from nurses' perceptions

This subtheme reflects the nurses' perspective on the violation of patients' privacy and confidentiality. This is considered a significant obstacle to bedside handover, as identified in the majority of included studies [13, 16, 18, 21].

Nurses have identified the handling of confidential information as an added layer of complexity during bedside handover [16, 21, 33]. They expressed worries about keeping patient information confidential during bedside handover, particularly when it relates to private (e.g., cancer and palliative care) or sensitive (e.g., blood-borne virus infection and drug and alcohol history) matters [33].

They also expressed significant concern about the potential privacy violations caused by the presence of other patients or caregivers [13, 16, 18, 21].

*"I feel there's a privacy issue, saying everything out loud. I try to speak quietly but curtains aren't soundproof. I don't like that"* ([33], p. 254).

(iv) Rising risk of overtime and unnecessary transmission of redundant information

This subtheme brings attention to the concerns raised by nurses in many included studies regarding the potential for increased overtime and the transmission of redundant information during bedside handover [13, 16, 18, 35]. Nurses who are required to work extra hours may feel pressured to hurry to finish all their duties, including bedside handover [13, 16, 18]. Furthermore, patients involved in bedside handover with nurses working overtime may feel frustrated, perceiving the nurses as absent, superficial, and lacking full involvement in the therapeutic relationship [35].

Nurses have reported that distractions, noises, and interruptions are unavoidable during bedside handover, and that these factors may potentially result in omissions [19, 21]. They believe that the traditional handover method, where nurses gathered around a table, posed less risk of information being overlooked [18, 21]. The necessity to repeatedly convey the same information at every shift can be overwhelming for both nurses and patients.

Nurses held varying opinions about the importance of patient involvement in bedside handover [19]. Some argued that patients should be excluded from this process because they lack expertise, and nurses often experience fatigue when trying to understand patients' needs, which can be time-consuming [35]. The occurrence of such failures has caused nurses to conduct superficial and abbreviated bedside handovers [35],

resulting in patients feeling left out and creating negative views of the process [17].

(v) Contribute to decrease in the sense of collegiality and security

This subtheme highlights a common barrier identified in many studies, where nurses perceive that bedside handover may lead to frustrations among colleagues, as well as feelings of uncertainty and discomfort [13, 16, 19]. Nurses explicitly referred to the freedom of expression provided by nonbedside handover methods, which were dedicated to sharing concerns and alleviating frustrations among colleagues [19]. In situations where nurses with lower skill levels and fewer patients to care for, implementing bedside handover often resulted in demands to revert to previous handover methods [13]. Bedside handovers occasionally caused nurses to feel uncertain, particularly if they sensed judgment from patients or coworkers [16]. Nurses have expressed that being interrogated in front of the patient without adequate information is a source of anxiety and can lead to embarrassing situations [16, 18]. At times, nurses have expressed that engaging in an intellectual activity such as bedside handover, which lacks a technical component, has led to feelings of embarrassment. This is due to patients not perceiving bedside handover as an essential procedure, but rather as a casual conversation among staff that does not align with the standard of care [18].

Moreover, nurses have described that bedside handover may lead to feelings of uncertainty and discomfort. Nurses have conveyed a feeling of uncertainty regarding the appropriate level of detail to be utilized during bedside handover [11]. They specifically experienced difficulty in responding to patients' inquiries during bedside handover and expressed frustration regarding the potential confusion it could cause [16]. Communication issues were particularly prevalent among novice nurses [21]. Nurses perceive bedside handover as a means for the staff to exert control and assert authority over them [17].

### 3.4.3. Theme 3: Strategies to Maintain Confidentiality during Bedside Handover

(1) *Patients' Perceptions*. The synthesized findings on the strategies to maintain confidentiality during bedside handover have two subthemes from patients' perceptions which include the following:

(i) Nurses should use discretion when handling sensitive issues

According to patients' perceptions, nurses are expected to exercise discretion when handling sensitive information during bedside handovers, including topics such as sexual health and alcohol issues, in order to maintain confidentiality. The discussion included various methods for nurses to communicate this

information during handover, such as speaking softly or relocating away from the patient's bedside [34].

*"I think nurses already act discreet(ly) with sensitive issues and don't vocalize it for everyone to hear"* ([34], p. 1690).

Patients anticipate that nurses will handle new or distressing information professionally. They believe that sensitivity is necessary when patients are unaware of the information about their condition, indicating that such news should not be conveyed during the nurses' handover conversation [34].

Patients typically found satisfaction in acquiring information, while nurses were required to convey it with professionalism, empathy, and compassion, particularly when delivering unfavorable news [17].

*"The positive is always positive, while the negative gets you down; you perceive there's something wrong"* ([17], p. 33).

(ii) Preference for handover to occur in the cubicle

This subtheme highlights another strategy to maintain confidentiality during handover. Many patients reported expressed worry about nurses discussing their condition in areas where others might overhear, possibly violating their confidentiality [34].

*"The only bad thing is that other patients can hear when they do it outside the cubicle"* ([34], p. 1690).

*"I prefer nurses to talk about personal information here in the cubicle not outside where other patients can hear"* ([34], p. 1690).

(2) *Nurses' Perceptions.* The synthesized findings on the strategies to maintain confidentiality during bedside handover have two subthemes from nurses' perceptions which include the following:

(iii) Inquiring with patients about their preference for the presence of caregivers

Nurses in the included studies have discussed various strategies for upholding confidentiality during bedside handover. These strategies encompass asking patients about their preference for the presence of caregivers [15, 21], indicating information in the patient's chart, and requesting visitors to leave the room before discussing sensitive details [33].

In addition, ensuring a private setting enhanced confidentiality during bedside handover [35], as did the pacts between nurses and patients concerning the information shareable in the company of others [18, 34].

*"We ask the patient if they are alright if we give a handover while they (visitors, family) are there and if they are not comfortable then we can always say to them" "if you can step out of the room (referring to visitors and family) so I can give handover"* ([15], p. 124).

(iv) Nurses should conduct private handovers for sensitive issues away from the bedside

The nurses in the studies included have emphasized the importance of discussing sensitive issues away from the bedside and conducting private handovers. Nurses seek flexibility in managing confidential health information, as indicated by the following comments:

*"Small things will be (discussed) out in the station; all the confidentiality issues are all discussed in front of our big board. If we've got to say something like "these patients got HIV," "they've got cancer;" we can do that discretely in another forum"* ([15], p. 124).

## 4. Discussion

This meta-synthesis examined the findings of qualitative studies exploring patients' and nurses' perspectives of bedside handover in a hospital setting. In order to ensure that this meta-synthesis is informative for clinicians and researchers, the authors established inclusive criteria to encompass all qualitative evidence regarding the perceptions of bedside handover from the perspectives of both nurses and patients. They then categorized the data based on the participants.

*4.1. Discussion of the Themes Emerged.* The meta-synthesis identified three key themes: facilitators of bedside nursing handover, barriers to bedside nursing handover, and strategies to maintain confidentiality during bedside handover. These findings have the potential to enhance our understanding of nurses' and patients' perceptions regarding bedside handover. The synthesized findings exhibit a moderate level of confidence, indicating their suitability for incorporation into clinical practice.

In terms of methodological quality, improvements should be made in the following respects: (1) ensuring alignment between the stated philosophical perspective and the study methodology, (2) clearly stating the cultural or theoretical background of the researcher, and (3) addressing the influence of the researcher on the research, and conversely.

*4.1.1. Theme 1: Facilitators of Bedside Nursing Handover.* This meta-synthesis highlights the facilitators of bedside handover from the perspective of nurses. These include the development of a partnership interaction between nurses and patients, as well as the promotion of professionalism and emotional communication among nurses. These findings align with other studies that have shown a positive correlation between bedside handovers and increased staff interaction, as well as improved patient communication



[36–38]. The findings indicate the importance of implementing bedside handover to improve patient communication, thereby ensuring a safer care process.

From patients' perceptions, the synthesized findings on the facilitators of bedside handover include ensuring a sense of safety, satisfaction, and confidence in the care received. The findings align with previous studies demonstrating that bedside handover improves the nursing handover process, elevates patient satisfaction, and enhances patient safety [39, 40].

The promotion of individualized nursing care is another key facilitator of bedside handover, as perceived by patients. These findings are consistent with previous studies that have highlighted the enhancement of patient-centered care through bedside handover [7]. The findings of this meta-synthesis suggest that clinicians should consider implementing bedside handover, taking into account the facilitators identified from the perspectives of both nurses and patients.

*4.1.2. Theme 2: Barriers to Bedside Nursing Handover.* Based on the findings of this meta-synthesis, both nurses and patients perceive breaching confidentiality and violating privacy as significant barriers to bedside handover. Both nurses and patients express varying levels of concern about these issues, with nurses showing a greater concern for confidentiality compared to patients. Nurses consider threats to patients' confidentiality as the primary obstacle to implementing bedside handover [13, 16, 18, 21]. They expressed worries about keeping patient information confidential during bedside handover, particularly when it relates to sensitive (e.g., alcohol history) matters [33]. This aligns with findings from some studies included in this meta-analysis, which have highlighted that some patients view their medical information, particularly details about sexually transmitted diseases or addiction, as sensitive and potentially discriminatory [34, 41]. Consequently, they prefer that these issues not be addressed during bedside handovers. These findings suggest that sensitive information such as sexually transmitted diseases or addiction should not be discussed during bedside handover. Clinicians should consider this barrier prior to implementing bedside handover.

Based on patients' perceptions, another barrier to bedside handover, as indicated by the findings of this meta-synthesis, is the neglect and exclusion of the patient during bedside handover. The use of medical jargon or complex medical language often left patients feeling excluded from important conversations, even when the discussions directly related to their well-being [17, 34]. The findings align with a meta-synthesis that confirmed how unfamiliar language can restrict patients' comprehension of information exchanged during handover, consequently impacting their active participation and perceptions [20]. Therefore, the findings of this meta-synthesis highlight the significance of nurses using simple and comprehensible language when communicating with patients during handovers. It is important for nurses to

avoid using medical jargon and to explain terms in a manner that patients can easily grasp.

*4.1.3. Theme 3: Strategies to Maintain Confidentiality during Bedside Handover.* The theme explored nurses' and patients' strategies for maintaining confidentiality during bedside handover. According to patients' perceptions, nurses are expected to exercise discretion when handling sensitive information during bedside handovers, including topics such as sexual health, in order to maintain confidentiality. The discussion included various methods for nurses to convey this information during handover, such as speaking softly or relocating away from the patient's bedside [34]. These findings are consistent with nurses' perceptions, and they have emphasized the importance of discussing sensitive issues away from the bedside and conducting private handovers. Clinicians should consider this strategy prior to implementing bedside handover.

Other strategies for maintaining confidentiality during bedside handover, from the perspective of nurses, include inquiring about patient preferences regarding caregiver presence [15, 21], recording information in the patient's chart, and asking visitors to leave before discussing sensitive details [33]. Nurses need to be ready to be flexible in how they conduct the bedside handover. Understanding the importance of being flexible during bedside handovers is crucial for their successful implementation.

Therefore, the findings of this meta-synthesis indicate the importance of implementing an educational program for patients and nurses regarding the process of conducting and participating in bedside handover. The educational program for patients aims to deliver clear instructions to them regarding their role and the purpose of bedside handover. This involves notifying them about the handover timing, the participants, the discussion topics, and how they can actively engage in the process [35]. The educational program for nurses aims to educate them about the importance and benefits of involving patients in handover procedures before conducting bedside handovers. Comprehending the significance of bedside handover can inspire nurses to actively engage patients during handovers. One of the included studies recommends integrating active educational activities for nurses, such as simulations that simulate real-life scenarios. These simulations offer nurses the opportunity to reflect on and cultivate suitable, patient-centered responses [19]. Future research should further evaluate these by integrating active educational activities and other implementation strategies in enhancing bedside handover.

*4.2. Limitations of the Study Findings.* While this paper was conducted according to the JBI meta-aggregative approach, which has a strong feature of enabling generalizable recommendations for policymakers, it is noteworthy that the majority of included studies were conducted in Western countries. This may limit the generalizability of the study's findings to other regions, such as Arab countries. Also, the level of care in all included studies was quite heterogeneous.

## 5. Conclusion

This study systematically reviewed and integrated the perceptions of patients and nurses about bedside handover and identified three main themes: facilitators of bedside nursing handover, barriers to bedside nursing handover, and strategies to maintain confidentiality during bedside handover. Based on nurses' perceptions, the combined findings highlight the facilitators of bedside handover, including developing partnership interaction between nurses and patients, promoting professionalism, and enhancing emotional communication among nurses. From the patients' viewpoint, the synthesized findings emphasize the facilitators of bedside handover, including acknowledging the expertise, professionalism, and humanity of the nursing profession, ensuring a sense of safety, satisfaction, and confidence in the care received, as well as promoting individualized nursing care. These findings underscore the importance for clinicians to incorporate these facilitators when implementing bedside handover.

In the context of bedside handover, both nurses and patients perceive breaches of confidentiality and privacy violations as significant barriers. According to nurses, other barriers include the risk of overtime, unnecessary transmission of redundant information, and potential contribution to a decreased sense of collegiality and security. Patients also perceive neglect and exclusion during bedside handover as additional barriers. Clinicians should carefully evaluate these barriers prior to implementing bedside handover.

When it comes to maintaining confidentiality during bedside handovers, it is important to consider patients' preferences. Patients often prefer handovers to take place in a private setting, such as a cubicle. In addition, nurses should use discretion when managing sensitive issues. From the nurses' perspective, it is important to inquire with patients about their preference for the presence of caregivers, and to conduct private handovers for sensitive issues away from the bedside.

## 6. Relevance to Clinical Practice

The findings of this meta-synthesis are highly valuable for clinicians who are looking to implement bedside handover as a way to improve the quality of healthcare. They should carefully evaluate the barriers and facilitators in this meta-synthesis prior to implementing bedside handover. The findings of this meta-synthesis also indicate the importance of implementing an educational program for patients and nurses regarding the process of conducting and participating in bedside handover.

## 7. Implications for Future Research

Further research is required to explore the perceptions of patients and nurses regarding bedside handover, particularly in Arab countries. It is essential to conduct further high-quality methodological research with a specific emphasis on implementation strategies for bedside handover. In terms of

methodological quality, improvements should be made in the following respects: (1) ensuring alignment between the stated philosophical perspective and the research methodology, (2) clearly stating the cultural or theoretical background of the researcher, and (3) addressing the influence of the researcher on the research, and vice versa.

## Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

## Conflicts of Interest

The authors declare that they have no conflicts of interest.

## Authors' Contributions

AH and ZA equally contributed to the study's conception. Independently, they selected reviews, extracted data, and evaluated the quality of the included studies. Furthermore, both authors have contributed and approved the final manuscript.

## Supplementary Materials

This section includes the Enhancing Transparency in Reporting the Synthesis of Qualitative Research (ENTREQ) Statement guidelines and Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist. (*Supplementary Materials*)

## References


- [1] K. Ernstmeier and E. Christman, *Communication*, Chippewa Valley Technical College, Coimbatore, Tamil Nadu, India, 2021.
- [2] D. Afriyie, "Effective communication between nurses and patients: an evolutionary concept analysis," *British Journal of Community Nursing*, vol. 25, no. 9, pp. 438–445, 2020.
- [3] M. Forde, A. Coffey, and J. Hegarty, "Bedside handover at the change of nursing shift: a mixed-methods study," *Journal of Clinical Nursing*, vol. 29, no. 19–20, pp. 3731–3742, 2020.
- [4] J. Wendorf Muhamad, T. R. Harrison, F. Yang, and S. Sawicki, "Code-switching and handoff communication processes," *American Journal of Medical Quality: The Official Journal of the American College of Medical Quality*, vol. 34, no. 5, pp. 511–512, 2019.
- [5] Jci, "International patient safety goals," 2021, <https://www.jointcommissioninternational.org/standards/international-patient-safety-goals>.
- [6] E. Manias, F. Geddes, B. Watson, D. Jones, and P. Della, "Communication failures during clinical handovers lead to a poor patient outcome: lessons from a case report," *SAGE open medical case reports*, vol. 3, p. 2050313X1558485, 2015.
- [7] L. J. Chien, D. Slade, M. R. Dahm et al., "Improving patient-centred care through a tailored intervention addressing nursing clinical handover communication in its organizational and cultural context," *Journal of Advanced Nursing*, vol. 78, no. 5, pp. 1413–1430, 2022.

- [8] Z. Khalaf, "Improving patient handover: a narrative review," *African Journal of Paediatric Surgery*, vol. 20, no. 3, pp. 166–170, 2023.
- [9] J. Ofori-Atta, M. Binienda, and S. Chalupka, "Binienda M, Chalupka S. Bedside shift report: implications for patient safety and quality of care," *Nursing*, vol. 45, no. 8, pp. 1–4, 2015.
- [10] K. White-Trevino and V. Dearmon, "Transitioning nurse handoff to the bedside: engaging staff and patients," *Nursing Administration Quarterly*, vol. 42, no. 3, pp. 261–268, 2018.
- [11] F. Dellafiore, C. Arrigoni, A. M. Grugnetti et al., "Bedside nursing handover and organisational will to achieve personalisation within an Italian Cardiac Surgery Unit: the nurses' viewpoint through a qualitative study," *Professioni Infermieristiche*, vol. 72, no. 1, pp. 51–59, 2019.
- [12] A. Didier, S. Dzemaili, B. Perrenoud et al., "Patients' perspectives on interprofessional collaboration between health care professionals during hospitalization: a qualitative systematic review," *JBI Evidence Synthesis*, vol. 18, no. 6, pp. 1208–1270, 2020.
- [13] J. Grimshaw, D. Hatch, M. Willard, and S. Abraham, "A qualitative study of the change-of-shift report at the patients' bedside," *The Health Care Manager*, vol. 35, no. 4, pp. 294–304, 2016.
- [14] J. Jimmerson, P. Wright, P. A. Cowan, T. King-Jones, C. J. Beverly, and G. Curran, "Bedside shift report: nurses opinions based on their experiences," *Nursing open*, vol. 8, no. 3, pp. 1393–1405, 2021.
- [15] M. Johnson and L. S. Cowin, "Nurses discuss bedside handover and using written handover sheets," *Journal of Nursing Management*, vol. 21, no. 1, pp. 121–129, 2013.
- [16] A. Kullberg, L. Sharp, O. Dahl, Y. Brandberg, and M. Bergenmar, "Nurse perceptions of person-centered handovers in the oncological inpatient setting: a qualitative study," *International Journal of Nursing Studies*, vol. 86, pp. 44–51, 2018.
- [17] G. Lupieri, C. Creatti, and A. Palese, "Cardio-thoracic surgical patients' experience on bedside nursing handovers: findings from a qualitative study," *Intensive and Critical Care Nursing*, vol. 35, pp. 28–37, 2016.
- [18] S. Roslan and M. Lim, "Nurses' perceptions of bedside clinical handover in a medical-surgical unit: an interpretive descriptive study," *Proceedings of Singapore Healthcare*, vol. 26, no. 3, pp. 150–157, 2017.
- [19] G. Tobiano, J. A. Whitty, T. Bucknall, and W. Chaboyer, "Nurses' perceived barriers to bedside handover and their implication for clinical practice," *Worldviews on Evidence-Based Nursing*, vol. 14, no. 5, pp. 343–349, 2017.
- [20] V. Bressan, I. Cadorin, S. Stevanin, and A. Palese, "Patients experiences of bedside handover: findings from a meta-synthesis," *Scandinavian Journal of Caring Sciences*, vol. 33, no. 3, pp. 556–568, 2019.
- [21] A. Hada, L. Jack, and F. Coyer, "Using a knowledge translation framework to identify barriers and supports to effective nursing handover: a focus group study," *Heliyon*, vol. 5, no. 6, 2019.
- [22] E. Aromataris and Z. Munn, "JBI manual for evidence synthesis," 2020, <https://synthesismanual.jbi.global>.
- [23] A. Tong, K. Flemming, E. McInnes, S. Oliver, and J. Craig, "Enhancing transparency in reporting the synthesis of qualitative research: entreq," *BMC Medical Research Methodology*, vol. 12, no. 1, 2012.
- [24] K. Hannes and C. Lockwood, "Pragmatism as the philosophical foundation for the Joanna Briggs meta-aggregative approach to qualitative evidence synthesis," *Journal of Advanced Nursing*, vol. 67, no. 7, pp. 1632–1642, 2011.
- [25] A. Liberati, D. G. Altman, J. Tetzlaff et al., "The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration," *PLoS Medicine*, vol. 6, no. 7, p. e1000100, 2009.
- [26] S. Moola, Z. Munn, K. Sears et al., "Conducting systematic reviews of association (etiology)," *International Journal of Evidence-Based Healthcare*, vol. 13, no. 3, pp. 163–169, 2015.
- [27] C. Lockwood, Z. Munn, and K. Porritt, "Qualitative research synthesis: methodological guidance for systematic reviewers utilizing meta-aggregation," *International Journal of Evidence-Based Healthcare*, vol. 13, no. 3, pp. 179–187, 2015.
- [28] C. Lockwood, K. Porritt, Z. Munn, L. Rittenmeyer, S. Salmond, and M. e. Bjerrum, "Chapter 2: systematic reviews of qualitative evidence," in *Joanna Briggs Institute Reviewer's Manual*, E. Aromataris, Z. Munn, E. Aromataris, and Z. Munn, Eds., The Joanna Briggs Institute, Adelaide, 2017.
- [29] Z. Munn, K. Porritt, C. Lockwood, E. Aromataris, and A. Pearson, "Establishing confidence in the output of qualitative research synthesis: the ConQual approach," *BMC Medical Research Methodology*, vol. 14, no. 1, p. 108, 2014.
- [30] J. Pun, "Factors associated with nurses' perceptions, their communication skills and the quality of clinical handover in the Hong Kong context," *BMC Nursing*, vol. 20, no. 1, p. 95, 2021.
- [31] C. A. Wollenhaup, E. L. Stevenson, J. Thompson, H. A. Gordon, and G. Nunn, "Implementation of a modified bedside handoff for a postpartum unit," *The Journal of Nursing Administration: The Journal of Nursing Administration*, vol. 47, no. 6, pp. 320–326, 2017.
- [32] L. Jeffs, S. Beswick, A. Acott et al., "Patients' views on bedside nursing handover: creating a space to connect," *Journal of Nursing Care Quality*, vol. 29, no. 2, pp. 149–154, 2014.
- [33] D. Kerr, S. Lu, and L. McKinlay, "Towards patient-centred care: perspectives of nurses and midwives regarding shift-to-shift bedside handover," *International Journal of Nursing Practice*, vol. 20, no. 3, pp. 250–257, 2014.
- [34] D. Kerr, K. McKay, S. Klim, M. Kelly, and T. McCann, "Attitudes of emergency department patients about handover at the bedside," *Journal of Clinical Nursing*, vol. 23, no. 11–12, pp. 1685–1693, 2013.
- [35] L. Khuan and M. Juni, "Nurses' opinions of patient involvement in relation to patient-centered care during bedside handovers," *Asian Nursing Research*, vol. 11, no. 3, pp. 216–222, 2017.
- [36] S. Jaber, M. Fawaz, A. Rayan et al., "Relationship between nurses' attitudes and satisfaction with bedside shift reports and patient safety culture," *Nurse Media Journal of Nursing*, vol. 12, no. 3, pp. 414–422, 2022.
- [37] P. Kumar, V. Jithesh, A. Vij, and S. K. Gupta, "Need for a hands-on approach to hand-offs: a study of nursing handovers in an Indian Neurosciences Center," *Asian journal of neurosurgery*, vol. 11, no. 01, pp. 54–59, 2016.
- [38] S. Malfait, K. Eeckloo, W. Van Biesen, and A. Van Hecke, "The effectiveness of bedside handovers: a multilevel, longitudinal study of effects on nurses and patients," *Journal of Advanced Nursing*, vol. 75, no. 8, pp. 1690–1701, 2019.
- [39] S. Ghosh, L. Ramamoorthy, and B. Pottakat, "Impact of structured clinical handover protocol on communication and

