ISSN 1907-6673

Jurnal Keperawatan Soedirman

Jurnal terbitan berkala dikelola oleh Jurusan Keperawatan Fakultas Ilmu-Ilmu Kesehatan Universitas Jenderal Soedirman

Jurnal Keperawatan Soedirman

A scientific journal

Jurnal Keperawatan Soedirman	Volume 19	Nomor 1	Halaman 1-58	Purwokerto Maret 2024	ISSN 1907-6673

Editorial Policies

Focus and Scope

Jurnal Keperawatan Soedirman is a Nursing journal cover all nursing area including basic research in nursing, management nursing, emergency and critical nursing, medical surgical nursing, mental health nursing, maternity nursing, pediatric nursing, gerontological nursing, community nursing, family nursing education nursing, complementary and alternative medicine (CAM) in nursing.

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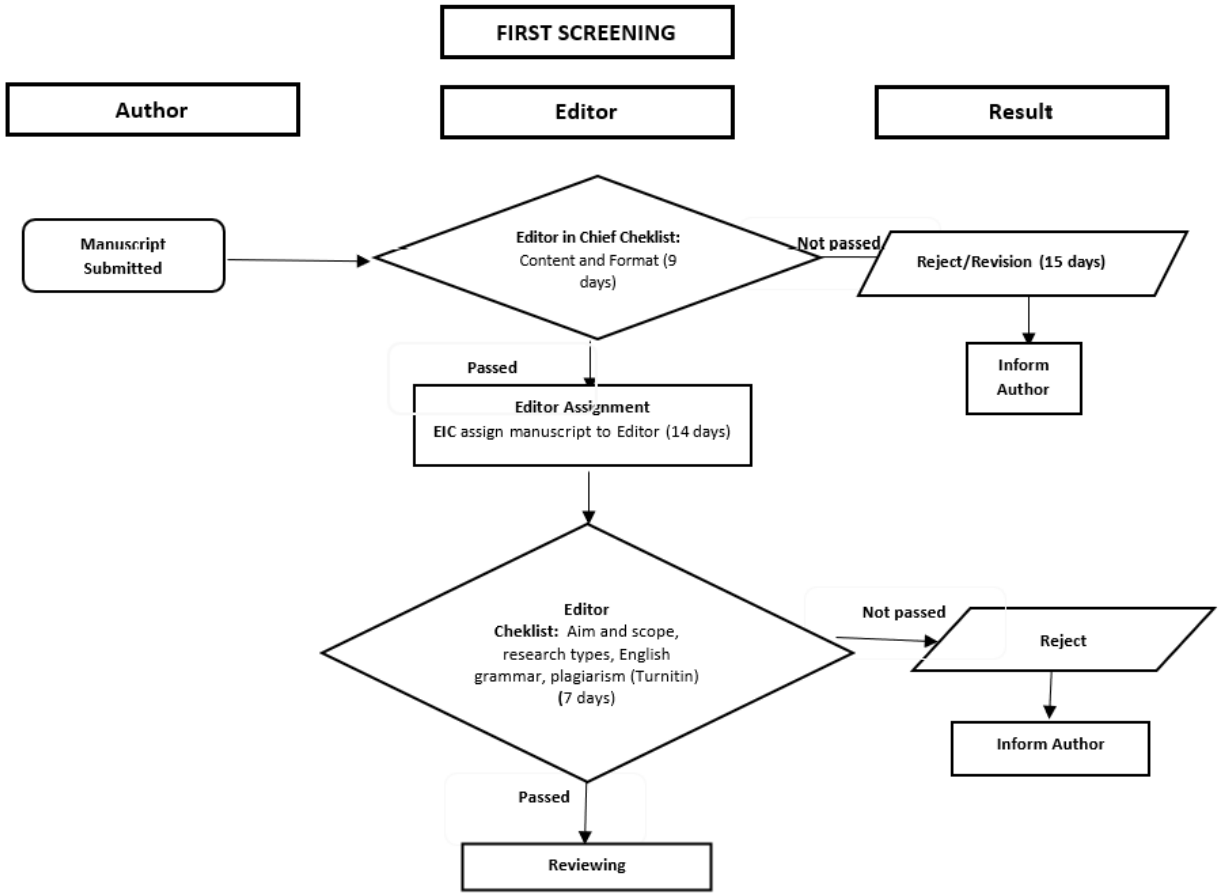
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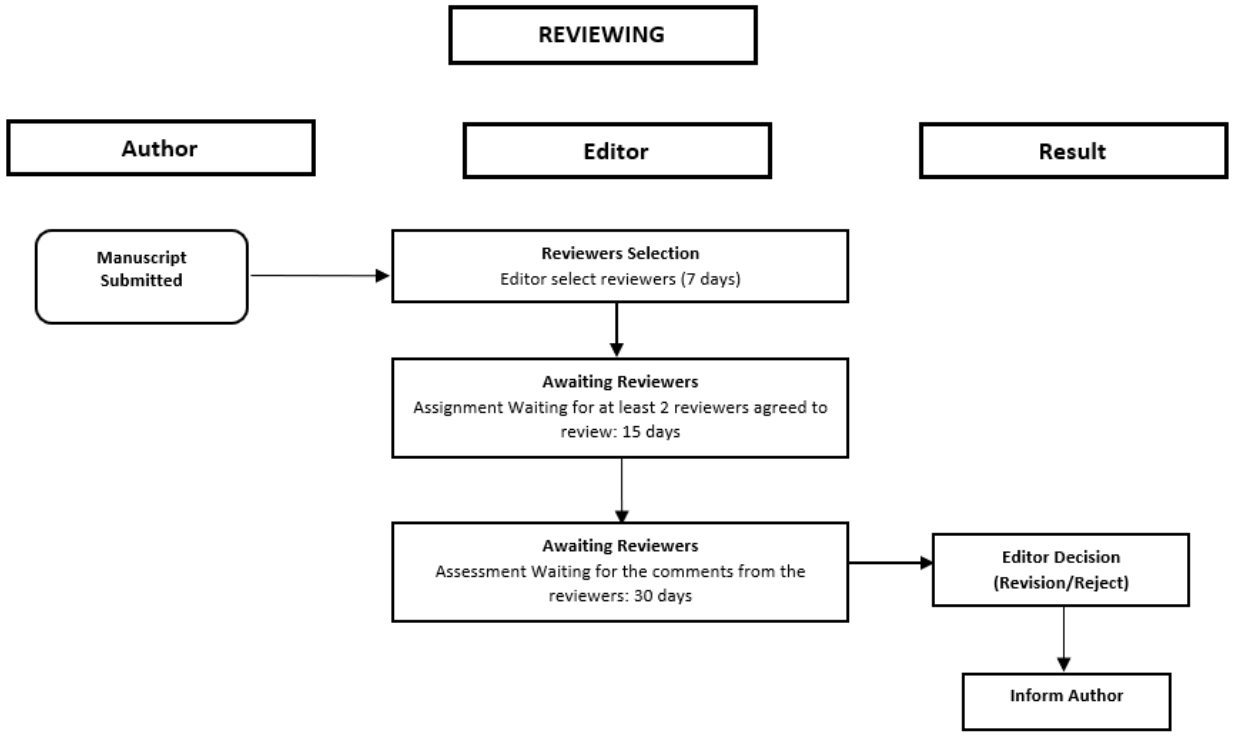
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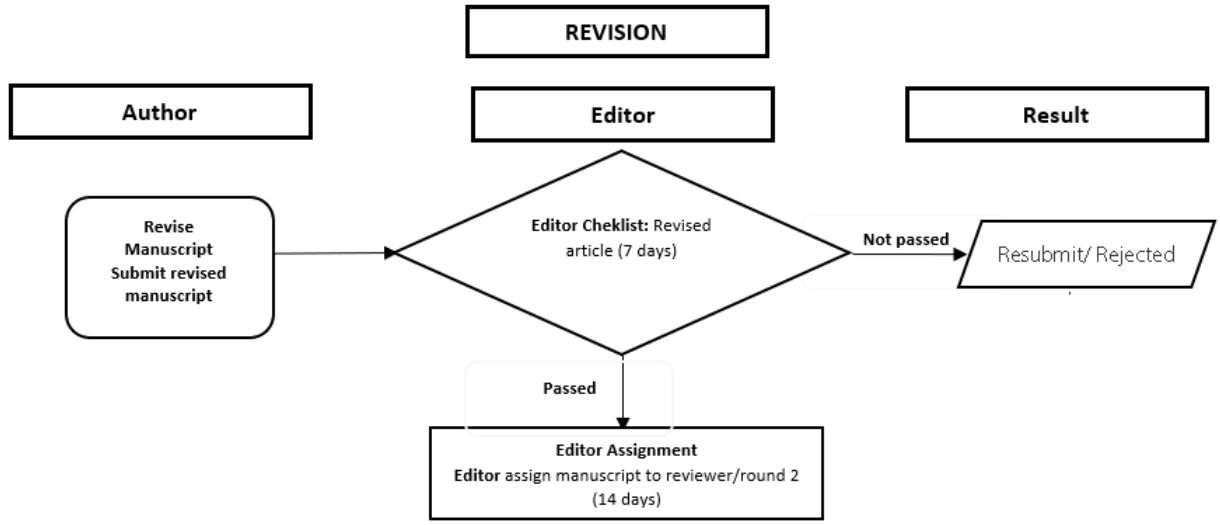