- patient satisfaction,” *Journal of patient experience*, vol. 8, p. 237437352199773, 2021.
- [40] S. Malfait, A. Van Hecke, W. Van Biesen, and K. Eeckloo, “Do bedside handovers reduce handover duration? An observational study with implications for evidence-based practice,” *Worldviews on Evidence-Based Nursing*, vol. 15, no. 6, pp. 432–439, 2018.
- [41] S. Bradley and S. Mott, “Adopting a patient-centred approach: an investigation into the introduction of bedside handover to three rural hospitals,” *Journal of Clinical Nursing*, vol. 23, no. 13-14, pp. 1927–1936, 2014.

## Research Article

# A Qualitative Study of HIV Testing Experiences and HIV Self-Testing Perspectives among Men in Northern Nigeria

Zubairu Iiyasu <sup>1</sup>, Zikrillahi A. Haladu,<sup>1</sup> Bilkisu Z. Iiyasu,<sup>1</sup> Aminatu A. Kwaku <sup>1</sup>,  
Nafisa S. Nass,<sup>1</sup> Taiwo G. Amole <sup>1</sup>, Hadiza M. Abdullahi,<sup>1</sup> Amina U. Abdullahi,<sup>1</sup>  
Fatimah I. Tsiga-Ahmed <sup>1</sup>, Auwal Abdullahi <sup>1</sup>, Humayra A. Bashir <sup>2</sup>,  
Hamisu M. Salihu <sup>3</sup>, and Muktar H. Aliyu <sup>4</sup>

<sup>1</sup>Department of Community Medicine, Bayero University, Kano, Nigeria

<sup>2</sup>VBRCH Training Program, Aminu Kano Teaching Hospital, Kano, Nigeria

<sup>3</sup>Kano Independent Research Centre Trust, Kano, Nigeria

<sup>4</sup>Vanderbilt Institute for Global Health, Vanderbilt University Medical Center, Nashville, TN, USA

Correspondence should be addressed to Zubairu Iiyasu; ziliyasu@yahoo.com

Received 17 August 2023; Revised 15 March 2024; Accepted 3 April 2024; Published 20 April 2024

Academic Editor: Johanna Elizabeth Maree

Copyright © 2024 Zubairu Iiyasu et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

HIV self-testing (HIVST) holds promise for accessing hard-to-reach populations by overcoming sociocultural and structural barriers to awareness of HIV status. This phenomenological qualitative study explored the experiences and perspectives of married men in Kano, northern Nigeria, regarding HIV testing and counseling (HTC) and HIVST. Twenty married men from diverse socioeconomic backgrounds participated in in-depth interviews conducted in the local language. Thematic analysis was employed to analyze the data, yielding key themes related to prior test experiences, knowledge of self-testing, and perceived ease of use, in addition to motivation for self-testing and concerns about reliability and counseling support. The findings shed light on the impact of facility-based HIV testing experiences on the perspectives of participants. Concerns related to delays, overcrowding, discomfort, fear, and unsupportive attitudes from healthcare providers influenced their perceptions. Among persons with previous self-testing experience, initial uneasiness was overcome with repeated use, highlighting the ease of use associated with HIVST. Motivations for self-testing included privacy, convenience, personal empowerment, improved infection detection, and efficiency. Concerns were raised regarding the reliability of self-testing results compared to hospital-based testing, and the absence of counseling support during self-testing. Our findings underscore the need to address infrastructural limitations, enhance counseling support, and promote awareness and knowledge of HIVST.

## 1. Introduction

Africa bears a disproportionate burden of the HIV pandemic, with approximately two-thirds of the world's 39 million people living with HIV residing in the region [1]. Despite programmatic efforts at scaling up HIV testing and counseling (HTC) using various strategies, a significant proportion of individuals living with HIV (approximately 14%) are still unaware of their status, leading to missed opportunities for prevention, treatment, and supportive care [1], and hindering progress towards the UNAIDS 95-95-95 targets.

Married men play a crucial role in shaping the health behaviors of their partners and families [2]. However, effectively reaching them with conventional HTC services remains challenging due to multiple factors operating at individual, sociocultural, and structural levels. At the individual level, factors such as fear of a positive result, denial, and perceived low risk contribute to men's reluctance to undergo HTC [3]. Similarly, sociocultural influences, including traditional gender norms and stigma surrounding HIV/AIDS, often discourage men from seeking testing services [4]. Moreover, structural barriers such as limited access to testing facilities, lack of targeted outreach, and

inconvenient operating hours hinder men's engagement with HTC [5]. Given these multiple barriers, innovative strategies and tailored interventions are necessary to effectively reach and engage married men in HIV testing programs.

HIV self-testing (HIVST) has emerged as a promising approach to expanding access to HIV testing and improving early detection rates worldwide [6]. By allowing individuals to test for HIV in the privacy of their own homes, HIVST offers convenience and reduces barriers associated with facility-based testing, such as stigma, long waiting times, and limited access to healthcare facilities [7]. Understanding the perspectives of married men regarding HIVST is crucial for developing culturally appropriate interventions that effectively address their specific needs and preferences. This understanding can increase the uptake of HIV testing among married men and ultimately enhance HIV prevention, treatment, and control efforts.

In Nigeria, the landscape of HIV testing and counseling is characterized by a mix of facility-based and community-based approaches, including standalone HTC centers, mobile testing units, and integrated testing services offered in healthcare facilities [8]. Despite these efforts, disparities in access to HIV testing persist, particularly among men and in rural areas [9]. Men often face challenges accessing HTC services due to factors such as distance to testing sites, fear of stigma, and concerns about confidentiality [10]. In addition, cultural beliefs and gender norms may discourage men from seeking testing, perpetuating the cycle of undiagnosed HIV infection [11].

The present study aims to address this gap by exploring the experiences and perspectives of married men in Kano, northern Nigeria, regarding HIV testing and counseling (HTC) and HIV self-testing (HIVST). Through in-depth interviews, we seek to understand the factors influencing married men's decisions regarding HIV testing, including their experiences with existing testing modalities, barriers to testing, and perceptions of HIVST. By shedding light on the current landscape of HTC in the local setting and elucidating the motivations and concerns of married men, this study aims to inform the development of targeted interventions to improve HIV testing uptake and promote early detection of HIV infection among this key population.

## 2. Materials and Methods

We employed a phenomenological qualitative research design to gain insights into previous HIV testing experiences and explore the perspectives of married men regarding HIV self-testing (HIVST). Phenomenology was chosen as the research design to enable a comprehensive understanding of participants' lived experiences, attitudes, and beliefs, capturing rich and nuanced data.

Ethical approval for this study was obtained from the Kano State Ministry of Health Research Ethics Committee. Informed consent was obtained from all participants. Participants were provided with a detailed explanation of the purpose of the study, procedures, potential risks, benefits, and their rights as participants. They were assured of their

confidentiality and the anonymity of their responses. Written consent was obtained from each participant, and they were informed of their right to withdraw from the study at any time without repercussions.

The sample size of 20 participants was determined based on the principles of qualitative research, aiming for an in-depth exploration of married men's experiences and perspectives on HIV testing and self-testing, ensuring diversity across socioeconomic backgrounds, marital status, and other relevant factors, allowing for data saturation and effective exploration of research objectives [12]. A purposive sampling approach was employed to select 20 married men from diverse socioeconomic backgrounds in Tarauni and Kumbotso local government areas in Kano, Nigeria. This approach ensured the inclusion of participants with a range of perspectives and experiences [13]. Through purposive sampling, the researchers identified men in monogamous or polygynous marriages who had undergone HIV testing and counseling (HTC), as well as those who had not. The participants were selected based on their varying levels of education, occupation, religion, ethnicity, income levels, and their knowledge of experience with HIVST. This selection strategy aimed to gather valuable insights that would address the research questions and objectives effectively.

In-depth interviews were conducted as the primary data collection method [14]. Experienced qualitative interviewers proficient in the local Hausa language conducted the interviews, establishing a rapport with the participants and creating an environment conducive to open and honest dialogue [15]. Conducting the interviews in the local language ensured that participants felt comfortable expressing their thoughts and experiences fully. Each interview lasted approximately 45–60 minutes, allowing participants ample time to share their perspectives in detail (see Supplemental file for interview script).

To ensure accuracy and facilitate data analysis, the interviews were audio-recorded and transcribed verbatim [16]. The transcripts and field notes recording nonverbal cues served as the foundation for subsequent analysis and interpretation. The researchers meticulously transcribed the interviews, capturing both the explicit content and the nuanced aspects of participants' responses. NVivo (version 13, QSR International) was used for qualitative data analysis.

Thematic analysis was employed as the analytical framework for this study [12, 17]. Initially, the researchers familiarized themselves through immersion in the data by repeatedly reading the transcripts, gaining a holistic understanding of the content. Subsequently, the researchers engaged in coding, systematically labeling segments of the data related to specific concepts or themes.

Throughout the coding process, codes were further categorized and organized into themes, enabling the identification of commonalities and patterns within the data [18]. This iterative analysis approach involved constant comparison, where the researchers examined similarities and differences across interviews, refining the emerging themes accordingly.

The thematic analysis approach used in this study was primarily inductive. Through immersion in the data, the researchers systematically identified patterns, concepts, and themes directly from the participants' narratives, without imposing preconceived theoretical frameworks or pre-determined codes. The emergent themes were derived directly from the data, allowing for a comprehensive exploration of participants' experiences, attitudes, and beliefs regarding HIV testing and self-testing.

To enhance the rigor and credibility of the findings, the research team engaged in discussions and debriefing throughout the analysis process [15]. These discussions facilitated peer debriefing and exploration of alternative interpretations, ensuring the reliability and validity of the findings. Interviews were conducted by ZI, ZH, and AA, transcriptions were carried out by BI, AK, NN, and TA, and analysis was performed by ZI, ZH, HB, HS, and MA.

### 3. Results

A total of 20 married men participated in in-depth interviews. The average age of the participants was 42 years, with ages ranging from 30 to 69 years. The participants were evenly distributed between urban and rural areas, with half residing in each setting. Regarding marital status, nine men were in polygynous marriages. In terms of education, 14 participants had completed postsecondary education, while six had completed secondary education. A total of 11 participants were civil servants, four were businessmen, and five were self-employed. All participants in the study were adherents of the Islamic religion and of Hausa or Fulani ethnicity (Table 1).

The in-depth interviews revealed several key themes, including participants' prior test experiences, limited knowledge of self-testing, motivations for self-testing, perceived ease of use, demotivators, and concerns about reliability and counseling support (Table 2).

**3.1. Theme: Prior HIV Test Experience.** Participants who had prior HIV counseling and testing did so as preadmission requirements to educational institutions, preemployment, premarital requirements, or based on health provider advice. They described their experiences at public hospitals. Several participants expressed concerns about overcrowding, long queues, and delayed test results. One participant described his experience as follows:

*"My experience was terrible. I went to the testing center within the government hospital early in the morning, but I met a long queue. When it came to my turn after a long wait, the blood sample was taken. But, before the test result came out I was so scared that it might come out positive. What I disliked most was the long wait before the result was disclosed to me."* (Businessman, 53 years)

TABLE 1: Demographic attributes of married men who participated in the in-depth interviews in Kano, Nigeria ( $n = 20$ ).

Characteristics	Frequency
<i>Age (years)</i>	
30–39	6
40–49	4
50–59	8
≥60	2
<i>Residence</i>	
Rural	10
Urban	10
<i>Marriage type</i>	
Monogamous	11
Polygynous	9
<i>Level of education</i>	
Secondary and lower	6
Postsecondary	14
<i>Occupation</i>	
Self-employed	5
Businessman	4
Civil servant	11
<i>Religion</i>	
Islam	20
Other faiths	0

Another participant highlighted his discomfort with being seen at a testing center and assumed to be HIV positive.

*"There was a large crowd with long queues and you know being at a testing center, you don't want to be seen in such places. I was afraid that someone who knows me will recognize me and spread the word that they saw me at a HIV test center. The fear of being labeled HIV-positive made me uncomfortable."* (Civil servant, 34 years)

**3.2. Theme: Concerns and Challenges with the Testing Process.** Some participants expressed concerns related to the HIV testing process itself. These included fear or anxiety about a HIV-positive status, particularly for first-time testers, discomfort or pain from the needle prick, and non-supportive attitudes from certain healthcare providers.

*"Well, the fear is there, and this is what makes us human. . . I hope you understand this feeling. Another thing I disliked about the testing process was the painful pricking to draw blood, either from the finger or vein. As a first-time tester, I had a lot of trouble with it."* (Civil servant, 32 years)

Apart from fear of the outcome, another participant highlighted the lack of support from healthcare providers.

*"For me, it was the fear and psychological destabilization I experienced prior to knowing the test outcome. When you are about to collect the result, there is a deep-seated fear,*

TABLE 2: Summary of themes, subthemes, and illustrative quotes.

Theme	Subtheme	Illustrative quote
Prior HIV test experience	Long wait times and overcrowding	"My experience was terrible. What I disliked most was the long wait before the result was disclosed to me." (Businessman, 53 years)
	Fear of stigma associated with testing	"The fear of being labeled HIV-positive made me uncomfortable." (Civil servant, 34 years)
Concerns and challenges with testing	Fear of a positive result	"Well, the fear is there. As a first-time tester, I had a lot of trouble with it." (Civil servant, 32 years)
	Lack of supportive attitudes from providers	"The healthcare workers were not as accommodating, offering no counseling, no smiles." (Businessman, 39 years)
Diverse opinions on the testing process	Positive experiences with counseling	"I can say my experience was good. I found the health workers welcoming." (Civil servant, 34 years)
	Discomfort and fear of stigma	"I was not comfortable prior to the test fortunately for me the result came out negative." (Businessman, 58 years)
Limited knowledge of self-testing	Surprise upon learning about self-testing	"Today is the first-time I am hearing about it." (Businessman, 58 years)
	Initial skepticism	"I didn't think it was real. Later, I browsed the Internet and was surprised to find out that it really exists." (Civil servant, 34 years)
Perceived advantages of self-testing	Ease of use	"For my first self-testing experience, I was overwhelmed and nervous, it became easy and straightforward." (Civil servant, 53 years)
	Motivation for self-testing	"HIV self-testing gives one the flexibility and provides individuals with absolute confidence in knowing their health status." (Civil servant, 32 years)
	Privacy and confidentiality	"The idea of self-testing motivates me because one can carry out the test in their own space." (Self-employed, 50 years)
	Convenience and efficiency	"It is convenient to perform the test. HIVST bypasses those issues and prevents time wasted in queues." (Businessman, 57 years)
	Personal empowerment	"It puts one in charge and in control of their health enhances interest in protecting one's health status." (Civil servant, 48 years)
	Increased detection of infection	"Doing the HIVST on my own would be easier to detect the infection early and seek treatment before it's too late." (Self-employed, 58 years)
	Ease of use and speed	"It's quick, can be done anywhere. There's even no blood involved." (Businessman, 53 years)
	Lack of awareness	"I never knew there is a test for HIV that a person can do at home." (Businessman, 53 years)
	Concerns about lack of professional support	"They might act impulsively without the guidance of a trained medical professional." (Civil servant, 34 years)
	Concerns about the reliability of self-testing	"The test result may not be considered valid could invalidate the test result." (Civil servant, 46 years)
Lack of counseling and support	Worries about emotional distress	"There are many disadvantages. The test that a doctor or health care professional would perform is more accurate than a self-test." (Civil servant, 33 years)
	Recognition of the value of counseling	"One downside of self-testing is the lack of counseling pretest and posttest counseling should be provided." (Self-employed, 65 years)
Reduced chance of disclosure	Perception of reduced likelihood of seeking care	"There will be no linkage to treatment and prevention services. This can lead to the spread of the disease to many people." (Civil servant, 33 years)



*numbness, and imbalance within you. Moreover, the healthcare workers were not as accommodating, offering no counseling, no smiles, and looking at you with a judgmental expression.*" (Businessman, 39 years)

### 3.3. Theme: Diverse Opinions on the Testing Process.

Opinions on the HIV testing process varied among participants. While some participants found the process to be smooth, straightforward, and simple, others had negative experiences and encountered challenges. Several participants emphasized the importance and value of pretest and posttest counseling as positive aspects of their testing experience. A participant shared a good experience, attributing it to the pretest counseling he received as follows:

*"I can say my experience was good because there was pretest counseling during which the health personnel assured me that even if my test result came out positive, there are medications available. I found the health workers welcoming."* (Civil servant, 34 years)

Another participant highlighted his initial discomfort which gave way to relief and a sense of freedom.

*"I was not comfortable prior to the test, but immediately after the smooth testing process and being declared negative, I felt free and comfortable. What I liked most was the fact that the process was smooth, simple, and straightforward and fortunately for me the result came out negative."* (Businessman, 58 years)

Among those who did not undergo HTC, their reasons revolved around trusting themselves and their marital partners. One participant expressed this sentiment, stating that

*"No, I have never tested for HIV. Why should I? There is no need. I am healthy, and when it comes to any illness related to sexual activity, it doesn't even cross my mind because I know I am healthy. I trust my spouse, and I only engage in sexual intercourse with my wife. Therefore, I don't even consider getting an HIV test."* (Self-employed, 65 years)

3.4. Theme: Limited Knowledge of HIV Self-Testing. Most participants were unaware of HIV self-testing (HIVST) prior to the interviews. They expressed surprise upon learning about the availability of a HIV test that could be conducted outside of a clinical setting. Some were particularly intrigued by the use of saliva instead of a blood sample during self-testing.

When asked if they had heard about rapid HIVST before the study, typical responses included the following:

*"No, I haven't. Today is the first-time I am hearing about it. I only know of the one they do in the hospital by drawing blood from the finger. So I thought it would be that one."* (Businessman, 58 years)

*"I never knew a person can self-test on their own prior to this study. I thought HIV tests could only be done in a hospital or laboratory setting by doctors and other health workers. Actually, today is the first-time I'm hearing about it."* (Self-employed, 50 years)

A few participants had prior knowledge of HIVST through various sources such as television, radio, friends, or healthcare providers.

One participant shared his initial skepticism and subsequent discovery as follows:

*"I heard about it on a radio program and commercials, but I didn't think it was real because I was thinking, how is it possible to do a HIV test at home? How can someone interpret and report the result? Later, I browsed the internet and was surprised to find out that it really exists."* (Civil servant, 34 years)

### 3.5. Theme: Perceived Advantages of Self-Testing

3.5.1. Ease of Use. Participants who had previous experience with self-testing initially felt uneasy or apprehensive when using HIVST for the first time. However, as they gained experience, they became more comfortable and confident in independently conducting the test. They expressed assurance in their ability to follow the instructions without supervision or guidance.

*"For my first self-testing experience, I was overwhelmed and nervous about whether I could perform the test correctly. However, after watching a video demonstration on how to do the test, it became easy and straightforward."* (Civil servant, 53 years)

*"I felt good using HIV self-testing. It was easy to use, and I didn't have to spend money on transportation to go to the hospital. It also provided confidentiality. I used the oral test, and it was easy to perform. The only difficulty I faced was in following the instructions."* (Businessman, 58 years)

3.5.2. Motivation to Self-Test for HIV. Participants expressed motivations for engaging in HIV self-testing (HIVST) that revolved around independence and greater privacy, in contrast with healthcare facility settings where others are present. They also viewed HIVST as a source of empowerment.

*"First of all, HIV self-testing gives one the flexibility to perform the test whenever needed. Secondly, it ensures confidentiality about one's health outcome, as it is not exposed to others. Thirdly, it provides individuals with absolute confidence in knowing their health status."* (Civil servant, 32 years)

*"Testing in public can discourage people from getting tested due to the possibility of others looking at you and making assumptions. But with self-testing, it is completely private,*

*saves time and cost by eliminating transportation and hospital charges.*" (Married man, 60 years)

Participants highly valued the privacy and confidentiality of self-testing. They perceived clinic visits, especially when the visibility of HIV testing and counseling (HTC) rooms allowed others to observe, as potential invasions of privacy.

*"The idea of self-testing motivates me because, in a clinic, people already know what is happening in the specific room you are entering. So, when you come out, they stare at you, trying to interpret your facial expression. But with HIV self-testing, one can carry out the test in their own space, where no one is watching."* (Self-employed, 50 years)

**3.5.3. Convenience and Efficiency.** Participants also highlighted the convenience and efficiency of HIV self-testing as motivating factors. They recognized the opportunity to test themselves and their family members in the comfort of their homes. The freedom to perform the test at a chosen time and place, without the need for a clinic visit, was viewed as advantageous and timesaving.

*"It is convenient to perform the test and to discover one's HIV status early, allowing for early medication initiation. Many people do not want to go to the hospital and wait in long queues, especially men. HIV self-testing bypasses those issues and prevents time wasted in queues."* (Businessman, 57 years)

**3.5.4. Personal Empowerment.** Participants recognized that having a self-test kit empowered them to proactively monitor their HIV status, fostering a sense of personal responsibility for their health.

*"It puts one in charge and in control of their health, enabling them to adjust their behavior accordingly. It saves time and enhances interest in protecting one's health status."* (Civil servant, 48 years)

**3.5.5. Increased Detection of Infection.** Participants believed that HIVST is beneficial for increasing the detection of infections, leading to early treatment initiation and improved outcomes. They recognized the advantages of HIVST and appreciated its merits.

*"I would often tell myself that I will go to the hospital on a certain date to test, but in the end, I couldn't. Doing the HIV self-testing on my own would be easier, and it would enable not only me but also others to detect the infection early and seek treatment before it's too late."* (Self-employed, 58 years)

**3.5.6. Ease of Use and Speed.** Participants emphasized the advantages of HIVST, including convenience, ease of use, and speed. These factors served as key motivators,

emphasizing the convenience and efficiency provided by HIVST.

*"We can easily do the test because saliva is in our mouth, whereas drawing blood might be scary for some people. It's quick, can be done anywhere, and involves only a little swab. There's even no blood involved."* (Businessman, 53)

*"It's quick. You can do it anywhere. You must go by yourself to a place like a pharmacy. It's only a little swab. There's no blood involved."* (Civil servant, 46 years)

**3.5.7. Time-Saving Features.** HIVST addresses the concerns of married men by eliminating long queues, fear of recognition, and discomfort in testing centers. Participants indicated that HIVST bypasses issues associated with facility-based HIV testing and counseling (HTC), saving time for individuals.

**3.6. Theme: Demotivators/Reasons for Avoiding HIV Self-Testing.** Participants mentioned several reasons for not engaging in HIV self-testing. The first was a lack of awareness about the availability of HIV self-tests. They expressed that they could not engage in something they were unaware of.

*"I never knew there is a test for HIV that a person can do at home. So, you see, I cannot do what I don't know."* (Businessman, 53 years)

The second reason was concerns about not having a medical professional present at home in case of a positive diagnosis, particularly for individuals with underlying mental illnesses. They highlighted the need for professional guidance and support during such situations.

*"Let's say a person is mentally ill, suffering from depression or something, and they happen to test positive at home. They would have nobody to talk to at that point in time. They might act impulsively without the guidance of a trained medical professional. So, you see, someone scary might happen."* (Civil servant, 34 years)

The third reason was concern about the reliability of results obtained through HIVST compared to hospital-based testing. They emphasized the importance of accuracy and reliability in HIV testing, particularly in ensuring trustworthy results from self-testing kits.

*"Firstly, there is the issue of reliability. If I do it myself, I am not a health professional. Presenting the test result to certain organizations, the result may not be considered valid and as a normal hospital test. Additionally, the test requires training. To get an accurate result I would have to be trained before testing myself."* (Civil servant, 46 years)

*"The HIV self-test result may be a false negative or false positive result, unlike the test done in the hospital, which I believe is more reliable. And since I am not a medical*

*professional, there is a chance that I may miss some steps or not perform the procedure correctly as professionals would. This could invalidate the test result.*" (Civil servant, 62 years)

**3.7. Theme: Lack of Counseling and Psychological Support.** Participants were worried about the absence of counseling during the self-testing process and the potential risk of emotional distress, including the risk of suicide, among individuals who received a positive HIV test result without pretest counseling. Some individuals may not be emotionally prepared and lack the necessary support systems to cope with a positive result.

*"There are many disadvantages. To me, they include the absence of a counselor during testing and the mistakes that could occur while performing or interpreting the test result. The test that a doctor or health care professional would perform is more accurate than a self-test."* (Civil servant, 33 years)

*"I am worried about the lack of counseling with the self-test. There should be counseling, even virtually and if someone tests positive, they should be enrolled to see a doctor for appropriate care."* (Civil servant, 51 years)

Participants recognized the value of counseling in HIV self-testing, which need not be extensive and could be online or in the form of helplines. They emphasized the need for the provision of accurate information and guidance on accessing appropriate care and support in the event of a positive result.

*"One downside of self-testing is the lack of counseling and knowledge about HIV. The self-test can be a big deal if you do not have counseling and information. Therefore, pre- and post-test counseling should be provided."* (Self-employed, 65 years)

**3.8. Theme: Reduced Chance of Disclosure.** Some participants perceived a reduced likelihood of seeking care among those who test positive through self-testing because there will not be any external pressure, as they are the only ones aware of the positive result. This was considered a significant disadvantage or demotivator for HIVST. They emphasized the importance of a seamless integration between self-testing and timely linkage to the continuum of HIV care.

*"It will bring trouble. Number one is that a person can keep the positive result to themselves, not telling anyone. So, there will be no linkage to treatment and prevention services. This can lead to the spread of the disease to many people."* (Civil servant, 33 years)

*"Someone may decide to keep quiet after testing positive and not seek care in a hospital."* (Businessman, 43 years)

## 4. Discussion

This qualitative study aimed to explore the experiences, motivations, and perceptions of HIV testing among married men in northern Nigeria, with a specific focus on HIV self-testing (HIVST). The analysis of the data revealed several key themes, including participants' prior experiences with HIV testing, limited knowledge of self-testing, motivators, and demotivators for self-testing, perceptions of the ease of use of self-testing, and concerns about its reliability and the availability of counseling support.

The participants' previous experiences with facility-based HIV counseling and testing emerged as a crucial factor influencing their perspectives. These experiences often involved delays, overcrowding, and long waiting times, consistent with previous reports [14–17]. These findings highlight the urgent need to address the inefficiency and suboptimal quality of facility-based testing services. Measures must be taken to alleviate the obstacles that discourage individuals from seeking HIV testing, including fear of stigmatization or being recognized by others at test centers. Negative experiences during testing can undermine the overall testing process, leading to reluctance for future testing and recommendations to others. One potential solution is the implementation of a prebooked appointment system.

Participants expressed concerns about the testing process itself, including discomfort, fear, and nonsupportive attitudes of healthcare providers, which align with previous research [18–21]. These findings highlight the importance of providing interpersonal communication skills training to healthcare providers and creating a supportive and compassionate environment in HIV testing centers to promote regular testing, early detection, and linkage to treatment.

Opinions on the HIV testing process varied among participants, with some describing negative experiences, while others found it to be smooth and simple. These diverse perspectives emphasize the need for standardized protocols, quality assurance measures, and integrating counseling services to ensure consistency in testing procedures and timely disclosure of results across different testing sites. Moreover, integrating counseling services with the testing process is crucial to addressing the psychological and emotional needs of individuals, providing accurate information and offering appropriate support before and after testing.

The participants' lack of knowledge and awareness about self-testing was evident, although some had heard about it through the media or healthcare providers. This highlights the potential role of information dissemination and health education in increasing awareness and knowledge about HIV self-testing, consistent with previous research [22, 23]. Utilizing various media platforms can be effective in disseminating information about HIVST and its advantages.

The motivations for HIV self-testing in this study, including privacy, convenience, personal empowerment, and increased detection of infection, are consistent with previous research findings [7, 22]. These findings highlight the importance of these motivations in shaping individuals' preferences for self-testing and align with the principles of patient-centered care and autonomy.

Overcoming initial apprehension about self-testing and gaining increased confidence through repeated testing suggest that individuals can adapt and overcome the challenges associated with self-testing. These findings align with previous studies that have investigated the ease of use and user experience of HIVST [24, 25]. To further enhance the uptake of HIVST, early adopters could be trained as peer educators to promote self-testing and provide support to their communities.

The lack of immediate access to counseling during self-testing, as voiced by the participants, aligns with previous reports among different populations [26, 27]. Addressing this concern requires integrating counseling services, remote helplines, and offering supervised and unsupervised self-testing options.

The implications of this study for policy and practice include improving facility-based testing infrastructure, training healthcare providers in communication skills and patient-centered care, implementing standardized protocols, and increasing awareness through educational campaigns. Integrating counseling services, remote helplines, and offering supervised and unsupervised self-testing options can address concerns and enhance the acceptability and effectiveness of self-testing initiatives.

The richness and depth of the data enhance the credibility of the findings, providing valuable evidence for targeted interventions to improve HIV testing awareness among married men. However, it is important to recognize the limitations of qualitative studies in terms of generalizability. Future studies can explore HIV testing experiences among different demographic groups and in diverse cultural contexts. Mixed methods research designs can provide a more comprehensive understanding of the topic by combining qualitative and quantitative approaches.

## 5. Conclusion

This study underscores the importance of addressing concerns related to the testing process, improving access to testing, and creating a supportive environment for individuals seeking HIV testing. The motivations expressed for self-testing emphasize the need for privacy, convenience, personal empowerment, and increased detection of infections. Integrating counseling services and remote helplines and offering supervised and unsupervised self-testing options can enhance the effectiveness of self-testing programs. By implementing these recommendations, policymakers and healthcare professionals can contribute to increased testing uptake, early detection, and linkage to care, ultimately helping to end the HIV epidemic.

## Data Availability

The data used to support the findings of the study are available from the corresponding author upon request and in strict accordance with the data privacy rules as set forth by the government of Nigeria.

## Ethical Approval

Ethics approval for this study was obtained from the Kano State Ministry of Health Ethics Review Committee.

## Disclosure

The findings and conclusions are those of the authors and do not necessarily represent the official position of the FIC, NIMH, NIAAAA, NICHD, NIH, the Department of Health and Human Services, or the government of the United States of America.

## Conflicts of Interest

The authors declare that they have no conflicts of interest regarding the publication of this paper.

## Acknowledgments

This work was supported by the Fogarty International Center, the National Institute of Mental Health (NIMH), the National Institute of Child Health and Human Development (NICHD), and the National Institute on Alcohol Abuse and Alcoholism (NIAAAA) of the U.S. National Institutes of Health, Grant award nos. 1D43TW011544 and 1G11TW011819.

## Supplementary Materials

Interviewer guide/script for participant interviews. (*Supplementary Materials*)

## References

- [1] Unaid World Aids Day, "Fact sheet. Global HIV statistics," 2023.
- [2] J. K. B. Matovu, R. Kisa, E. Buregyeya et al., "If I had not taken it [HIVST kit] home, my husband would not have come to the facility to test for HIV: HIV self-testing perceptions, delivery strategies, and post-test experiences among pregnant women and their male partners in Central Uganda," *Global Health Action*, vol. 11, no. 1, p. 1503784, 2018.
- [3] J. Jones, B. Carter, R. Wilkerson, and C. Kramer, "Attitudes toward HIV testing, awareness of HIV campaigns, and using social networking sites to deliver HIV testing messages in the age of social media: a qualitative study of young black men," *Health Education Research*, vol. 34, no. 1, pp. 15–26, 2019.
- [4] C. S. Camlin, E. Ssemmondo, G. Chamie et al., "SEARCH Collaboration. Men missing from population-based HIV testing: insights from qualitative research," *AIDS Care*, vol. 3, pp. 67–73, 2016.
- [5] N. Tshuma, K. Muloongo, G. Setswe et al., "Potential barriers to rapid testing for human immunodeficiency virus among

- a commuter population in Johannesburg, South Africa," *HIV/AIDS (Auckland, N.Z.)*, vol. 7, pp. 11–19, 2015.
- [6] World Health Organization, *Guidelines on HIV Self-Testing and Partner Notification: Supplement to Consolidated Guidelines on HIV Testing Services*, World Health Organization, Geneva, 2023, <https://www.ncbi.nlm.nih.gov/books/NBK401675/>.
- [7] C. Bwalya, M. Simwinga, B. Hensen et al., "The HPTN 071 PopART study team Social response to the delivery of HIV self-testing in households: experiences from four Zambian HPTN 071 (PopART) urban communities," *AIDS Research and Therapy*, vol. 17, no. 1, p. 32, 2020.
- [8] S. Ahmed, K. Delaney, P. Villalba-Diebold et al., "HIV counseling and testing and access-to-care needs of populations most-at-risk for HIV in Nigeria," *AIDS Care*, vol. 25, no. 1, pp. 85–94, 2013.
- [9] E. L. Sibanda and M. Taegtmeier, "Inequalities in uptake of HIV testing despite scale-up," *Lancet Global Health*, vol. 8, no. 6, pp. e744–e745, 2020.
- [10] O. Dirisu, G. Eluwa, E. Adams, K. Torpey, O. Shittu, and S. Adebajo, "I think this is the only challenge... the stigma Stakeholder perceptions about barriers to Antenatal care (ANC) and Prevention of mother-to-child transmission (PMTCT) uptake in Kano state, Nigeria," *PLoS One*, vol. 15, no. 4, p. e0232028, 2020 e0232028.
- [11] D. Durevall and A. Lindskog, "Intimate partner violence and HIV in ten sub-Saharan African countries: what do the Demographic and Health Surveys tell us?" *Lancet Global Health*, vol. 3, no. 1, pp. e34–e43, 2015.
- [12] J. M. Morse, "Data were saturated," *Qualitative Health Research*, vol. 25, no. 5, pp. 587–588, 2015.
- [13] M. D. C. Tongco, "Purposive sampling as a tool for informant selection," *Ethnobotany Research and Applications*, vol. 5, pp. 147–158, 2007, <https://ethnobotanyjournal.org/index.php/era/article/view/126>.
- [14] L. Tindall, J. A. Smith, P. Flower, and M. Larkin, "J.A. Smith, P. Flower and M. Larkin (2009), *Interpretative phenomenological analysis: theory, Method and research*.: London: sage," *Qualitative Research in Psychology*, vol. 6, no. 4, pp. 346–347, 2009.
- [15] M. Horsfall, M. Eikelenboom, S. Draisma, and J. H. Smit, "The effect of rapport on data quality in face-to-face interviews: beneficial or detrimental?" *International Journal of Environmental Research and Public Health*, vol. 18, no. 20, p. 10858, 2021.
- [16] C. McMullin and Q. Methods, "Transcription and qualitative methods: implications for third sector research," *Voluntas*, vol. 34, no. 1, pp. 140–153, 2023.
- [17] L. S. Nowell, J. M. Norris, D. E. White, and N. J. Moules, "Thematic analysis: striving to meet the trustworthiness criteria," *International Journal of Qualitative Methods*, vol. 16, no. 1, pp. 1–13, 2017.
- [18] J. Neale, "Iterative categorization (IC): a systematic technique for analysing qualitative data," *Addiction*, vol. 111, no. 6, pp. 1096–1106, 2016.
- [19] S. A. Meehan, N. Leon, P. Naidoo, K. Jennings, R. Burger, and N. Beyers, "Availability and acceptability of HIV counselling and testing services. A qualitative study comparing clients' experiences of accessing HIV testing at public sector primary health care facilities or non-governmental mobile services in Cape Town, South Africa," *BMC Public Health*, vol. 15, no. 1, p. 845, 2015.
- [20] A. Meremo, B. Mboya, D. Ngilangwa et al., "Barriers to accessibility and utilization of HIV testing and counseling services in Tanzania: experience from Angaza Zaidi programme," *Pan Afr Med J*, vol. 23, p. 189, 2016.
- [21] P. Ngangue, M. P. Gagnon, and E. Bedard, "Challenges in the delivery of public HIV testing and counselling (HTC) in Douala, Cameroon: providers perspectives and implications on quality of HTC services," *BMC International Health and Human Rights*, vol. 17, no. 1, p. 9, 2017.
- [22] C. Mwamba, A. Sharma, N. Mukamba et al., "'They care rudely!': resourcing and relational health system factors that influence retention in care for people living with HIV in Zambia," *BMJ Global Health*, vol. 3, no. 5, p. e001007, 2018 e001007.
- [23] S. I. Ahmed, S. A. Syed Sulaiman, M. A. Hassali, K. Thiruchelvam, S. S. Hasan, and C. K. Lee, "Attitudes and barriers towards HIV screening: a qualitative study of people living with HIV/AIDS (PLWHA) in Malaysia," *Journal of Infection Prevention*, vol. 18, no. 5, pp. 242–247, 2017.
- [24] A. Rao, E. M. Nagourney, V. H. Chen et al., "Assessing attitudes to ED-based HIV testing: development of a short-structured survey instrument," *PLoS One*, vol. 16, no. 5, p. e0252372, 2021 e0252372.
- [25] J. M. Dapaah, "Attitudes and behaviours of health workers and the use of HIV/AIDS health care services," *Nursing Research and Practice*, vol. 2016, pp. 1–9, 2016.
- [26] S. M. Kiene, K. Sileo, R. K. Wanyenze et al., "Barriers to and acceptability of provider-initiated HIV testing and counselling and adopting HIV-prevention behaviours in rural Uganda: a qualitative study," *Journal of Health Psychology*, vol. 20, no. 2, pp. 173–187, 2015.
- [27] Y. R. Tan, N. Kaur, A. J. Ye et al., "Perceptions of an HIV self-testing intervention and its potential role in addressing the barriers to HIV testing among at-risk heterosexual men: a qualitative analysis," *Sexually Transmitted Infections*, vol. 97, no. 7, pp. 514–520, 2021.

## Research Article

# The Lived Experience of Play and How It Relates to Psychological Wellbeing: An Interpretive Phenomenological Analysis (IPA) Study Amongst Undergraduate Students from Medicine, Nursing, and Allied Health Professions' Programmes in the United Kingdom

Rebecca Rylance-Graham 

University of Liverpool, School of Health Sciences, The Quadrangle, Brownlow Hill, Liverpool L69 3GB, Merseyside, UK

Correspondence should be addressed to Rebecca Rylance-Graham; [r.rylance@liverpool.ac.uk](mailto:r.rylance@liverpool.ac.uk)

Received 19 December 2023; Revised 15 March 2024; Accepted 22 March 2024; Published 3 April 2024

Academic Editor: Marcus Ang

Copyright © 2024 Rebecca Rylance-Graham. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Current literature acknowledges that undergraduate students undertaking programmes in medicine, nursing, and allied health professions experience occupational stress which presents as a detriment to mental health, psychological wellbeing (PWB), and burnout. Strategies to improve the wellbeing of students have been slow to embed and have had limited impact, indeed the issue of declining wellbeing amongst this group is escalating. Studies from the business literature suggest that organisations that foster a playful environment reap benefits in terms of employee wellbeing. This interpretive phenomenological analysis (IPA) study explored the lived experiences of play amongst undergraduate students from medicine, nursing, and allied health professions' programmes in the clinical practice setting. The resultant findings offer some unique empirical insights into the types of play that the students engaged in, ranging from informal banter with peers and patients to artful, sophisticated, cocreated play. The study also revealed insights about the factors which facilitate play, notably the “big personalities” on the ward. The factors which limited play are related to the tension between being a health professional and the enactment of play as well as hierarchical factors. Crucially, the study found that the practice of play induced key hedonic and eudaimonic PWB benefits to the students, ranging from positive affect to improved relationships, a sense of meaning, and a positive learning environment, offering original empirical insights. These findings have not been observed previously and shine a conceptual light on a previously unknown phenomenon.

## 1. Introduction

For many decades, the mental health and wellbeing of UK healthcare workers have attracted attention as a major public health concern. Indeed, employee wellbeing has been the focus of many organisational imperatives [1–3]. Despite the somewhat nebulous term, the concept of wellbeing stems from the positive psychology movement [4]. Considered to be a dynamic and multifaceted continuum [5], PWB is frequently conceptualised within psychology literature as a combination of positive affective states [6] and is rooted in

the hedonistic and eudaimonic traditions. The hedonic tradition relates primarily to affective states such as achieving a balance between positive and negative emotions and feeling happy and satisfied in life, whereas the eudaimonic perspective is concerned with the fulfilment of human potential and a meaningful life [7]. To put simply, wellbeing relates to feeling good and flourishing in life [8, 9].

Since the SARS-CoV-2 virus (COVID-19) pandemic, the wellbeing of those who provide front-line care is at a crisis point [10, 11]. Of further concern is an often-disregarded workforce population, healthcare students. Students

undertaking clinical programmes (degree programmes which lead to professional registration with a regulatory body) are amongst the most vulnerable occupational groups with regard to poor wellbeing and mental health [12]. This is largely due to the fact that they are located within two distinct organisational contexts: higher education and clinical practice. A combination of academic workload and responsibilities in clinical practice is thought to contribute to a significant psychological burden amongst this group [13]. With mounting referrals to university counselling and occupational health services, the wellbeing of the UK student population is at a crisis point [14]. Crucially, since the COVID-19 pandemic, the mental health and wellbeing of undergraduate students have reached a critical juncture, with a recent report by the Office for National Statistics (ONS) [15] stating that students reported unprecedented levels of anxiety, unhappiness, and life dissatisfaction.

Strategies to improve PWB before and during the pandemic tended to focus on prevention and self-management, with targeted support such as education, counselling, resilience training, and meditation/mindfulness [16, 17] (NHS England and NHS Improvement, 2021). However, there is limited evidence that such strategies produce favourable outcomes [18], suggesting perhaps that there may be other previously unexplored strategies to enhance PWB.

The subject of play, for example, amongst the workforce is an emerging topic of research inquiry. Studies have shown that play can affect the emotional climate in the modern workplace [19] and that organisations which foster a playful work environment and employees who engage in the playful practice benefit greatly in terms of enhanced PWB [20]. Studies suggest that the practice of play appears to generate hedonic and eudaimonic wellbeing benefits to both employers and employees, bringing about increased engagement, enhanced productivity, improved job satisfaction, and a reduction in workplace stress and burnout [21–26].

That withstanding, extant play studies have been almost entirely conducted within the business sector and there are limited studies which have explored the playful practice of those who work within the healthcare organisational setting. Furthermore, there is a dearth of studies which have explored the practice of play amongst undergraduate students undertaking clinical programmes. This study seeks to address the gaps in the literature by exploring how play is expressed amongst undergraduate medicine, nursing, and allied health professions' (AHP) students and how it influences psychological wellbeing.

## 2. Literature

There are many definitions of play, and the distinct and sometimes discreet characteristics of play, for example, joking, humour, and playing games, make it difficult to achieve a universally accepted definition [21]. Indeed, there is much debate within the literature about the definition of play in the context of the workplace, and a consensus concerning the definition of organisational play is yet to be established. However, Celestine and Yeo [27] succinctly define play in the organisational context as follows:

“Activity undertaken in a work context that is interactive in nature and undertaken with the goal of having fun” [27].

Characterised by fun, humour, competition, and fantasy, play is often regarded as the activities which exist outside the confines of the workplace [28]. Indeed, until recently, work and play were considered to be two distinct and incompatible domains [29].

Perhaps due to the ostensibly nonserious and light-hearted image of the play, the concept of play at work and the potential benefits have remained a relatively understudied topic of research inquiry [21]. Contemporary thinking challenges the work/play dichotomy as something of a misnomer and asserts that it is possible to integrate the two in order to benefit individuals and organisations [21, 28, 30].

Current literature acknowledges that students undertaking programmes in medicine, nursing, and AHPs experience occupational stress which presents as a detriment to mental health, wellbeing, and burnout [12]. Stress in student nurses, for example, has been associated with depression, anxiety, and impaired emotional wellbeing [31, 32], and whilst much of the extant literature is located in the nursing press, there are studies which have shown that medical students also experience stress when faced with exam pressures or when caring for sick patients for the first time [33]. Similarly, students undertaking AHP programmes such as physiotherapy and radiography also experience occupational stress, which presents as poor PWB and burnout [34, 35]. Burnout levels amongst this group of students are high and have been linked to increased suicidal ideation, reduced self-esteem, and programme attrition [36].

That aside, studies have shown that healthcare workers (both students and staff) do engage in a number of practices which help them cope with stress and improve psychological wellbeing (PWB). Activities that provide a sense of joy, having fun, and utilising social support systems have been cited in the literature [37, 38]. These “informal” playful practices are not well understood, yet capture the playful activities which would seem to address PWB. Take, for example, the practice of humour and jocularity, having a sense of humour is thought to be a vital job resource for healthcare professionals and a crucial buffer against organisational adversity [39]. Indeed, there is a long tradition of a “gallows humour” amongst clinicians [40]. Gallows humour relates to the practice of mocking in times of extreme adversity such as death and dying [41]. Argued by some as being inappropriate, unprofessional, and disrespectful, and by others as a paradoxical, yet is a necessary human function to cope with the enormity of illness, disease, and death [42]. Studies have shown that healthcare workers who engage in humour in the workplace are more likely to achieve job satisfaction and are less likely to leave their profession [43, 44]. Furthermore, the link between humour and positive wellbeing is well-established within the existing literature [39, 45]. Humour and other expressions of play appear to provide psychological benefits for healthcare workers during times of stress or crisis [46].

Notwithstanding, the organisational play literature alludes to an apparent synergistic relationship between play, the achievement of organisational imperatives, and PWB. However, there are no extant studies which have empirically explored play as a conduit for improved PWB, thus exposing a gap. There are also gaps in the literature in relation to the drivers of play, and studies have tended to focus on employer-driven play, with the informal playful practice of employees remaining largely unknown. Similarly, the factors which facilitate or limit play have gone unnoticed in the literature.

### 3. Research Question

“How is play expressed amongst undergraduate students from medicine, nursing, and allied health professions’ programmes and how does it relate to psychological wellbeing?”

### 4. Research Aim

To provide an in-depth exploration of the lived experience of play in the clinical environment amongst medicine, nursing, and AHP undergraduate students.

### 5. Research Methods

**5.1. Methodological Approach.** Since the aim of the study was to explore the lived experiences of play in the clinical environment, the study employed a qualitative phenomenological design through the use of the structured approach embedded within the interpretative phenomenological analysis (IPA). IPA draws from three distinct philosophical stances: phenomenology, hermeneutics, and idiography [47]. IPA is a fitting approach to inquiry as it is congruent with the topic of exploration and it was anticipated that the depth of interpretation and faithfulness to the unique experiences of the participants could not have been gleaned by adopting other qualitative approaches.

**5.2. Sample.** As the topic of inquiry relied on participants who could talk in-depth about their unique experiences of play in the context of the healthcare environment, participants were recruited from a nonprobability sample from the Schools of Medicine and Health Sciences at a United Kingdom university. Only 3rd year undergraduate students, those who had experienced the most clinical practice, were recruited. There were nine participants in total: (male = 2; female = 7) Participants were recruited from Medicine ( $n = 1$ ) Nursing ( $n = 4$ ), Physiotherapy ( $n = 2$ ), and Therapeutic Radiography programmes ( $n = 2$ ). Each participant was allocated a pseudonym to protect their identity (see Table 1).

**5.3. Data Collection.** Data were gathered using in-depth 1 : 1 semistructured interviews in order to glean rich, meaningful descriptions of the participants’ lived experiences of play within the clinical setting. Interviews were guided by an interview topic guide (see Table 2 overleaf).

TABLE 1: Sample.

Participant	Age	Undergraduate Programme
Greta	20	Nursing
India	21	Nursing
Stuart	22	Therapeutic radiography
Nancy	42	Physiotherapy
Diane	31	Therapeutic radiography
Emily	21	Nursing
Leon	20	Nursing
Alice	20	Physiotherapy
Penny	25	Medicine

Consistent with the interpretative phenomenological analysis (IPA) studies, the topic guide did not dictate the interview but instead served as a guide to facilitate flow and prompt narrative of the topic area. Each interview took place online or on campus (adhering to local and national social distancing rules at the time) and audio was recorded before being transcribed verbatim. Interviews took place over a period of five months and lasted between twenty-one minutes and fifty-eight minutes (mean: 40.7 minutes).

**5.4. Data Analysis.** Since the aim of the study was to explore the lived experiences of the enactment of play and how it relates to PWB, the study employed a qualitative phenomenological design, through the use of the structured approach embedded within interpretative phenomenological analysis (IPA). This facilitated the detailed exploration of the participants’ lived experiences, allowing the researcher to explore and interpret the unique and nuanced perspectives of play in the clinical setting. The distinguishing elements of IPA, in contrast to other phenomenological approaches, lie in the meticulous process of analysis. Smith and Nizza [48] and Smith et al. [47] offer a procedural approach which informed the study design.

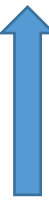
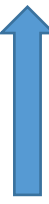









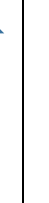
Each step of the analytical process necessitates full immersion in the data [49]. The purpose of the reading and rereading stage was to ensure that the participant remained the focus of the analysis [47]. Reading and rereading the transcripts facilitated exploratory noting (EN) and “free coding” [50]. Each participant’s narrative account was distilled into a personal, unique experiential statement (ES). Each ES was subsequently tabulated, with a supporting participant narrative resulting in a case-level summary for each participant paying attention to the ideographic nature of IPA to ensure that the participant’s “voice” had not been lost in the process. By searching for patterns and themes, the initial experiential statements (ESs) were then clustered into personal experiential themes (PETs). The process was then repeated for each participant. The resultant PETs were compared across cases to identify which PETs were most potent across all datasets. By searching for connections and clusters across cases, the data were reduced without losing the unique experiences of the participants. From an ontological perspective, it was imperative that the themes were rooted in the participants’ lived experience of play. The subsequent PETs were clustered to provide a final master table of group experiential themes (GETs) (see Table 3



TABLE 2: Interview topic guide.

Technical set up/preparation	
Check recording equipment Pen/paper	
Setting the background	
Introduction Informed consent Check participants' programme of study and year Confidentiality, safeguarding, and professional concerns Reiterating the scope of the study	
Icebreaker	
Topic guide	
Questions	Prompts and probes
1	How did that come about? (What was happening/happened on the ward/placement at that time?) When did this happen? What else is there about the situation which made it playful? What happened as a result? What happened afterwards? How did it impact you? Who else did it impact?
2	How did it affect you? How long did it last?
3	What was your next example? How does this differ from the previous example?
4	Tell me about other playful examples which are different? Remember to let the silence in
Winding down	
Thank you Any questions? Emotional check-in * Advise that a follow-up call will happen in the next week	

TABLE 3: Master table of GETs.

PETs	Direction of analytical movement	GET (1)	Subthemes
Teasing, jokes, banter, competitions, board games, pranks, and food		Playtime (expression of play)	Subtheme 1 Informal play
Having fun with patients			(a) Unstructured
TikTok and Snapchat to play and connect			Subtheme 2 Patient play
Behind the scenes, when the ward/department is quiet			Subtheme 3 Social media play
			Subtheme 3 Covert play
PETs	Direction of analytical movement	GET (2)	Subthemes
Individual staff and their personal characteristics instigating play		The clinical playground (facilitative and limiting factors)	Subtheme 1 “Big personalities”
Need to be careful around the band 6’s and 7s			Subtheme 2 “The pecking order”
There is a time and a place to play			Subtheme 3 “The play paradox”
PETs	Direction of analytical movement	GET (3)	Subthemes
Play lightning/boosting mood		“Flourishing” (psychological wellbeing)	Subtheme 1 Positive affect
Energizing/soothing effects of play			Subtheme 2 Relationships and connectedness
In with the crowd “acceptance”			Subtheme 3 Meaning
Team building			Subtheme 4 Positive clinical learning environment
Play makes the patients’ episode of care more comfortable, leading to a sense of purpose and job satisfaction			
Play opens up a space to ask questions			

overleaf) and are thus presented as three GETs and are ordered to satisfy the research question as follows:

“How is play expressed amongst Undergraduate Students from Medicine, Nursing and Allied Health Professions programmes and how does it relate to Psychological Wellbeing?”

**5.5. Quality.** Unlike quantitative research which has a range of well-established methods and conventions for promoting trustworthiness, it must be acknowledged that the notion of trustworthiness in qualitative research inquiry remains a topic of much scholarly debate [51] and there is a lack of well-defined criteria within which to judge the quality of qualitative research. Arguably, the diligent step-by-step process of analysis required in the undertaking of an IPA study, highlighting the transparent and complex analysis will demonstrate quality [47]. Yardley [52], however, proposes that the three characteristics of (1) sensitivity to context, (2) commitment, rigour, transparency, and coherence, and (3) impact and importance demonstrate quality in qualitative studies.

**5.5.1. Sensitivity to Context.** The context of the study embraces multiple facets such as awareness of the extant literature, theoretical underpinnings, and prior, established methodical approaches. Whilst knowledge of this may influence interpretation, it is essential that the analysis remains faithful to the data.

**5.5.2. Commitment, Rigour, Transparency, and Coherence.** Commitment refers to the prolonged engagement with the topic of inquiry and the development of the researcher, as they advance their skills in the undertaking of the analysis. Rigour encompasses the completeness of the study in terms of data collection and analysis. Maintaining reflexivity by providing a clear audit trail sharing of notes, transcripts, and coding procedures with the supervisory team supported transparency.

**5.5.3. Impact and Importance.** As a much-misunderstood topic of inquiry within the healthcare context, it is envisaged that the empirical findings from the study will offer unique insights into the expression of play as a conduit of improved PWB amongst medicine, nursing, and AHP undergraduate students. Moreover, it is hoped that the findings will add to a sparse body of literature and persuade further critical discussion among the academic and health community.

**5.6. Ethics.** Permission to undertake the research was granted by the University of Chester Business' School Ethics Committee (19/11/2021) and the University of Liverpool' Research Ethics Team (29/11/2021).

## 6. Findings

The resultant data revealed common themes which spanned a wide range of playful experiences encountered by the participants during the undertaking of their clinical placements. Their collective experiences revealed a number of factors related to play and PWB and the features which facilitated or limited play. In keeping with the IPA tradition, examples are shared from each participant, demonstrating commonality across cases yet maintaining the ideographic focus of each participant.

Through the detailed analysis of the participants' experiences, it was clear that they all engaged in playful practice during their clinical placements. Frequently expressed as fun, pranks, banter, and jocularity, each participant revealed aspects of play which aligned with Seligman's [8] PERMA wellbeing indicators. Seligman's PERMA flourishing model of wellbeing which encompasses positive emotion, engagement, relationships, meaning, and accomplishment reflects the essential components of flourishing. Furthermore, flourishing is associated with reduced stress, improved health, and the promotion of resilience [53].

## 7. GET (1): Playtime

Playtime was created to capture the participants' lived experiences of playful practice during their clinical placements. This GET illuminates the reader to some of the types of play that the participants engaged in. Since the practice of play among medicine, nursing, and AHP students is rarely discussed in the literature, it was necessary to create a shared and lived account of how play is expressed in the clinical environment. It was evident from the analysis that every participant had engaged in play during the undertaking of their clinical placements. Each participant shared their unique experiences of play; the subthemes reflect the nuanced and sometimes discreet elements of play.

**7.1. Subtheme (1): Informal Play.** The majority of the contemporary literature related to organisational play is dominated by serious play, which is ostensibly employer-driven. Furthermore, the findings from the literature review exposed informal play as a much-neglected area of academic inquiry. Since the expression of informal play in the healthcare organisational context remains unknown, the findings from the study revealed some powerful insights about the types of informal play that the participants engaged in. This subtheme is organised into two distinct sections: “unstructured” and “structured,” to capture the often spontaneous and nuanced aspects of informal play.

**7.1.1. Unstructured Informal Play (Banter, Teasing, and Pranks).** Unstructured informal play refers to the spontaneous employee-driven aspects of play which were free from structure or any play props such as games or prizes. All participants shared their experiences of having humorous banter with peers, qualified staff, and patients. According to the Oxford English Dictionary [54], “banter” is defined as

“teasing, joking, or humorously mocking remarks exchanged playfully with another person or group.” Alternative definitions suggest that banter is a form of jocular abuse [55]. Popularised as common vernacular amongst young people, banter has established itself as a means of expressing humour and promoting social bonding [56]. Banter, as unstructured, informal play was experienced by all participants and was frequently expressed as teasing and pranking.

Penny shares her experience of theatre staff teasing her following an event where she had fainted in the theatre as follows:

“And then in the next surgery they were like “don’t fall over in this one” kind of thing, so they were like poking fun at that, which was nice kind of affectionate” (Penny p11).

Penny associates the teasing practice of her peers as being psychologically affirming. Similarly, Leon described how teasing amongst staff about borrowing and returning equipment could be a funny experience. He also alluded to the notion of the staff being “down in the dumps.” Here, it would seem that Leon believed that this was a shared feeling amongst healthcare workers and that the enactment of play brought about psychological benefits.

“So, erm, I feel like when you go over and you like ask to borrow something they’re like “make sure you bring it back” but sometimes you’ll have a good joke about like just borrowing equipment, I don’t know if that shows like how down in the dumps, we all are, but something just making jokes about little things like that can be so funny sometimes” (Leon, p12).

Both participants attributed the enactment of banter as being a positive playful event, initiating and confirming relationships and adding value to their clinical placement experience.

Related to the banter was the topic of food. Most participants described food as being a playful experience, and whilst the food in and of itself was not necessarily playful, the collective consumption of food seemed to be a conduit for social engagement and play. Emily and India, for example, shared their experiences of a playful encounter around food which took place during the COVID-19 health pandemic as follows:

“I remember when it was sort of the second wave of lockdown and I was in A&E and, there was a Greggs over the road, they would send sort of breakfast rolls and things in the break room, so we’d all have like a little snack and have like banter” (Emily, p11).

“We had like pizza parties, which were quite good. Everyone definitely enjoyed that, it was good fun. Nurses definitely love their food (laugh), being treated by other people, that’s always lovely” (India, p7).

Similarly, Leon described having food on a central table in the A&E Department as follows:

“They have one big table sat in the middle, so like everyone just comes and sits round this one big table so it’s a bit like a family dinner, I know you’re not all on the same break but there will be 4 or 5 of you at there at some point and everyone is sat there eating and having a laugh” (Leon, p6).

Each account seems to suggest that the gathering of people and the consuming of food, as a communion of sorts, engendered playful practice and promoted social bonding.

Another element of informal play relates to the practice of playful pranks. Many of the participants shared their experiences of pranks which had occurred within the clinical environment. These were most frequently driven by patients or other staff, but in all instances, the participants associated the experience with hedonic feelings.

Emily shared her experience of a prank which occurred on night duty as follows:

“I think on nights it’s quite funny, people get up to mischief, cos it’s so quiet and all the patients are asleep erm we had this one HCA at (name of Trust) that was telling us something about ghost stories and saying that it was haunted and that kind of thing, you know then you had people jumping out of the linen cupboard with bedsheets all over them, I think that’s quite funny too just seeing their reaction” (Emily p13).

Emily went on to say that

“We talked about it for ages after and it was like a couple of months after, I suppose the wards are a bit quieter and there’s not as much going on so you can really build your bonds and have a bit more fun. But things like that yeah, it is quite childlike, but it was still quite funny” (giggle) (Emily, p13).

Here, Emily acknowledges that the playful prank mediated positive relationships with peers and recounts the event as being memorable and evocative of childish play.

*7.1.2. Structured Informal Play (Games, Quizzes, and Competitions).* Informal play relates to play which was sometimes spontaneous but had an element of structure. Most participants shared an experience of competitive play, and often this was created by other staff. Nancy, for example, shared her experience of a workweek hustle (a synch of a fitbit which allows up to ten people to undertake competitive fitness challenges) as follows:

“They had like a workweek hustle which I joined with my Fitbit, and they were quite competitive, and they would joke and egg you on by saying like “we bet you’ve tied yours to the dog or you’ve given yours to your kids to play out with” and stuff like that which was fun” (Nancy, p 2).

Alice shared her experience of playing a game with patients whilst undertaking a physiotherapy placement as follows:

“We used to do erm like group sessions sometimes with some patients. So, at the end of like the group session we did like a game like where you had to throw like a beanbag into a big hole. So, we had like it was like a big board with like all these different targets on it they’d had to throw it in and then we had like 3 patients like going against each other. It was like obviously we’re doing things that will really help them, but like they’re actually really enjoying themselves at the same time, which is nice to see” (Alice, p9).

Both participants’ experiences alluded to the hedonic and eudaimonic benefits of the playful encounter.

The subtheme of informal play captures the essence of play amongst the participants, providing a glimpse into playful practice which has not been observed before in the literature. It is worthy of note that the narrative accounts suggest that the play is purposeful, yielding PWB outcomes.

*7.1.3. Subtheme (2): Play with Patients.* The topic of patient play had not been identified in the literature review and this subtheme captures the experiences of patient play encountered by the participants. Sometimes driven by the patients themselves, other times coproduced with the participant or the ward/departmental staff, and in all instances, the participants’ experience of patient play brought about a number of perceived benefits for both the student and the patient.

Emily and Greta shared their experiences of dressing up, dancing, and having fun with the patients on the ward as follows:

“We were all sort of dressing up and there were Christmas trees and all sorts like that. I think that was really good because it felt like, you know, you were part of the team, everybody was doing their own little thing to like to make the patients day a bit brighter and happier and Christ-massy” (Emily, p2).

“One ward I was on, they got like a choir in and they all got up dancing, you could dance with them, so it was nice to see them having some fun as well as me” (Greta, p 2).

Both participants’ accounts imply that patient play induced hedonic outcomes, engendering positive relationships and a lifting of mood.

Stuart shared many experiences of patient play in the Radiotherapy Department. In particular, he described a playful encounter where there was a delay on a machine, resulting in the patient’s waiting time being extended. Here, he describes having to change the time on the board and the patients changing it back to the original time as follows:

“We had a really long delay so I had to like go up and like change the cards on the board from like 15 minutes to

90 minutes, and this one patient kept coming up and changing it back (laugh) because the waiting time was so long, they were sat there the whole time waiting, so you’ve got nothing else to do so they were just like playing a game with me the whole time” (Stuart, p12).

He added to this experience by saying that

“It’s nice when you’ve got a patient that is being silly and has like something that they’ll talk to you about on a Monday and is a running joke for the rest of the week then. Erm, it makes you feel kind of like oh ok like, they also see me as somebody who’s not just here for their treatment” (Stuart, p7).

This playful experience encapsulates the patient creating the play, with Stuart “playing along.” Stuart attributes the playful experience as adding to his self-worth.

Each participant engaged in purposeful play for the benefit of the patients, acknowledging the hedonic and eudaimonic benefits.

*7.2. Subtheme (3): Social Media Play.* This subtheme was created to elucidate the expression of play in the context of the digital platforms used by the participants. During the COVID-19 health pandemic, social media usage such as TikTok grew in popularity [57]. The pandemic witnessed healthcare workers engaged in social media play, as evidenced by the TikTok dances which were prolific at the height of the pandemic. Whilst the pandemic has now abated; it would seem from the participants’ experiences that TikTok continues to provide a virtual space within which to play.

Leon describes a TikTok game titled “Rate my Shoes,” which he played with fellow students whilst on clinical placement as follows:

“One of our Uni mates did a TikTok-like rating everyone’s shoes that they wear for placement, so she’s actually like videoing your shoe and then she’d put like 6/10, bit scuffed, doesn’t look waterproof and then she’d like mine and she say like 9/10 erm, loses a point for working in boots, but you know like they’re protected from urine and blood and wipe clean and all this and that and then stuff like that which was funny” (Leon, p5).

Likewise, Penny shared her experience of being the “filmer” during the creation of a TikTok dance as follows:

“There would always be one person that couldn’t get it, they’d think they’d got it and then as you go and film it and everyone would be like “Come on, we’ve all got it” and there would be one person who hadn’t, so kind of making fun of each other. But it was funny to watch because it’s kind of chaos and then it all comes together” (Penny, p8).

Greta described TikTok as something fun to do and a way of connecting (asynchronously) with her friends.

“I like to scroll though social media and message my friends. Go through TikTok, stuff like that, I just like to see what my friends are up to, it’s just something fun to do” (Greta, p3).

Conversely, Emily discussed using social media as a way to connect with her friends and crucially, ask for advice or support. Here, she recognises the value of talking to her peers who she believes are having similar experiences in the clinical environment.

“I talk to my friends on like Snapchat or Instagram or whatever, you know just maybe saying ooh I’ve just had a patient with this and I’m not sure what to do or, you know. It’s good to ask somebody who’s in the same boat as you as a student (pause) WhatsApp helps erm for instance, if you like say “oh, I’m having a bad day” erm somebody will be there to lift you up” (Emily, p11).

*7.3. Subtheme (4): Covert Play.* Unlike the very visible enactment of play discussed previously, the subtheme of covert play captures the participants’ shared experience of play which was ostensibly surreptitious in nature. Penny, for example, shared her experience of working on the hospital wards over the bank holidays as follows:

“Working Bank Holidays, Christmas, Easter or whatever is better because you have more time because it’s not kind of routine stuff, you have more time to do more fun stuff like that and kind of mess around” (Penny, p2).

Diane and Emily revealed their playful experiences when they were out of view, or when the ward or department was quiet as follows:

“Sometimes there’s like, kind of staff banter, you know behind the scenes if you know what I mean” (Diane, p3).

“Nights are definitely a bit quieter and there’s not as much going on so you can really build your bonds and have a bit more fun. But things like that (pranks) yeah, it is quite childlike, but it was still quite funny” (Emily, p13).

Likewise, Stuart shared his experience of play when there was a gap between the patients in the Radiotherapy Department as follows:

“There’s little mechanisms of when maybe we don’t have a patient for a while as there are little protocols to follow like they have to drink a certain amount of water and we have 5 minutes or so where we do silly little games and stuff or like silly stuff” (Stuart, p23).

The participants acknowledged that the routine of the ward may afford opportunities to engage in play. This type of ludic activity is likely to be intrinsically motivated and may be related to a desire to break boredom, lift mood, or simply have fun. There was certainly a sense from the shared

experiences that each participant enjoyed having fun in the workplace and attributed it to a number of hedonic benefits.

## 8. GET (2): The Clinical Playground

As with all playgrounds, there are players, rules, and curators [58, 59] and the clinical playground is no exception. This GET was created to illuminate the reader to the factors which facilitate or limit play and to capture an appreciation of who the players and instigators of play are in the healthcare organisational context. When undertaking the analysis, there was a sense from the participants’ lived experiences that some clinical staff played more than others, and that the participants were sensitive to, or aware of a hierarchical and professional dynamic in the clinical environment, and how this influenced the creation of play or (more often) limited playful practice. There was a sense that the participants experienced tension between being a healthcare professional and in engaging in the practice of play. The subthemes have been created to draw the reader’s attention to the subtle, rarely articulated factors which relate to the unwritten rules of play within the healthcare context.

*8.1. Subtheme (1): The Big Personalities.* The notion of certain personalities being the creators of the play was expressed frequently by the participants. The subtheme “the big personalities” was produced to highlight the instigators and enablers of play in the clinical playground to the reader. Emily, Penny, and Leon each share their experience of the personalities on the ward or department as follows:

“Like a lot of the junior doctors are on the ward, cos I see them a lot, you’d kind of know who you could have a laugh with but then someone there would be just people that like had big personalities, you go on a ward and there’s always that really loud nurse, who makes everyone laugh and is really funny and will kind of get everyone involved in whatever” (Penny, p6).

“I think sometimes staff might have a big personality, that might be a nurse or a physio or an HCA or whatever, I think it depends on the individual people. I think most wards have one” (Emily, p7).

Both accounts recognise that particular individuals drive playful practice. Leon, Greta, and Alice also share their common experience of certain personalities driving play.

“I feel like there’s certain people who give off like a certain aura and you know when they walk in and you’re like almost laughing already and they’ve not even said anything” (Leon, p17).

“I can think of one woman who was really funny, but you know when you can’t put your finger on what she’s done (giggle). I can’t think. She’s made really good relationships on the ward, she’s known as the jokey one” (Greta, p6).

“like the outgoing kind of ones start the banter, they’re like quite funny anyways, so they just like to make other people laugh and stuff like that” (Alice, p13).

Their shared experiences acknowledge that certain individuals, particularly those with a certain personality, drive playful practice and there is a hint too, that they expect to meet such people in the clinical playground.

*8.1.1. Subtheme (2): The Pecking Order.* As discussed previously, students undertaking clinical programmes are invariably exposed to the traditions and rituals of the ward or department where they undertake their clinical learning. Arguably, they are inescapably subjected to inherent hierarchies in the healthcare setting as they develop their professional identity and their position within the hierarchy. This subtheme captures the pecking order in the context of limiters and facilitators of play. Each participant contributed to this subtheme, and the notion of seniority expressed as clinical banding was threaded throughout each of the participant’s experiences. Clinical banding (1–9) relates to the UK pay structure in the NHS; the higher bands relate to increased salary and position.

Emily shared her experience of having a playful encounter with senior clinical staff as follows:

“If you’re talking to a doctor and having a joke then you feel like they’re just human like you are (pause). You know, it gets rid of the ranking system or maybe like the ward manager, they might be band 7 and you might think ooh, they’re really important and I need to be careful what I’m saying but if you can have a bit of a joke and a laugh, we can do that together or erm, we can help each other out and I think it makes everyone seem a bit more human” (Emily, p9).

Emily acknowledges the seniority of the doctor and ward manager and alludes to being cautious in their presence, perhaps recognising her position as a student as being inferior to the doctor. She seems to attribute the enactment of play as flattening the hierarchy and contributing to a shared sense of working together. This notion of clinical banding and how it influenced the participants’ behaviour was shared by Nancy and Leon, who recognised that opportunities to play were perhaps limited in the presence of the more senior clinical staff.

“The band 8b wasn’t there all the time, so when the band 8 came, this is what I mean about the band hierarchy, she was very serious and there was a slightly different tone to the day” (Nancy, p8)

“I’ve seen band 7’s come out of their room, and everyone will sort of like quieten down from what they’re doing (playing) and be like head down and do some paperwork” (Leon, p8)

They both acknowledge that the presence of a senior member of staff influenced their behaviour and Leon’s account seems to allude to a different type of play, whereby he

plays a game of pretence (pretending to be busy) when band 7 is present. Conversely, Stuart’s experience acknowledges his junior position in relation to band 8, and again he recognises that his professional behaviour may need to be modified on account of band 8 potentially interviewing him for a job at some point in the future, however, he too seems to allude to play as flattening the hierarchy.

“It’s really strange, I think you would think it would be like the highest band, so maybe like a band 8, and you’d be like I can’t say anything, like I need to be professional cos they’re potentially the person who’s looking at me if I apply, so you’d think it would be the highest in the hierarchy, but I actually don’t think it is” (Stuart, p10).

There was a sense from each of the participants’ experience that they might change their playful behaviours in the company of a senior member of clinical staff.

This subtheme offers an insight into the influencing factors of play in the clinical playground and the participants’ lived experiences of play suggest that the pecking order is a limiting factor.

*8.1.2. Subtheme (3): The Play Paradox.* Each of the participants’ experiences alludes to play in the clinical playground and being a professional, on the one hand, they defend the playful actions of others and on the other, they defend their own play. This subtheme was created to highlight the tensions which exist between the professional behaviours, incumbent on healthcare professionals and the enactment of play.

Leon and Emily talk about their feelings regarding the TikTok dances during the height of the COVID-19 pandemic. Both seem quick to defend the actions of their peers.

“I remember there were staff dancing down the corridors and it got loads of backlash. Everyone was like why are you not working and this and that, it’s like they’re having fun for 10 minutes of their day, just let them. I think, as long as the environment’s good, you can always have a laugh and there’s no harm in having a laugh either is there?” (Leon, p14).

“I think some people took it in a bad sense of like you’re not doing your job, you’re too busy doing TikTok dances and all. I just saw it from the other side and thought, that’s really good that they can take a breather and have a bit of fun with it and then get back out because obviously it was such a bad time for everybody, it was very difficult, very busy” (Emily, p11).

In contrast, Diane talks about the seriousness of radiation treatment and implies that there is a time and a place to play.

“You can’t really be off laughing or joking when you have to make sure that you’ve got the right patient that you’re going to give radiation to, do you know what I mean?” (Diane, p2).

Diane's experience seems to confirm that she understands her professional candour by empathising that plays would only take place at certain times. Similarly, Stuart expressed his experience of having fun with patients yet was keen to emphasise how he would remain professional.

“It's nice when you've got a patient that is being silly and has like something that they'll talk to you about on a Monday and is a running joke for the rest of the week then. Again, it's like if I bumped into them, I hope that we could actually like, I don't know how to say it, in a way like remain professional, but kind of like silly with one another” (Stuart, p8).

There was a sense from the participants' shared experiences that the clinical playground can be difficult to navigate. Their lived experiences of play exposed a range of limiting and facilitative factors, offering new empirical insights into a previously unexplored topic of enquiry.

There were many features of PWB expressed by the participants throughout the analysis and subsequent creation of the GETs. The next GET will discuss these in more detail.

### 9. GET (3): Flourishing

Considered to be more than simply feeling happy, flourishing is a pluridimensional construct combining many aspects of psychological wellbeing [8]. This GET therefore captures elements of PWB that the practice of play seemed to engender among the participants. This finding was significant and supports the notion that play, in the context of the organisational setting, brings about features of PWB. This GET draws the reader's attention to the particular elements of wellbeing which were engendered through the playful practice of undergraduate healthcare students.

During the undertaking of the analysis, it was clear that play fulfilled a number of elements of PWB, irrespective of the type of play. Each participant talked about a playful event as being mood-uplifting, providing relaxation, and/or facilitating a psychological reprieve from the stresses and strains of the clinical environment. The participants' unique experiences provided an allegory of how play facilitated the building of relationships and how play enhanced the patient's experience. Their shared experience of learning was seemingly nurtured and fulfilling in a playful environment. The subthemes reflect elements of play which correspond to PWB indicators.

*9.1. Subtheme (1): Positive Affect.* The subtheme of positive affect (PA) is a key flourishing wellbeing indicator, linked to positive emotion [8]. The subtheme of positive affect was created to highlight the participants' shared experiences of hedonic feelings. Regardless of the type of play, each participant's experience alluded to a lifting or brightening of the mood, in other words, enhanced positive affect. Here, Emily and India share their experiences of having banter on the ward and how it positively impacts their mood.

“It (banter) kind of makes you feel a bit happier and a bit more like excited for the day because you know if you start the day with a bit of a giggle then you're thinking it might be a good day today and you're a bit more enthusiastic maybe” (Emily, p9).

“When you're like starting to like calm down and you've got documentation to do just to like to keep the mood up and stuff, I think people start having a bit of banter” (India, P2).

Along with the lifting of mood, each participant experienced feelings of relaxation or a psychological switch-off as a consequence of the play. There was a sense from the shared experiences that the time engaged in play (often, but not limited to break times), afforded the participants the chance to be less serious and “chill out.” Emily, for example, talks about clearing her mind for a little while before going back “out there.” Here, Emily emotionally distances herself from the pressures of the ward environment and engages in play (TikTok).

“To just almost distract yourself from what's happening on the ward, to clear your mind a little bit before you go back out there (TikTok)” (Emily, p11).

Greta shared her experience of staff talking about the ward events during break time which she did not like, as it “stressed her out.” To avoid this, Greta chose to go on her phone instead.

“Er, go to the staff room, sit there and try and chill for a bit (giggle). Scroll through TikTok, share videos and stuff, it's something fun to do” (Greta, p3).

This notion of psychological detachment is defined in the literature as “the absence of something” [60], in other words, not thinking about the job during nonwork time. Engaging in low-effort activities such as social media and play has been shown to reduce stress [61].

Similarly, Leon talks about play as providing a “release.” Here, he talks about a playful encounter with a patient who presented with a “weird” condition which he knew nothing about, and how funny the interaction became between him and the patient who was equally uninformed. He goes on to say that

“I guess when something like that happens (play) it just puts you in good spirits for the rest of the day, erm yeah, it's a nice little release” (Leon, p3).

Penny shared her experience of working in the acute medical unit (AMU) and how play reduced stress as follows:

“Play definitely relieves stress, it makes wherever you are a little less, erm, you can associate it with fun as well as like tragedy almost. Like I generally don't like AMU, actually no, once I got to know everyone, I liked it but early on it was SO STRESSFUL! There's so much going on, so many



patients, like people were being brought in all the time and I'd just find it really stressful, but then with the egg and spoon race, and they did have other things, it made it less like intimidating almost cause then you're like oh, all be really busy but then I'll have a laugh and like the people that will be fun" (Penny, p8).

Penny makes the connection that the practice of play made her experience of placement more inclusive, and that fun was permissible despite the business of the unit.

India describes the energizing effects of play and seems to suggest that play influences her mood which subsequently enhances the mood of others.

"I can't explain it, but yeah, it (play) sort of energizes you, gives you a bit more motivation cos once you start off with a good day, things start rolling onwards if you know what I mean, cos if you are in a good mood, you put others in a good mood almost" (India, p8).

Each of the participants' experiences was suggestive of the notion that positive affect was induced by a playful encounter.

*9.2. Subtheme (2): Relationships and Connectedness.* This subtheme was developed to draw the reader's attention to the participants' practice of play, in relation to promoting positive relationships, building connections, and providing the participants with a sense of clinical-cultural belonging.

Emily shared a particular experience of play which occurred during her clinical placement as follows:

"Sometimes you can be on a ward, and you'll be the only student, so it can feel a little bit isolating, but that was like a really good, sort of, technique to make everybody feel that they were still part of the community. Er, they had like a little kitchen, and they had board games and stuff that you could play on your break which was fun, because you know, you get to know other people as well as the people on the ward" (Emily p3).

Here, she acknowledges the isolation that she experienced as a student nurse and how play enhanced her sense of belonging. Penny too, recognises that being a medical trainee can be difficult and states that

"I'm like a trainee, sometimes it's kind of hard like establish yourself in the team or have people know who you are" (Penny p1).

She goes on to talk about her experience of taking part in a ward egg and spoon race as follows:

"It just, it like brings a bit like, it is just fun and it brings a bit more kind of LIGHTNESS to it, but I think it's good in terms of like, erm, I feel like people remember you when you go back in a few weeks, they'll "oh this is the one who run the race or whatever, so it's good in terms of like

team building kind of stuff as well I think, erm cos you've got more things to like associate people with other than work" (Penny, p3).

Here, she confirms that the playful experience promoted positive relationships with the clinical team. Likewise, Stuart shared his experience of belonging as a result of play. Here, he comments on being "part of the crowd" and how the practice of play (frequently expressed as silliness and fun) contributed to this.

"for example, when it's playing with staff, you've usually been comfortable for quite a while. It feels like you're almost like in on the crowd. It's like oh, I've been accepted and it's quite respectful, it's like letting you into their little like, not clique, but like their thing. Erm, so I think like yeah, it feels like you belong" (Stuart, p8)

This subtheme supports the notion that play promotes a sense of connectedness between the student and others.

*9.3. Subtheme (3): Meaning.* There was a sense from the shared experiences of the participants that their engagement in patient play brought about a better experience of care, which in turn was personally fulfilling and/or satisfying. This subtheme was particularly emotive and goes beyond the ludic activities discussed previously, in the sense that the participants' experiences were rooted in a desire to improve the patient experience. Each participant acknowledged the patients' vulnerability owing to them being in the hospital and how the practice of play engendered the PWB indicator of meaning.

Stuart recalls an account when he was undertaking a paediatric radiotherapy placement as follows:

"Just because the child is going through radiotherapy treatment doesn't mean it's the end of the world, I mean a lot of the time, it's like a curative radical treatment, so I usually err on the side of caution, like I'll see how friendly they want to be and how like, erm, I'm not going to throw my one-liners out, but if they are, and if its comfortable, then I will" (Stuart, p5).

Here, Stuart deliberates about if and when to initiate play, his decisions are guided by a desire to improve the patients' experience of care. This feeling was echoed by Diane, in her experience of banter-play with a patient which revealed key eudaimonic wellbeing indicators.

"Because they're coming for radiotherapy, some of them can be coming for like 6 weeks, so erm that's what I like (banter). I like that, getting that rapport with the patient, it makes me feel good you know, like it's all worthwhile" (Diane, p2).

There was a sense from the shared experiences of the participants that their engagement in patient play brought about a better experience of care, which in turn was

personally fulfilling and/or satisfying. This subtheme was particularly emotive and goes beyond “playing for playing’s sake” in the sense that the participants’ experiences were rooted in a desire to improve the patient’s experience.

*9.4. Subtheme (4): Positive Clinical Learning Environment.* The subtheme “Positive Clinical Learning Environment” relates to flourishing in the context of the practice setting, be it a hospital ward or a department. Arguably related to the PERMA [8] wellbeing indicators of positive emotion and meaning, this distinct subtheme was created to provide the reader with an insight into the learning dimension of the clinical context. Here, the participants’ shared experiences revealed how the practice of play fostered a climate where they were able to ask questions in the pursuit of knowledge, relevant to their clinical practice.

Emily, for example, shared her experience of play in contributing to feeling comfortable and more inclined to ask questions as follows:

“It (play) makes you feel more comfortable, because er, obviously you’re meant to learn on placement and you’re meant to ask questions, so I think if you can have like a bit of fun with the person who you’re with that day, I think it makes you feel more comfortable to ask them questions” (Emily, p9).

Nancy’s experience of play in relation to the learning environment was particularly powerful.

“I could relax and be yourself a little bit more, and for me that was big because I felt I learned more, because I felt like I could relax in the learning environment and take more on board. I could ask questions and get stuff wrong; I wasn’t worried about looking stupid” (Nancy, p4).

Both participants’ acknowledge that play cultivated a comfortable space within which they were able to ask questions. Likewise, Diane and India shared their experience of play and how it gave them confidence and added value to their role.

“If I have a day when we’ve had good energy, you know we’ve had good banter, a good laugh these moments have given me the confidence to do this (the job) I just need to get paid” (Diane, p8).

“It sort of just gives you that bit of confidence, a bit more energy to just to take with you, it makes you feel valued as well” (India, p3).

Each of the participants’ experiences of play seemed to capture hedonic feelings related to confidence, which in turn promoted an environment conducive to learning.

## 10. Discussion

The PWB and mental health of the undergraduate student population are of growing concern. Play and PWB are

emerging topics of empirical endeavour, with a paucity of studies located in the healthcare organisational context. The study findings, however, confirm that undergraduate students engaged in a diverse range of playful activities in the clinical environment, and these would seem to contribute to enhance PWB. The findings related to informal play, particularly the playful practice of banter, were not insignificant. There are limited empirical studies within the existing literature related to banter in the workplace and seemingly dichotomous opinions about whether banter is harmful or promotes the bonding and socialisation of employees [56, 62]. Importantly, there are no empirical studies to date which have examined playful banter amongst undergraduate students in the healthcare context. This may support the notion that certain types of play often go unnoticed by organisations or are hidden or rebellious [63].

The finding related to food as a conduit for social interaction was not particularly significant but provides a unique insight into the favourable conditions which engender play. Previous studies have explored the role of food and eating in the promotion of human connections and play [64, 65]. A study by Dunbar [65], for example, found that social dining, as well as creating and strengthening relationships, yielded significant health benefits. In contrast, but in keeping with the theme of food, the seminal “banana time” study by Roy [66] demonstrated how food as a prop served as a conduit for the initiation of humour and good-natured banter amongst employees.

The characterisation of patient play was a surprising finding from the study. Patient play was not always driven by the participants and was often coproduced with the patient, suggesting perhaps a “play driver” which has previously gone unnoticed in the literature. Arguably, this is due to the fact that play in the healthcare context is an emerging area of empirical inquiry and thus primary data sources are limited. That withstanding, there are a handful of studies, mainly from oncology literature, which have examined patient-initiated humour play [67], however, studies are limited to testing the fidelity of humour as a therapeutic approach to care. Thus, the findings from this study extend to a more sophisticated characterisation of play; the enactment of patient play. Manifested as purposeful, sometimes mischievous, and highly interactive, this aspect of play offers direction for future empirical endeavour.

The notion of play through social media was an experience shared by many of the participants. Sometimes this was asynchronous, other times synchronous, and perhaps reflects a generational mode of playing and socialising. This has not been observed previously and extends the discussion to possible tools through which to achieve psychological wellbeing benefits. There is certainly emerging evidence to suggest that millennials and iGENs engage with social media platforms to play and virtually connect, often to escape offline from psychological troubles [68]. However, there is a difference of opinion in the literature about the benefits of social media usage and how it may adversely affect mental health and wellbeing [69]. That withstanding, it is worthy of the note that the majority of the students in the study would be considered to be iGENs [70], and therefore had the

population been from another age range, this type of play may not have been found. Nonetheless, the expression of social media play adds to a sparse body of knowledge around play in the healthcare organisational context.

Likewise, the expression of covert play was a key finding, confirming that the students played in the clinical environment, particularly when the ward or department was less demanding, thus adding another facet to the typology of play. This notion of “play for the sake of play” has been observed in the literature [71], but studies are mostly bound by child-play studies, with no extant empirical studies which have examined play amongst adults in the healthcare organisational context. This finding therefore sheds new light on a misunderstood or perhaps dismissed aspect of play.

The study found a number of facilitating and limiting factors of play, offering some unique empirical insights. Previous organisational play research has mostly focused on the outcomes of play, with little consideration given to the factors (both individual and organisational) which facilitate or limit playful practice [27]. The finding that “big personalities” were the main facilitators of play in the healthcare context had not been explored before and therefore cannot be supported by existing empirical studies. That notwithstanding, the participants recognised that certain personalities were more likely to engage in or drive playful practice and this would seem to align with the notion of personality traits as a key theoretical perspective. Personality traits have been observed in the literature and are characterised as those individuals who are spontaneous, gregarious, and joyful [72]. There remains a dearth of literature related to drivers of play, with the exception of “manufactured play” located within the realms of serious play and employer-driven play. The findings therefore contribute to a sparse body of knowledge.

Finally, the notion of PWB in the context of play within the healthcare environment has not been empirically examined previously and this study brings new insights, by revealing that the enactment of play would seem to bring about enhanced psychological wellbeing (PWB) in a range of established (PERMA) wellbeing indicators [8]. A key finding of the study was that a positive effect was induced by the practice of play. Captured as a mood-lifting, emotional relief, energizing, or soothing, this finding is aligned to Seligman’s [8] PWB indicator of positive emotion. Indeed, positive emotion has been delineated to characterise the features of positive affect into hedonic and eudaimonic wellbeing: hedonic relating to enjoyment and feeling happy, and eudaimonic relating to purposeful engagement [73]. The influence of positive affect on wellbeing and health has been much discussed in the literature over recent decades [74]. It is worthy of note that positive affect (mood) is associated with long-term health and wellbeing [75]. Therefore, the finding that the students’ experienced enhanced mood during play was a significant finding.

The study also found that the enactment of play, irrespective of type, would seem to provide an opportunity to detach from the pressures of work and facilitate a psychological reprieve or uplift of mood. This adds new insights

into the PWB indicator of positive emotion and is supported by the key theoretical perspectives of psychological detachment. Psychological detachment is defined in the literature as “the absence of something” [60], in other words, not thinking about the job during the nonwork time. Engaging in low-effort activities such as play has been shown to facilitate psychological detachment and reduce stress [61]. Arguably, the findings also accord with the cathartic theoretical perspective of play [76] and relate to playful practice which releases tension and stress, providing psychological relief.

In addition, positive relationships are widely accepted pillars of PWB and are a feature of Seligman’s [8] PERMA wellbeing model. It is accepted within extant literature that social connectedness promotes both physical and mental health [77, 78], and indeed the World Health Organization [79] recognises positive relationships as an important social determinant of health. The findings from this study confirm that the enactment of play promoted positive relationships and facilitated interpersonal connections. This finding is supported by studies from the wider literature [80–83] which found that the enactment of play, albeit predominantly employer-driven, facilitated person-to-person bonds and team spirit and human connections. The unique insights related specifically to the healthcare organisational setting amongst undergraduate students have not been observed before.

The PWB indicator of meaning was not found in the literature and is possibly due to the organisational context where the studies were undertaken. As mentioned previously, the healthcare organisational environment is distinct from other business sectors, and arguably healthcare personnel seek caring roles which offer a sense of personal worth. This study found that the practice of play afforded the students a sense of personal satisfaction, which in turn optimised the patient experience, engendering purpose and self-worth.

Finally, the study found that the enactment of play created an environment where the students were more comfortable and therefore more receptive to learning. This was an interesting finding, and the topic of play and learning in the clinical environment has been observed in the literature in terms of the sociocultural theory of human learning [84]. Sociocultural theory and situated learning emphasise how social and culturally organised activities influence cognition and learning [85]. Indeed, Kolb and Kolb [86] 47 states that “Play exemplifies one of the highest forms of experiential learning.” However, it is rarely used with adults, and this perhaps gives rise to the notion that play amongst adults is yet to be fully explored as both an agent for enhanced learning as well as the promotion of PWB. This finding may also be redolent of the “hidden curriculum,” whereby the students learn the rules of play as they go along. The hidden curriculum was first observed in the literature in the 1980s [87] and defined more recently by Raso et al. [88] 989 as a “learning dimension made up of culturally acquired, unintended lessons.” However, this was beyond the scope of the study and offers a new direction for future empirical inquiry.

## 11. Implications and Recommendations for Practice

It is perhaps time to redefine play in the healthcare and educational organisational context and consider playful practice as an extension of enhanced communication skills, thereby legitimising play as a skill befitting of a healthcare professional. Furthermore, the reappraisal of the spectrum of understanding about what being a healthcare professional entails will pave the way for a new thinking. By creating a shared understanding of what is meant by play, clinicians and educators can offer students and healthcare workers permission to play, outlining the context within which it is permissible. As discussed above, by redefining play as an enhanced communication skill, there is the potential for it to be taught within the higher education institution (HEI) setting. It is recommended that the vehicle to do this would be through simulated teaching. Simulation has gained popularity over the recent years and is now a commonplace within medical, nursing, and AHP curricula [89]. However, the concept of simulation, which is to create a safe and real-life learning environment for students [90], has tended to focus on the acquisition of technical clinical skills, evidenced by the increased use of augmented and virtual reality devices [91]. Thus, by introducing the “softer clinical skills” to the simulation curriculum, there is an opportunity for play to be incorporated into advanced communication skills training.

There is a critical mass of students currently in higher education, most of whom would be considered to be “iGENs.” Uniquely different, this cohort of students is more playful and has never known life without a smartphone [92]. This is significant, and as discussed in the findings, the students used their digital devices to play, socialise, and connect, albeit asynchronously at times. It is therefore recommended that both the healthcare and education providers should consider how smartphones and digital devices can be used to promote the wellbeing of students.

The findings from this research indicate that students often played during off-clinical time, such as breaks. Therefore, it is recommended that dedicated spaces be created for students and healthcare workers to eat, socialise, and play. Furthermore, it is recommended that such spaces are resourced with play props such as board games, thereby facilitating detachment from the demands of the clinical environment. This recommendation can also be extended to education providers in terms of providing and resourcing spaces for students to play and emotionally detach from the pressures of university life. Moreover, the characterisations of play and the factors which facilitate and/or limit play in the healthcare setting are incomplete and this warrants further empirical investigation. Finally, the findings from this study offer a new direction for play as a facilitator of PWB for undergraduate healthcare students.

Play and PWB are emerging topics of empirical endeavour, and this study has confirmed that an empirical relationship exists between the two in a distinct population. The findings that play enhanced the PERMA [8] wellbeing

indicators of positive emotion, relationships, and meaning lend weight to future empirical inquiry into other elements of wellbeing such as engagement and accomplishment. Furthermore, the notion of the patient as a “play driver” has been overlooked in the literature and this is worthy of future empirical exploration. Moreover, the characterisations of play and the factors which facilitate and/or limit play in the healthcare setting are incomplete and this too warrants empirical investigation.

## 12. Limitations

First, the study was limited by the fact that the participants’ lived experiences of play occurred during the time of a global health pandemic; however, the insights gleaned shed light on previously unexplored topics of inquiry. Secondly, it could be argued that the sample size was a limitation of the study, however, since the study was qualitative in design, a sample of nine was methodologically congruent with IPA studies and arguably produced a depth and richness of data which could not have been amassed by using a larger sample size. Thirdly, the data were collected via one-to-one semi-structured interviews. It is recognised within the extant literature that there may be an imbalance of power between the interviewer and the interviewee [93, 94]. In other words, the interviewer knows what they are going to ask, and the interviewee does not. Careful preparation and adherence to the ethical principles of prevention of harm mitigated this.

## 13. Conclusion

The study confirmed that undergraduate medicine and healthcare students engaged in a diverse range of playful activities in the clinical environment, resulting in the creation of a typology of play, capturing the expression of play amongst a previously untested population, and therefore adding an original contribution to the existing play literature. By providing unique insights into the factors which facilitate and limit the enactment of play in the healthcare organisational context, the study findings add to a dearth of existing literature and provide some gleanings into future empirical endeavour. Crucially, the study found that the enactment of play induced key hedonic and eudaimonic PWB benefits, ranging from positive affect to improved relationships, a sense of meaning, and a positive learning environment, offering original empirical insights. These findings have not been observed previously and shine a conceptual light on a previously unknown phenomenon.

## Data Availability

The narrative data used to support the findings of this study are included within the article.

## Conflicts of Interest

The author declares that there are no conflicts of interest.

## Acknowledgments

The author would like to thank the supervisors: Professor Tony Wall (Liverpool John Moores University) and Dr Gina Holmes (University of Chester) for their support. This work was undertaken as part of a Professional Doctorate (DProf) and was partly funded by the University of Liverpool.

## References

- [1] S. De Simone, "Conceptualizing wellbeing in the workplace," *International Journal Of Business And Social Science*, vol. 5, no. 12, pp. 118–122, 2014.
- [2] M. A. Buffet, R. L. Gervais, M. Liddle, and L. Eekelaert, *Wellbeing At Work: Creating a Positive Work Environment. Literature Review. European Agency for Health at Work*, EU-OSHA. Publications Office for European Union, Luxembourg, UK, 2013.
- [3] S. Bevan, *The Business Case for Employees Health and Well-being*. A report prepared for Investors of People UK, London, UK, 2010.
- [4] J. Henry, "Positive psychology and the development of wellbeing," in *Wellbeing*, J. Haworth and G. Hart, Eds., pp. 24–40, Palgrave Macmillan, London, UK, 2007.
- [5] Á. Kun, P. Balogh, and K. Gerákné Kranz, "Development of the work-related well-being questionnaire based on Seligman's PERMA model," *Periodica Polytechnica, Social and Management Sciences*, vol. 25, no. 1, pp. 56–63, 2017.
- [6] H. Winefield, T. Gill, A. Taylor, and R. Pilkington, "Psychological well-being and psychological distress: is it necessary to measure both?" *Psychology of Well-Being: Theory, Research and Practice*, vol. 2, no. 1, p. 3, 2012.
- [7] E. L. Deci and R. M. Ryan, "Hedonia, eudaimonia, and well-being: an introduction," *Journal of Happiness Studies*, vol. 9, no. 1, pp. 1–11, 2008.
- [8] M. E. P. Seligman, *Flourish, a New Understanding of Happiness and Wellbeing – and How to Achieve Them*, Nicholas Brealey Publishing, London, UK, 2011.
- [9] F. A. Huppert, "Psychological well-being: evidence regarding its causes and consequences," *Applied Psychology: Health and Well-Being*, vol. 1, no. 2, pp. 137–164, 2009.
- [10] G. Kinman, K. Teoh, and A. Harriss, "Supporting the well-being of healthcare workers during and after COVID-19," *Occupational Medicine*, vol. 70, no. 5, pp. 294–296, 2020.
- [11] L. E. Søvdal, J. A. Naslund, A. A. Kousoulis et al., "Prioritizing the mental health and well-being of health workers: an urgent global public health priority," *Frontiers in Public Health*, vol. 9, no. 679397, pp. 1–12, 2021.
- [12] E. C. Janse van Vuuren, K. Bodenstien, and M. Nell, "Stressors and coping strategies among physiotherapy students: towards an integrated support structure," *Health SA, Journal of Interdisciplinary Health Sciences*, vol. 23, 2018.
- [13] S. Prymachuk and D. Richards, "Predicting stress in pre-registration nursing students," *British Journal of Health Psychology*, vol. 12, no. 1, pp. 125–144, 2007.
- [14] T. Cannon, "Promoting Student wellbeing," 2017, <https://www.redbrickresearch.com/2017/11/30/promoting-student-wellbeing/>.
- [15] Office for National Statistics, *Coronavirus and the Impact on Students in Higher Education in England: September to December 2020*, ONS, London, UK, 2020.
- [16] J. Maben and J. Bridges, "Covid-19 supporting nurses psychological and mental health," *Journal of Clinical Nursing*, vol. 29, pp. 2742–2750, 2020.
- [17] M. D. Abram and W. Jacobowitz, "Resilience and burnout in healthcare students and inpatient psychiatric nurses; a between-groups study of two populations," *Archives of Psychiatric Nursing*, vol. 35, no. 1, pp. 1–8, 2021.
- [18] P. Cairns, G. Aitken, L. Pope et al., "Interventions for the well-being of healthcare workers during a pandemic or other crisis: scoping review," *BMJ Open*, vol. 11, no. 8, p. e047498, 2021.
- [19] I. M. Verenikina and H. M. Hasan, "The importance of play in organisation," *Faculty of Health and Behavioural Sciences Papers (Archive)*, pp. 120–134, 2010.
- [20] M. Dodgson, "Innovation and play," *Innovation*, vol. 19, no. 1, pp. 86–90, 2016.
- [21] C. A. Petelczyc, A. Capezio, L. Wang, S. L. D. Restubog, and K. Aquino, "Play at work: an integrative review and agenda for future research," *Journal of Management*, vol. 44, no. 1, pp. 161–190, 2018.
- [22] M. Van Vleet and B. C. Feeny, "Young at heart: a perspective for advancing research on play in adulthood," *Perspectives on Psychological Science*, vol. 10, no. 5, pp. 639–645, 2015.
- [23] B. Sørensen and S. Spoelstra, "Play at work: continuation, intervention and usurpation," *Organization*, vol. 19, no. 1, pp. 81–97, 2011.
- [24] A. Everett, "Benefits and challenges of fun in the workplace," *Library Leadership and Management*, vol. 25, no. 1, pp. 1–10, 2005.
- [25] K. Karl, J. V. Peluchette, and L. Harland, "Attitudes toward workplace fun: a three sector comparison," *Journal of Leadership and Organizational Studies*, vol. 12, no. 2, pp. 1–17, 2005.
- [26] D. H. Berg, "The power of a playful spirit at work," *Journal for Quality and Participation*, vol. 24, no. 2, pp. 57–62, 2001.
- [27] N. A. Celestine and G. Yeo, "Having some fun with it: a theoretical review and typology of activity-based play-at-work," *Journal of Organizational Behavior*, vol. 42, no. 2, pp. 252–268, 2021.
- [28] V. Tökkäri, "Organizational play: within and beyond managing," *Qualitative Research in Organizations and Management: An International Journal*, vol. 10, no. 2, pp. 86–104, 2014.
- [29] M. Spraggon and V. Bodolica, "A practice-based framework for understanding (informal) play as practice phenomena in organizations," *Journal of Management and Organization*, vol. 24, no. 6, pp. 846–869, 2018.
- [30] S. E. West, E. Hoff, and I. Carlsson, "Play and productivity. Enhancing the creative climate at workplace meetings with play cues," *American Journal of Play*, vol. 9, no. 1, pp. 71–86, 2016.
- [31] W. M. Chernomas and C. Shapiro, "Stress, depression and anxiety among undergraduate nursing students," *International Journal of Nursing Education Scholarship*, vol. 10, no. 1, pp. 255–266, 2013.
- [32] A. Mitchell, "The perceived psychological stressors and coping behaviours in university students, on a pre-registration programme," *The Journal of Mental Health Training, Education and Practice*, vol. 15, no. 4, pp. 249–259, 2020.
- [33] General Medical Council, *Supporting Medical Students with Mental Health Conditions*, GMC, Manchester, MA, USA, 2015.
- [34] T. Brooke, M. Brown, R. Orr, and S. Gough, "Stress and burnout: exploring postgraduate physiotherapy students' experiences and coping strategies," *BMC Medical Education*, vol. 20, no. 433, pp. 1–11, 2020.

- [35] G. Eslick and V. Raj, "Occupational stress amongst radiographers: does working in private or public practice make a difference?" *Radiography*, vol. 8, no. 1, pp. 47–53, 2002.
- [36] P. Ibikunle, E. Amah, and U. Useh, "Prevalence and pattern of burnout syndrome among healthcare professionals in a university teaching hospital," *Tropical Journal of Medical Research*, vol. 19, no. 2, p. 144, 2016.
- [37] L. J. Labrague, D. M. McEnroe-Petitte, D. Gloe, L. Thomas, I. V. Papathanasiou, and K. Tsaras, "A literature review on stress and coping strategies in nursing students," *Journal of Mental Health*, vol. 26, no. 5, pp. 471–480, 2017.
- [38] F. Rafati, E. Nouhi, S. Sabzevari, and N. Dehghan-Nayeri, "Coping strategies of nursing students for dealing with stress in clinical setting: a qualitative study," *Electronic Physician*, vol. 9, no. 12, p. 6120, 2017.
- [39] P. Bhattacharyya, K. L. Jena, and S. Pradhan, "Resilience as a mediator between workplace humour and well-being at work: an enquiry on the healthcare professionals," *Journal of Health Management*, vol. 21, no. 1, pp. 160–176, 2019.
- [40] J. Christopher, "An introduction to black humour as a coping mechanism for student paramedics," *Journal of Paramedic Practice*, vol. 7, no. 12, pp. 610–617, 2015.
- [41] R. Danzinger, "He who laughs last laughs best. Humor as a consolation for the dying and their relatives," 2018, <http://www.rainerdanzinger.at>.
- [42] K. Watson, "Gallows humor in medicine," *Hastings Center Report*, vol. 41, no. 5, pp. 37–45, 2011.
- [43] H. Nunstedt, M. Eriksson, A. Obeid, L. Hillström, A. Truong, and S. Pennbrant, "Salutary factors and hospital work environments: a qualitative descriptive study of nurses in Sweden," *Biomed Central Nursing*, vol. 19, no. 1, pp. 2–11, 2020.
- [44] C. M. Healy and M. F. McKay, "Nursing Stress: the effects of coping strategies and job satisfaction in a sample of Australian Nurses," *Journal of Advanced Nursing*, vol. 31, no. 3, pp. 681–688, 2000.
- [45] J. Collicutt and A. Gray, "A Merry Heart Doeth good like Medicine: humour, religion and wellbeing," *Mental Health, Religion and Culture*, vol. 15, no. 8, pp. 759–778, 2012.
- [46] F. Ghaffari, N. Dehghan-Nayeri, and M. Shali, "Nurses' experiences of humour in clinical settings," *Medical Journal of the Islamic Republic of Iran*, vol. 29, no. 182, pp. 1–11, 2015.
- [47] J. A. Smith, P. Flowers, and M. Larkin, *Interpretative Phenomenological Analysis*, SAGE, London, UK, 2nd edition, 2022.
- [48] J. A. Smith and I. Nizza, *Essentials of Interpretative Phenomenological Analysis*, APA, Washington, DC, USA, 2022.
- [49] S. Charlick, J. Pincombe, L. McKellar, and A. Fickler, "Making sense of participants experiences: interpretive phenomenological analysis in midwifery research," *International Journal of Doctoral Studies*, vol. 11, pp. 205–216, 2016.
- [50] M. Larkin and A. R. Thompson, "Interpretive phenomenological analysis in mental health and psychotherapy research," in *Qualitative Research Methods in Mental Health and Psychotherapy: A Guide for Students and Practitioners*, D. Harper and A. R. Thompson, Eds., pp. 99–116, Wiley-Blackwell, Oxford, UK, 2011.
- [51] K. Roberts, A. Dowell, and J.-B. Nie, "Attempting rigour and replicability in thematic analysis of qualitative research data: a case study of code book development," *BMC Research Methodology*, vol. 19, no. 66, pp. 2–8, 2019.
- [52] L. Yardley, "Dilemmas in qualitative health research," *Psychology and Health*, vol. 15, no. 2, pp. 215–228, 2000.
- [53] B. Berend, D. Voght, and M. Brohm-Badry, "Positive emotions and flourishing are resilience factors for stress symptoms," *International Journal of Stress Promotion and Wellbeing*, vol. 4, no. 5, pp. 1–11, 2020.
- [54] Oxford University Press, "Oxford english dictionary," 2022, <https://www.oed.com>.
- [55] J. Hay, "Jocular abuse patterns in mixed-group interaction," *Wellington Working Papers in Linguistics*, vol. 6, pp. 26–55, 1994.
- [56] B. A. Plester and J. Sayers, "Taking the piss: functions of banter in the IT industry," *International Journal of Humor Research*, vol. 20, no. 2, pp. 157–187, 2007.
- [57] C. Chapple, "TikTok crosses 2 billion downloads after best quarter for any app ever," 2020, <https://sensortower.com/blog/tiktok-downloads-2-billion>.
- [58] K. Salen and E. Zimmerman, *Rules of Play: Game Design Fundamentals*, Massachusetts Institute of Technology Press, Cambridge, UK, 2004.
- [59] J. Huizinga, "Homo ludens. A study of the play-element in our culture," *Kettering: Anglicopress.com*, vol. 12, 1949/2016.
- [60] S. Sonnentag and C. Fritz, "Recovery from job stress: the stressor detachment model as an integrative framework," *Journal of Organizational Behaviour*, vol. 36, no. 1, pp. 72–103, 2015.
- [61] J. M. Ragsdale, T. A. Beehr, S. Grebner, and K. Han, "An integrated model of weekday stress and weekend recovery of students," *International Journal of Stress Management*, vol. 18, no. 2, pp. 145–180, 2011.
- [62] M. Dynel, "No aggression, only teasing: the pragmatics of teasing and banter," *Lodz Papers in Pragmatics*, vol. 4, no. 2, pp. 241–261, 2008.
- [63] T. S. Henricks, "Play as self-realisation: toward a general theory of play," *American Journal of Play*, vol. 6, no. 2, pp. 190–213, 2014.
- [64] W. Batat, P. C. Peter, E. M. Moscato et al., "The experiential pleasure of food: a savouring journey to food well-being," *Journal of Business Research*, vol. 100, pp. 392–399, 2019.
- [65] R. I. M. Dunbar, "Breaking bread: the function of social eating," *Adaptive Human Behaviour and Physiology*, vol. 3, no. 3, pp. 198–211, 2017.
- [66] D. F. Roy, "Banana time: job satisfaction and informal interaction," *Human Organization*, vol. 18, no. 4, pp. 158–168, 1959.
- [67] K. N. Adamle, R. Ludwick, R. Zeller, and J. Winchell, "Oncology nurses response to patient-initiated humour," *Cancer Nursing*, vol. 31, no. 6, pp. 1–9, 2008.
- [68] P. G. Yadav and J. Rai, "The generation Z and their social media usage: a review and a research outline," *Global Journal of Enterprise Information System*, vol. 9, no. 2, pp. 110–116, 2017.
- [69] V. Chotpitayasunondh and K. Douglas, "The effects of 'Phubbing' on social interaction," *Journal of Applied Social Psychology*, vol. 48, no. 6, pp. 304–316, 2018.
- [70] T. Wiedmer, "Generations do differ: best practices in leading traditionalists, boomers and generations X, Y and Z," *The Delta Kappa Gamma Bulletin*, vol. 82, no. 1, pp. 51–58, 2015.
- [71] S. Besio, D. Bulgarelli, and V. Syancheva-Popkostadinova, *Play Development in Children with Disabilities*, De Gruyter Open, Poland, UK, 2022.
- [72] L. A. Barnett, "The nature of playfulness in young adults," *Personality and Individual Differences*, vol. 43, no. 4, pp. 949–958, 2007.
- [73] B. L. Fredrickson, "The role of positive emotions in positive psychology: the broaden-and-build theory of positive emotions," *American Psychologist*, vol. 56, no. 3, pp. 218–226, 2001.

- [74] M. Brondino, D. Raccanello, R. Burro, and M. Pasini, "Positive affect over time and emotion regulation strategies: exploring trajectories with latent growth mixture model analysis," *Frontiers in Psychology*, vol. 11, p. 1575, 2020.
- [75] A. Steptoe, K. O'Donnell, M. Marmot, and J. Wardle, "Positive affect, psychological well-being, and good sleep," *Journal Of Psychosomatic Research*, vol. 64, no. 4, pp. 409–415, 2008.
- [76] M. J. Ellis, *Why People Play*, Prentice Hall, New Jersey, NY, USA, 1973.
- [77] L. H. Duke, "The importance of social ties in mental health," *Mental Health and Social Inclusion*, vol. 21, no. 5, pp. 264–270, 2017.
- [78] D. Umberson and J. Karas Montez, "Social relationships and health: a flashpoint for health policy," *Journal of Health and Social Behavior*, vol. 51, no. 5, pp. 54–66, 2010.
- [79] World Health Organisation, *Review of Social Determinants and the Health Divide in the WHO European Region: Final Report*, WHO, Geneva, Switzerland, 2013.
- [80] C. Sakr, R. Zotti, and N. Khaddage-Soboh, "The impact of implementing fun activities on employee's engagement," *International Journal of Organizational Analysis*, vol. 27, no. 5, pp. 1317–1335, 2019.
- [81] H. Han, W. Kim, and C. Jeong, "Workplace fun for better team performance: focus on frontline hotel employees," *International Journal of Contemporary Hospitality Management*, vol. 28, no. 7, pp. 1391–1416, 2016.
- [82] K. Georganta and A. Montgomery, "Exploring fun as a job resource: the enhancing and protecting role of a key modern workplace factor," *International Journal Of Applied Positive Psychology*, vol. 1, no. 1-3, pp. 107–131, 2016.
- [83] N. Wijewardena, R. Samaratunge, C. Härtel, and A. Kirk-Brown, "Why did the emu cross the road? Exploring employees' perception and expectations of humor in the Australian workplace," *Australian Journal of Management*, vol. 41, no. 3, pp. 563–584, 2016.
- [84] L. S. Vygotsky, *Mind in Society: The Development of Higher Psychological Processes*, Harvard University Press, Massachusetts, MA, USA, 1978.
- [85] R. W. Black and S. M. Reich, "Affordances and constraints of scaffolded learning in a virtual world for young children," *International Journal of Game-Based Learning*, vol. 1, no. 2, pp. 52–64, 2011.
- [86] A. Y. Kolb and D. A. Kolb, "Learning to Play, Playing to Learn: case study of ludic learning space," *Journal of Organizational Change Management*, vol. 23, no. 1, pp. 26–50, 2010.
- [87] J. Bell, "The hidden curriculum," *Nursing Mirror*, vol. 158, no. 12, pp. 20–21, 1984.
- [88] A. Raso, A. Marchetti, D. D'Angelo et al., "The hidden curriculum in nursing education: a scoping study," *Medical Education*, vol. 53, no. 10, pp. 989–1002, 2019.
- [89] I. Motola, L. A. Devine, H. S. Chung, J. E. Sullivan, and S. B. Issenberg, "Simulation in healthcare education: a best evidence practical guide. AMEE Guide No. 82," *Medical Teacher*, vol. 35, no. 10, pp. e1511–e1530, 2013.
- [90] D. A. Cook, R. Hatala, R. Brydges et al., "Technology-enhanced simulation for health professions education: a systematic review and meta-analysis," *Journal of the American Medical Association*, vol. 306, no. 9, pp. 978–988, 2011.
- [91] T. Gunn, L. Jones, P. Bridge, P. Rowntree, and L. Nissen, "The use of virtual reality simulation to improve technical skill in the undergraduate medical imagining student," *Interactive Learning Environments*, vol. 26, no. 5, pp. 613–620, 2018.
- [92] M. Ozkan and B. Solmaz, "Mobile addiction of generation Z and its effects on their social lifes: (an application among university students in the 18-23 age group)," *Social and Behavioral Sciences*, vol. 205, pp. 92–98, 2015.
- [93] M. Råheim, L. H. Magnussen, R. J. T. Sekse, Å. Lunde, T. Jacobsen, and A. Blystad, "Researcher–researched relationship in qualitative research: shifts in positions and researcher vulnerability," *International Journal of Qualitative Studies on Health and Well-Being*, vol. 11, no. 1, 2016.
- [94] S. Brinkmann and S. Kvale, "Confronting the ethics of qualitative research," *Journal of Constructivist Psychology*, vol. 18, no. 2, pp. 157–181, 2006.

## Research Article

# Impact of Childhood Cancer on Family Functioning and Family Quality of Life in the Western Region of Saudi Arabia

Tagwa Yousif Omer 

College of Nursing, King Saud Bin Abdulaziz University for Health Sciences, P.O. Box 9515, Jeddah 21423, Saudi Arabia

Correspondence should be addressed to Tagwa Yousif Omer; omert@ksau-hs.edu.sa

Received 13 July 2023; Revised 13 August 2023; Accepted 27 December 2023; Published 19 January 2024

Academic Editor: Xu Tian

Copyright © 2024 Tagwa Yousif Omer. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Background.** Childhood cancer affects families and friends and causes lifestyle changes that become overwhelming for them. Childhood cancer may cause decreased physical, emotional, and social health-related quality of life (QOL). Childhood cancer may cause strain on the financial status of the family and shape their coping strategy to the disease. The extent of the impact of childhood cancer on families is associated with several demographic characteristics of the family such as diagnosis, phase of treatment, and parent's educational level, employment, and marital status of the parents. **Objectives.** The objective of this study was to explore the impact of childhood cancer on family functioning and family quality of life (QOL) in the Western Region of Saudi Arabia. **Methods.** This study was a quantitative, randomized, cross-sectional study. 187 participants were randomly selected from the population of parents whose children have cancer and treated at Princess Noorah Oncology Center in King Abdulaziz Medical City, Jeddah. A survey was used to collect data for this study. Healthcare and social systems may have to consider the impact of childhood cancer in the care plans of the patients. **Result.** Leukemia represents the highest disease prevalence followed by brain tumor. The highest score of the impact on the family survey was familial social concerns domains followed by financial burden with mean scores of 3.59 (98.8%) and 3.56 (98.0%), respectively. Then, mastery domain mean score is 3.43 (85.8%) and finally personal strain with mean score of 3.21 (98.0%). The QOL of the family results indicated that the highest was physical/material well-being with mean score of 3.84 (76.8%) and family interaction with mean score of 3.82 (76.4%), followed by emotional well-being with mean score of 3.54 (70.8%) and parenting with mean score of 3.53 (70.6%). Significant differences were found between the overall scales of QOL and the scale of impact on the family and some demographic characteristics of children and their parents. **Conclusions.** Childhood cancer has a substantial effect on family functioning and the family's QOL. In addition, both were significantly associated with some demographic characteristics of the child and his parents.

## 1. Background

The incidence of childhood cancer tends to increase worldwide. More than 400,000 children aged birth to 19 years are diagnosed with cancer each year around the world [1]. Diagnosis of cancer for any family member affects the whole family and friends and causes lifestyle changes that become stressful and overwhelming for the family. Childhood cancer has a high association with the domains of impact on family [2]. Families that have a child diagnosed with cancer may decrease physical, emotional, and social health-related QOL of these families [2, 3].

Several studies have proven that childhood cancer is associated with family functioning domains such as cohesion, expressiveness/communication, conflict, adaptability, and support [4–8].

A study conducted in Turkey identified that children with cancer and their families experienced major psychosocial and financial problems [9]. Furthermore, 62% of families need financial support and 49% of families borrowed money or have loans. In addition, 69% of families experienced difficulties to care for the other healthy siblings and 43% of mothers experienced severe psychological problem during and after treatment [9].



In Sweden, a qualitative study revealed two main themes. The first is unfamiliarity and frightening situation during treatment, which related to initial reactions to uncontrollable situation, adjustment to situations, and focus on supporting the sick child during treatment. The second was emotional struggles after the end of curative treatment which related to transitioning back to life as it was before the diagnosis, emotional scars, uncontrollable fears and worries about the cancer disease, and new perspective of life after the treatment [10].

A phenomenological study of parents' experience for caring of children with cancer identified challenges that parents face, including anxiety of the death of their children, inability to respond to the questions of their children, inability to have an appropriate behavior while confronting the children angry, suffering of treatment side effects in their children, the pressure of economic, social, and psychological burden on family, lack of time, the impact of spiritual support, and the influence on the relationship between parents [11]. Another study done in Jordan found out that there were significantly higher stress scores in parents who have child with cancer than those with no seriously ill child [12].

Caregivers of children with cancer presented with burden, mostly isolation, disappointment, and compromised aspects of QOL. The scores of QOL of caregivers of children with cancer were lower than the control group in the eight domains: physical functioning, role physical, bodily pain, general health perception, vitality, social role functioning, emotional role functioning, and mental health [13]. A systematic review on impact of a cancer diagnosis on family caregivers revealed that there was negative impact on caregivers who experienced high distress, diminished quality of life (QOL) and reported moderate to high fear of cancer recurrence [14].

There was no enough literature on the experience of families who have children with cancer in Saudi Arabia. The aim of this study is to explore the impact of childhood cancer on family functioning and family QOL in the Western Region of Saudi Arabia.

### 1.1. Objectives of the Study

- (1) To assess the impact of childhood cancer on family functioning
- (2) To determine the QOL of family whose children have cancer
- (3) To identify the correlation of the demographic characteristics of patients and their parents and impact of childhood cancer and family QOL

## 2. Methodology

**2.1. Study Design.** This study was a quantitative, randomized, cross-sectional study. Participants were randomly selected from the population of parents whose children have cancer and treated at Princess Noorah Oncology Center in King Abdulaziz Medical City, Jeddah.

**2.2. Setting.** This study was conducted at an oncology center in a 750-bed tertiary care hospital in the city of Jeddah, Saudi Arabia. The oncology center is one of the biggest centers for cancer treatment in the Western Region of Saudi Arabia, and it includes adult and pediatric oncology services and has outpatient, inpatient, and radiation therapy services. The pediatric hematology oncology inpatient service currently has 35 beds including pediatric BMT.

**2.3. Sampling Procedures.** A simple random sample was used in this study, and all randomly selected children under 18 years of age were invited with their parents to participate. According to the statistics in PNOC, there are 370 oncology pediatric patients followed up and treated in the center. The sample size was calculated using the modified Cochran formula for sample size calculation in smaller populations [15]. The estimated sample size will be  $n = 187$  participants. The 370 were put in one list. Randomization was carried out by randomly selecting each other patient from the list through the computer. The selected participants were contacted by the researcher and invited to fill the questionnaire after signing an informed consent.

Several strategies were used by the researcher to avoid sampling bias. First is the definition of the target population and the sampling frame before data collection. Second is the randomization of sample. Third is the follow-up of non-respondents to ensure their voluntary participation.

**2.4. Data Collection.** Three tools were administered to the parents of a child less than 18 years old:

- (1) Sociodemographic and health-related survey that is developed by the researcher after literature review [12, 13, 16]: This part includes patients and parents demographic characteristics.
- (2) Impact on the family scale which is a 24-item questionnaire answered on a 4-point Likert-type scale (strongly agree–strongly disagree): This scale was designed to measure the family impact of chronic medical illnesses in four dimensions [17, 18].
  - (a) Financial burden (changes in the financial status of the family): It consists of 4 items.
  - (b) Familial/social impact concerns level of disruption of interaction within the family unit and outside the family: It consists of 9 items.
  - (c) Personal strain-psychological burden experienced by caregiver of the child with cancer: It consists of 6 items.
  - (d) Mastery-coping strategy employed by the family: It consists of 5 items.

Cronbach alpha reliabilities are 0.72, 0.86, 0.81, and 0.60, respectively, and the total score reliability is 0.88.

- (3) The family QOL (FQOL) scale [19]: This scale is a 21-item inventory rate on a 5-point Likert-type scale (very satisfied–very dissatisfied). Its purpose is to

measure the family QOL under four subscale domains:

- (a) Family interaction (6 items)
- (b) Parenting (6 items)
- (c) Emotional well-being (4 items)
- (d) Physical/material well-being (5 items)

Cronbach reliabilities for FQOL subscales are 0.75, 0.71, 0.76, and 0.77, respectively. The total score reliability is 0.88.

**2.5. Data Analysis.** Data collected were stored, prepared, and coded in Excel sheets prior to the data analysis process. SPSS software, version 25, was used to analyse the data. Categorical variables were presented in frequencies and percentages, and quantitative continuous variables were described by measures of descriptive statistics including mean scores and SD. Significant differences in study scales were examined using the *t* test for independent groups and ANOVA. Correlation analysis was conducted to examine the strength and direction of the relations between scales components. A *p* value of less than or equal 0.05 was considered significant.

**2.6. Ethical Considerations.** Approval for this study was obtained from the Research Committee of the College of Nursing as well as from Human Subject Board (IRB) of King Abdulla International Medical Research Center. All participants were invited to participate by invitation letter and received informed consent form with the questionnaire ensuring that the participation is voluntary. The invitation letter contained the purpose of the study, research procedure, and a guarantee to maintain anonymity and confidentiality of the information. No names of participants and medical ID numbers were disclosed in any questionnaire. Collected data were kept in a secured safe. Only the PI has an access to it.

### 3. Results

**3.1. Demographic Characteristics of Participants.** A total number of 187 families of a child with cancer were included in this study. Data regarding the demographic characteristics were collected for both children with cancer and their parents. Demographic data of the children with cancer revealed that the mean age is 6.3 years with 3.6 SD. Approximately half of the patients were males and half were females. Leukemia represents the highest disease prevalence (41.6%), followed by brain tumor (25.3%) of all types of childhood cancer. The mean of time since diagnosis was 2.0 years (SD 1.4), and most of the children with cancer are still on treatment, 154 (86.4%). Table 1 shows the demographic data of the children with cancer.

The mean ages of mothers and fathers are 35.5 and 39.7 years, respectively. About 90% of parents were married at time of data collection, while 10% of them were divorced. All parents were educated with at least primary level, and 43.3% of fathers had a university degree, compared to 27.0% of mothers. Most fathers were employed, while the majority

TABLE 1: Child demographic characteristics (*N* = 187).

	Mean	S.D.	Minimum	Maximum
Age	6.3 years	3.6	9 months	14 years
Gender	Male	88 (49.4%)		
	Female	90 (50.6%)		
Diagnosis	Leukemia	74 (41.6%)		
	Brain tumor	45 (25.3%)		
	Lymphomas	36 (20.2%)		
	Others	23 (12.9%)		
Time since diagnosis	2.0 years	1.4	6 months	8 years
Treatment phase	Completed	6 (3.4%)		
	Ongoing	154 (86.4%)		
	Not specified	16 (9%)		
Number of siblings	3.87	2.27	0	11

of mothers were unemployed. The mean number of children in family was 3.9 children. Characteristics of parents are presented in Table 2.

**3.2. Impact of Childhood Cancer on the Family.** The mean and percentage of agreement for each domain of the impact on the family survey were calculated and arranged from high to low mean scores. Mean scores of familial social concerns (level of disruption of interaction within the family and outside the family) and financial burden (changes in the financial status of the family) domains are 3.59 (89.8%) and 3.56 (89.0%), respectively. Then, mean score of mastery (coping strategy employed by the family) is 3.43 (85.8%), and finally, mean score of personal strain (psychological burden experienced by care giver of the child with cancer) is 3.21 (80.3%). Results are presented in Table 3.

Items within each domain of the impact of childhood cancer on the family survey were analysed. The mean and SD for each item were calculated and then arranged from high to low mean scores. For the financial burden domain, the highest item's mean is "additional income is needed to cover medical expenses" with mean score of 3.64 and the least item's mean in this domain is "time is lost from work because of hospital appointments" with mean score of 3.54. For the familial social concern domain, the highest item's mean was "because of the illness, we are not able to travel out of the city" with mean score of 3.70 and the lowest item's mean is "people in the neighborhood treat us specially because of my child's illness" with mean score of 3.48. The third domain is personal strain. The highest rated item's mean was "nobody understands the burden I carry" with mean score of 3.52 and the least scored item is "travelling to the hospital is a strain

TABLE 2: Parents' demographic characteristics.

	Mother	Father
<i>Age</i>		
Mean	35.5	39.7
S.D.	7.58	8.23
Minimum	20	22
Maximum	50	58
<i>Marital status</i>		
Married	161 (90.4%)	159 (89.3%)
Divorced	17 (9.6%)	19 (10.7%)
<i>Educational level</i>		
General education	122 (68.5%)	89 (50%)
University	48 (27%)	77 (43.3%)
Postgraduate	8 (4.5%)	12 (12%)
<i>Employment status</i>		
Employed	137 (77%)	7 (3.9)
Unemployed	39 (21.9%)	159 (89.4%)
Retired	2 (1.1%)	12 (6.8%)

TABLE 3: Impact on family domains.

Domains	Mean	%
Familial social concerns	3.59	89.8
Financial burden	3.56	89.0
Mastery	3.43	85.8
Personal strain	3.21	80.3
Total of impact on family domains	3.45	

on me" with mean score of 2.40 where participants agreed that this is not a challenge for them. The final domain is mastery, the highest item was "learning to manage my child's illness has made me feel better about myself" with mean score of 3.55 and the lowest item was "my relatives have been understanding and helpful with my child" with mean score of 3.32. Table 4 shows the results of the impact on family domains.

**3.3. Quality of Life of the Families with Childhood Cancer.** Family QOL domains' mean and percentage of agreement were also calculated and arranged. The five domains were ranked from the highest mean to the lowest mean. The highest mean was physical/material well-being with mean score of 3.84 (76.8%) and then family interaction with mean score of 3.82 (76.4%), followed by emotional well-being with mean score of 3.54 (70.8%), and the lowest is parenting with mean score of 3.53 (70.6%). Data are presented in Table 5.

Each of the quality of life domain items was ranked from the highest to lowest mean. In the physical/material well-being domain, the highest item's mean score is "my family feels safe at home, work, school, and in our neighborhood" with mean score of 4.29 (SD 0.93) and the lowest item is "my family gets dental care when needed" with mean score of 3.23 (SD 0.91). In the family interaction domain, the highest item's mean score is "my family is able to handle life's ups and downs" with mean score of 3.90 (SD 0.89) and the lowest item's mean score is "my family enjoys spending time together" with mean score of 3.73 (SD 0.73). The highest item's mean score for emotional well-being domain is "my family

members have some time to pursue their own interests" with mean score of 3.61 (SD 0.95) and the lowest item's mean score is "my family members have friends or others who provide support" with mean score of 3.47 (SD 0.92). Regarding the parenting domain, the highest mean for the item is "family members help the children learn to be independent" with mean score of 3.66 (SD 0.80) and the lowest mean for the item is "adults in my family have time to take care of the individual needs of every child" with mean score of 3.45 (SD 0.10). Data on family QOL subscale are presented in Table 6.

**3.4. Correlation between Overall Scores of Impact of Family Domains and Demographic Characteristics of Participants.** The strength of the relationship between demographic characteristics and overall score of impacts on family domains was tested using correlation coefficient. Results revealed significant correlations between the impact of family domains and most of the demographic characteristics except financial burden with both mother and father employment status ( $p > 0.05$ ) and personal strain with fathers' age, employment status, and number of siblings ( $p > 0.05$ ). The mastery domain is also significantly correlated with all demographic characteristics except time since diagnosis, fathers' age, and fathers' employment status ( $p > 0.05$ ). Data are presented in Table 7.

**3.5. Correlation between Overall Scores of Quality of Life Domains and the Demographic Characteristics of Participants.** The strength of the relationship between demographic characteristics and the families' quality of life domains was tested using correlation coefficient. Results indicated that some of the quality of life domains were significantly correlated with some demographic characteristics of the participants. Family interaction did not correlate with any of the demographic characteristics. Parenting domain has a positive correlation with all demographics except age and gender ( $p < 0.05$ ). Emotional well-being domain has a positive correlation with the phase of treatment and the mothers' employment status ( $p < 0.05$ ). Physical/material well-being domain had a positive correlation with age and phase of treatment ( $p < 0.05$ ). Data on correlation are presented in Table 8.

The correlation matrix of quality of life domains and impact in family domains is shown in Table 9. The results reported significant correlations between some of the domains of scales. Family interaction was significantly and positively correlated with financial burden only, while parenting was significantly and negatively correlated with all domains of impact on family factors except the financial burden domain. Physical well-being domain was significantly and positively correlated with all four domains of impact on life domains.

## 4. Discussion

This study aims to explore the impact of childhood cancer on family functioning and family QOL. Childhood cancer is one of the very stressful and life-changing experiences for

TABLE 4: Impact on the family subscales.

Statements	Mean	SD
<i>Financial burden (changes in the financial status of the family)</i>		
Additional income is needed in order to cover medical expenses	3.64	0.57
The illness is causing financial problems for the family	3.60	0.63
I am cutting down the hours I work to care for my child	3.55	0.75
Time is lost from work because of hospital appointments	3.54	0.68
<i>Familial/social concerns (level of disruption of interaction within the family and outside the family)</i>		
Because of the illness, we are not able to travel out of the city	3.70	0.56
We have little desire to go out because of my child's illness	3.66	0.61
Sometimes we have to change plans about going out at the last minute because of my child's state	3.66	0.60
Sometimes I wonder whether my child should be treated "specially" or the same as normal child	3.63	0.74
Don't have much time left over for other family members after caring for my child	3.61	0.72
I think about not having more children because of the illness	3.56	0.71
Our family gives up things because of my child's illness	3.54	0.76
We see family and friends less because of the illness	3.51	0.72
People in the neighborhood treat us specially because of my child's illness	3.48	0.73
<i>Personal strain (psychological burden experienced by care giver of the child with cancer)</i>		
Nobody understands the burden I carry	3.52	0.64
Sometimes I feel like we live on a roller coaster: in crisis when my child is acutely ill, OK when things are stable	3.49	0.66
I live from day to day and don't plan for the future	3.40	0.74
Fatigue is a problem for me because of my child's illness	3.31	0.74
It is hard to find a reliable person to take care of my child	3.19	0.76
Travelling to the hospital is a strain on me	2.40	0.65
<i>Mastery (coping strategy employed by the family)</i>		
Learning to manage my child's illness has made me feel better about myself	3.55	0.82
Because of what we have shared we are a closer family	3.48	0.90
We try to treat my child as if he/she were a normal child	3.43	0.89
My partner and I discuss my child's problem together	3.38	0.91
My relatives have been understanding and helpful with my child	3.32	0.86

TABLE 5: Family quality of life total.

Quality of life domains	Mean	%
Physical/material well-being	3.84	76.8
Family interaction	3.82	76.4
Emotional well-being	3.54	70.8
Parenting	3.53	70.6
Overall quality of life	3.68	

TABLE 6: Family quality of life subscale.

Quality of life domains	Mean	S.D.
<i>Physical/material well-being</i>		
My family feels safe at home, work, school, and in our neighborhood	4.29	0.93
My family gets medical care when needed	4.20	0.87
My family has a way to take care of our expenses	3.82	0.75
My family members have transportation to get to the places they need to be	3.68	0.85
My family gets dental care when needed	3.23	0.91
<i>Family interaction</i>		
My family is able to handle life's ups and downs	3.90	0.89
My family members talk openly with each other	3.87	0.79
My family solves problems together	3.86	0.81
My family members show that they love and care for each other	3.84	0.82
My family members support each other to accomplish goals	3.76	0.89
My family enjoys spending time together	3.73	0.73

TABLE 6: Continued.

Quality of life domains	Mean	S.D.
<i>Emotional well-being</i>		
My family members have some time to pursue their own interests	3.61	0.95
My family has outside help available to us to take care of special needs of all family members	3.56	1.0
My family has the support we need to relieve stress	3.54	0.86
My family members have friends or others who provide support	3.47	0.92
<i>Parenting</i>		
Family members help the children learn to be independent	3.66	0.80
Family members teach the children how to get along with others	3.54	0.96
Family members help the children with schoolwork and activities	3.53	0.92
Adults in my family teach the children to make good decisions	3.51	1.01
Adults in my family know other people in the children's lives (friends, teachers)	3.51	1.01
Adults in my family have time to take care of the individual needs of every child	3.45	1.01

TABLE 7: Overall scores of impact on family domains correlation with demographic characteristics.

Variable	Mean $\pm$ SD	P value
<i>Gender</i>		
Male	3.5 $\pm$ 0.52	0.480
Female	3.4 $\pm$ 0.54	
<i>Diagnosis</i>		
Leukemia	3.6 $\pm$ 0.45	0.022
Brain tumor	3.4 $\pm$ 0.57	
Lymphomas	3.3 $\pm$ 0.49	
Others	3.4 $\pm$ 0.64	
<i>Phase of treatment</i>		
Completed	2.8 $\pm$ 0.13	0.001
Ongoing	3.5 $\pm$ 0.52	
Not specified	3.3 $\pm$ 0.56	
<i>Marital status (mother)</i>		
Married	3.5 $\pm$ 0.49	0.001
Divorced	2.7 $\pm$ 0.24	
Widow	—	
<i>Educational level (mother)</i>		
Uneducated	—	0.001
High school or less	3.6 $\pm$ 0.47	
University degree	3.3 $\pm$ 0.57	
Postgraduate	2.8 $\pm$ 0.38	
<i>Employment status (mother)</i>		
Unemployed	3.5 $\pm$ 0.47	0.003
Employed	3.2 $\pm$ 0.66	
Retired	2.8 $\pm$ 0.01	
<i>Marital status (father)</i>		
Married	3.5 $\pm$ 0.51	0.001
Divorced	2.9 $\pm$ 0.41	
Widow	—	
<i>Educational level (father)</i>		
Uneducated	—	0.001
High school or less	3.7 $\pm$ 0.32	
University degree	3.2 $\pm$ 0.61	
Postgraduate	3.1 $\pm$ 0.49	
<i>Employment status (father)</i>		
Unemployed	3.1 $\pm$ 0.56	0.001
Employed	3.5 $\pm$ 0.51	
Retired	2.8 $\pm$ 0.34	

TABLE 8: Overall scores of family's quality of life domains correlation with demographic characteristics.

Variable	Mean $\pm$ SD	P value
<i>Gender</i>		
Male	3.7 $\pm$ 0.58	0.248
Female	3.6 $\pm$ 0.53	
<i>Diagnosis</i>		
Leukemia	3.8 $\pm$ 0.58	0.076
Brain tumor	3.6 $\pm$ 0.59	
Lymphomas	3.7 $\pm$ 0.48	
Others	3.4 $\pm$ 0.48	
<i>Phase of treatment</i>		
Completed	4.0 $\pm$ 0.29	0.001
Ongoing	3.6 $\pm$ 0.55	
Not specified	4.1 $\pm$ 0.50	
<i>Marital status (mother)</i>		
Married	3.7 $\pm$ 0.52	0.390
Divorced	3.8 $\pm$ 0.84	
Widow	—	
<i>Educational level (mother)</i>		
Uneducated	—	0.462
High school or less	3.6 $\pm$ 0.53	
University degree	3.7 $\pm$ 0.59	
Postgraduate	3.9 $\pm$ 0.69	
<i>Employment status (mother)</i>		
Unemployed	3.6 $\pm$ 0.56	0.184
Employed	3.8 $\pm$ 0.55	
Retired	3.9 $\pm$ 0.01	
<i>Marital status (father)</i>		
Married	3.7 $\pm$ 0.52	0.596
Divorced	3.8 $\pm$ 0.79	
Widow	—	
<i>Educational level (father)</i>		
Uneducated	—	0.147
High school or less	3.7 $\pm$ 0.56	
University degree	3.6 $\pm$ 0.54	
Postgraduate	4.0 $\pm$ 0.56	
<i>Employment status (father)</i>		
Unemployed	4.2 $\pm$ 0.33	0.021
Employed	3.7 $\pm$ 0.56	
Retired	3.8 $\pm$ 0.29	

TABLE 9: Correlation between the overall scores of family's quality of life domains and the impact on family domains.

	Family interaction	Parenting	Emotional well-being	Physical/material well-being
Financial burden	0.162*	-0.147	0.082	0.286*
Familial/social concerns	0.120	-0.214*	-0.069	0.286*
Personal strain	0.97	-0.224*	-0.084	0.304*
Mastery	0.043	-0.208*	-0.091	0.324*

families and has a profound impact on the family. 187 families of children with cancer were included in this study. Results indicated that leukemia and brain tumor represent the highest prevalence of cancer types. This result is congruent with the result of International Agency for Research on Cancer [20] and locally with the report from the Ministry of Health (MOH) which indicated there are 12 types of children's cancers in Saudi Arabia and leukemia and brain cancers are among the most common childhood cancers followed by all other types of childhood cancer [21]. The

mean age of children involved is supported by [3], who found that the clinical features of childhood cancers are mostly manifested and diagnosed at an early age (within five years) of the children.

Families of children with cancer are faced with several issues that affect the family's QOL. Despite this, research studies on the impact of childhood cancer on the families have not been conducted in Saudi Arabia. Results of this study indicated that the four domains of the QOL scale, physical well-being, family interaction, emotional well-

being, and parenting, were affected. Other studies had found the same results; parents who have children with cancer reported physical symptoms, such as fatigue (68%) and difficulty sleeping (51%), and parents reported somatic disorders more often if children were ill for more than 3 years [22]. Similar results found that nearly 50% of their study population experienced low QOL, and this low score was significantly associated with level of parent's education, lower socioeconomic status, prolonged treatment duration, and increasing cost of treatment [23, 24]. A comparison study performed to assess the QOL of parents of children diagnosed with cancer compared to parents of children with minor ailments found that the QOL of parents of childhood cancer was significantly impaired in psychological domain, social relationship domain, and environmental domain [13].

The diagnosis of childhood cancer can pose substantial challenges to families. The result of this study revealed that childhood cancer has a great impact on the family. A study done in Bangladesh, using the same survey that was used in this study, revealed that all four domains were affected with different sequences, this study result [3]. The Bangladesh family achieved the highest score in mastery as their top-performing aspect, with a rating of 3.63. Following closely were financial burden, reflecting changes in financial status (3.33); personal strain, indicating the psychological burden experienced (3.28); and lastly, social impact, representing the level of disruption of interaction within and outside the family (3.2) [3]. Another study revealed that parents of children who suffered from cancer struggled with various problems [22]. The first is the financial problem, where almost half of the participating families (44%) believed that their financial situation worsened with the child's cancer to a moderate extent and 39% believed it worsened to a large extent. The second is the psychological problem, where 20% of parents were devastated, 75% of the parent felt anxiety, and 35% of the parents received support from their own families. The third is the family relationship problem, where families indicated that the child's disease did not change the relationship within the family (41%); it strengthened family ties in 32% and the family relations deteriorated in 27% [22].

The results of this study identified significant differences between the overall scales of QOL and the scale of impact on the family and some demographic characteristics of children and their parents. Family functioning and the appraisal of the cancer diagnosis proved to be related to cancer-related emotions of patients and their family members and QOL after the diagnosis of the cancer [6]. A study concluded that the occurrence of problems for parents of children suffering from cancer had a significant negative correlation with both the age of the parents and the level of education [22]. In addition, parents with financial problems more often had their children ill for a long time [22]. These results are congruent with the study conducted in Bangladesh, where the difference in impact on family score was significantly correlated to the father's occupation, type and duration of cancer, and treatment cost [3]. Family relationships were also impaired when diagnosed with leukemia/lymphoma compared to solid tumor [16].

A study conducted in South India revealed that QOL was significantly associated with the age of the child, parents'

level of education, and the type of parents' work [24]. The results also found that difference in QOL values was significant for lower socioeconomic class, longer duration of treatment (1–3 years of treatment), and high cost of treatment amounting [24]. On the other hand, gender, educational qualification, socioeconomic status, and place of residence had shown no significant difference on QOL [13].

## 5. Conclusions

Families of children with childhood cancer face substantial challenges. The present study explored the QOL of the family and the impact of childhood cancer on these families. Results indicated that the domains of QOL are associated with the domains of impact on family. In addition, the domains of both tools were significantly associated with some demographic characteristics of the child and his parents. Based on these findings, increased psychosocial and emotional resources for patients and their families have to be facilitated and improved.

**5.1. Implications.** The result of this study revealed that the quality of life of the family of children diagnosed with cancer is affected in all aspects, psychologically, emotionally, socially, and financially. This implies that interventions should start as early as possible. Through the assessment, the patients and their families provide enough data for care plan. A multidisciplinary care plan to be formulated included all concerned healthcare professionals. Also, the results of these studies imply further research studies in this topic to investigate barriers and facilitators for family care.

## Data Availability

The quantitative SPS data used to support the findings of this study are available from the corresponding author upon request.

## Conflicts of Interest

The author declares that there are no conflicts of interest.

## References

- [1] World Health Organization, *CureAll Framework: WHO Global Initiative for Childhood Cancer: Increasing Access, Advancing Quality, Saving Lives*, World Health Organization, Geneva, Switzerland, 2021.
- [2] L. Aung, S. M. Saw, M. Y. Chan, T. Khaing, T. C. Quah, and H. M. Verkooijen, "The hidden impact of childhood cancer on the family: a multi-institutional study from Singapore," *Annals Academy of Medicine Singapore*, vol. 41, no. 4, pp. 170–175, 2012.
- [3] M. Z. Islam, S. Farjana, and S. S. Efa, "Impact of childhood cancer on the family: evidence from Bangladesh," *Heliyon*, vol. 7, no. 2, Article ID e06256, 2021.
- [4] M. Van Schoors, A. L. De Paepe, K. Norga et al., "Family members dealing with childhood cancer: a study on the role of family functioning and cancer appraisal," *Frontiers in Psychology*, vol. 10, p. 1405, 2019.

- [5] M. Van Schoors, L. Caes, N. B. Knoble, L. Goubert, L. L. Verhofstadt, and M. A. Alderfer, "Systematic review: associations between family functioning and child adjustment after pediatric cancer diagnosis: a meta-analysis," *Journal of Pediatric Psychology*, vol. 42, no. 1, pp. 6–18, 2017.
- [6] M. Van Schoors, A. L. De Paepe, K. Norga et al., "Family members dealing with childhood cancer: a study on the role of family functioning and cancer appraisal," *Frontiers in Psychology*, vol. 10, p. 1405, 2019.
- [7] K. Marina and C. J. A. Luiz, "Psychosocial impact of pediatric cancer on parents: a literature Review1," *Psychosocial Aspects of Cancer*, vol. 22, no. 51, pp. 119–129, 2012.
- [8] H. Tamaki, "The impact of childhood cancer on family functioning: a review," *Graduate Student Journal of Psychology*, vol. 15, pp. 18–30, 2015.
- [9] C. Bozkurt, Z. Ugurlu, H. G. Tanyildiz et al., "Economic and psychosocial problems experienced by pediatric with cancer patients and their families during the treatment and follow-up process," *Turk Pediatri Ars*, vol. 54, no. 1, pp. 35–39, 2019.
- [10] T. Carlsson, L. Kukkola, L. Ljungman, E. Hoven, and L. von Essen, "Psychological distress in parents of children treated for cancer: an explorative study," *An explorative study*, vol. 14, no. 6, Article ID e0218860, 2019.
- [11] M. Ahmadi Pishkuhi, M. Ahmadi, H. Shoraka, and M. Chegeni, "Parents' experience of caring children with cancer: a qualitative study with phenomenological approach," *Journal of Comprehensive Pediatrics*, vol. 9, no. 4, Article ID e65545, 2018.
- [12] R. Masa'Deh, J. Collier, and C. Hall, "Parental stress when caring for a child with cancer in Jordan: a cross-sectional survey," *Health and Quality of Life Outcomes*, vol. 10, no. 1, p. 88, 2012.
- [13] B. S. Rashi, S. Pal, S. S. Ganguly, and S. K. Biswas, "Parenting children with cancer: impact assessment on quality of life using World Health Organization quality of life tool-BREF tool," *International Journal of Medical Science and Public Health*, vol. 7, no. 3, pp. 225–228, 2018.
- [14] M. C. Neves, A. Bártolo, J. B. Prins, C. M. D. Sales, and S. Monteiro, "Taking care of an adolescent and young adult cancer survivor: a systematic review of the impact of cancer on family caregivers," *International Journal of Environmental Research and Public Health*, vol. 20, no. 8, p. 5488, 2023.
- [15] J. E. K. W. J. Barlett and C. C. Higgins, "Organizational research: determining appropriate sample size in survey research," *Information Technology, Learning, and Performance Journal*, vol. 19, pp. 43–50, 2001.
- [16] C. Erker, K. Yan, L. Zhang, K. Bingen, K. E. Flynn, and J. Panepinto, "Impact of pediatric cancer on family relationships," *Cancer Medicine*, vol. 7, no. 5, pp. 1680–1688, 2018.
- [17] R. E. Stein and D. J. Jessop, "The impact on family scale revisited: further psychometric data," *Journal of Developmental and Behavioral Pediatrics*, vol. 24, no. 1, pp. 9–16, 2003.
- [18] R. E. Stein and C. K. Riessman, "The development of an impact-on-family scale: preliminary findings," *Medical Care*, vol. 18, no. 4, pp. 465–472, 1980.
- [19] L. Hoffman, J. Marquis, D. Poston, J. A. Summers, and A. Turnbull, "Assessing family outcomes: psychometric evaluation of the beach center family quality of life scale," *Journal of Marriage and Family*, vol. 68, no. 4, pp. 1069–1083, 2006.
- [20] E. Steliarova-Foucher, M. Colombet, L. A. G. Ries et al., "International incidence of childhood cancer, 2001–10: a population-based registry study," *The Lancet Oncology*, vol. 18, no. 6, pp. 719–731, 2017.
- [21] MOH, "Cancer country profile," 2020, <https://www.who.int/publications/m/item/cancer-sau-2020>.
- [22] A. Lewandowska, "Influence of a child's cancer on the functioning of their family," *Children*, vol. 8, no. 7, p. 592, 2021.
- [23] L. Aung, S. M. Saw, M. Y. Chan, T. Khaing, T. C. Quah, and H. M. Verkooijen, "The hidden impact of childhood cancer on the family: a multi-institutional study from Singapore," *Annals Academy of Medicine Singapore*, vol. 41, no. 4, pp. 170–175, 2012.
- [24] A. J. Innamimuthu, D. Jayaraman, G. Jeyarani et al., "Quality of life of parents of children with cancer—single-center, prospective cross-sectional study from South India," *Indian Journal of Medical and Paediatric Oncology*, vol. 43, no. 03, pp. 255–261, 2022.