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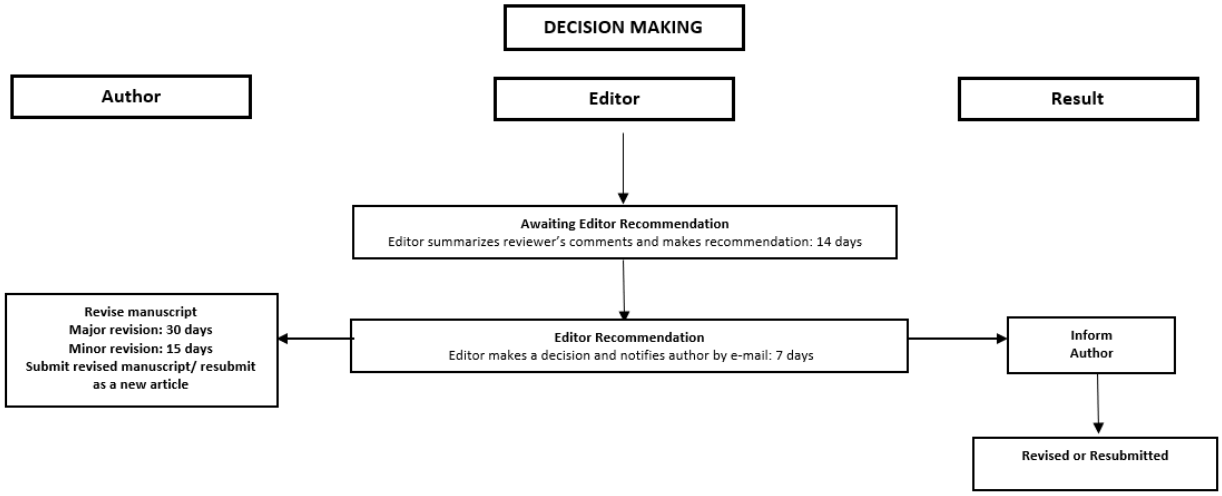
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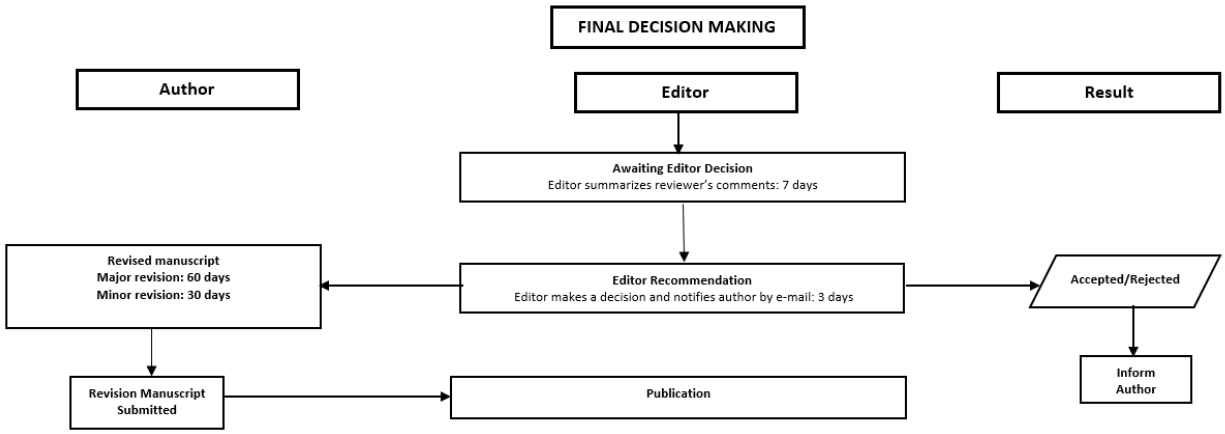
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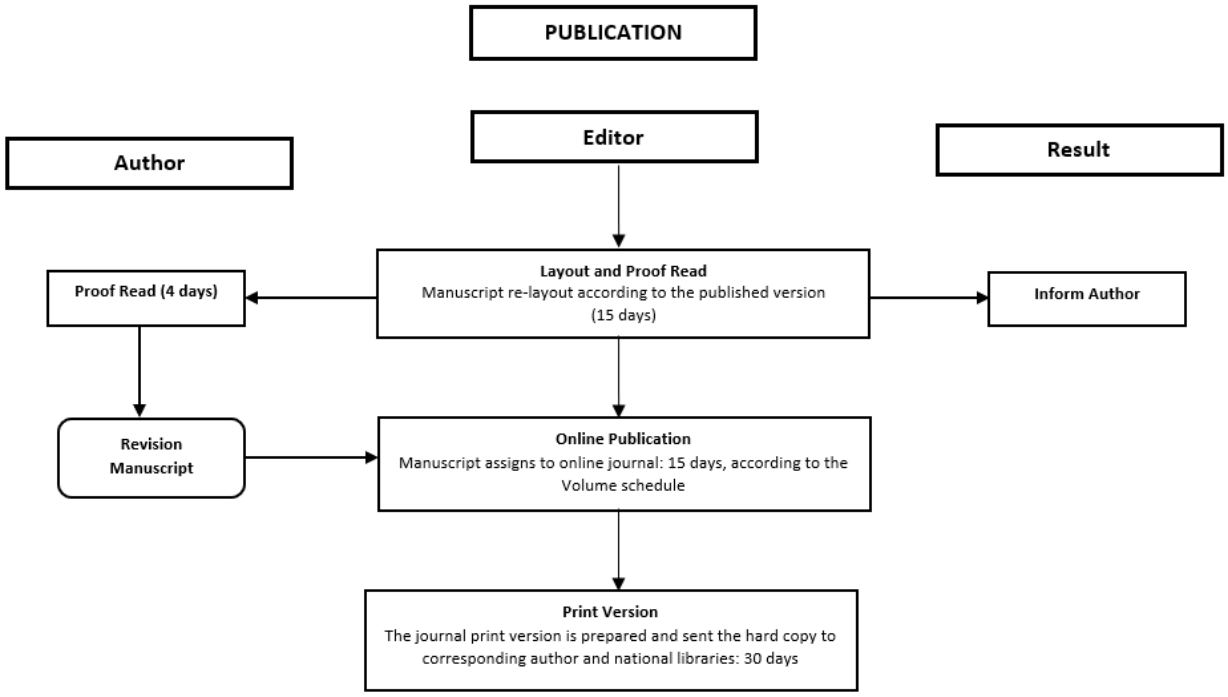

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All manuscripts submitted to this journal must follow focus and scope, and author guidelines of this journal. The submitted manuscripts must address scientific merit or novelty appropriate to the focus and scope. All manuscripts must be free from plagiarism contents. All authors are suggested to use plagiarism detection software to do the similarity checking. Editors check the plagiarism detection of articles in this journal by using a Turnitin software.

The research article submitted to this journal will be double blind review at least 2 (two) or more expert reviewers. The reviewers give scientific valuable comments improving the contents of the manuscript.

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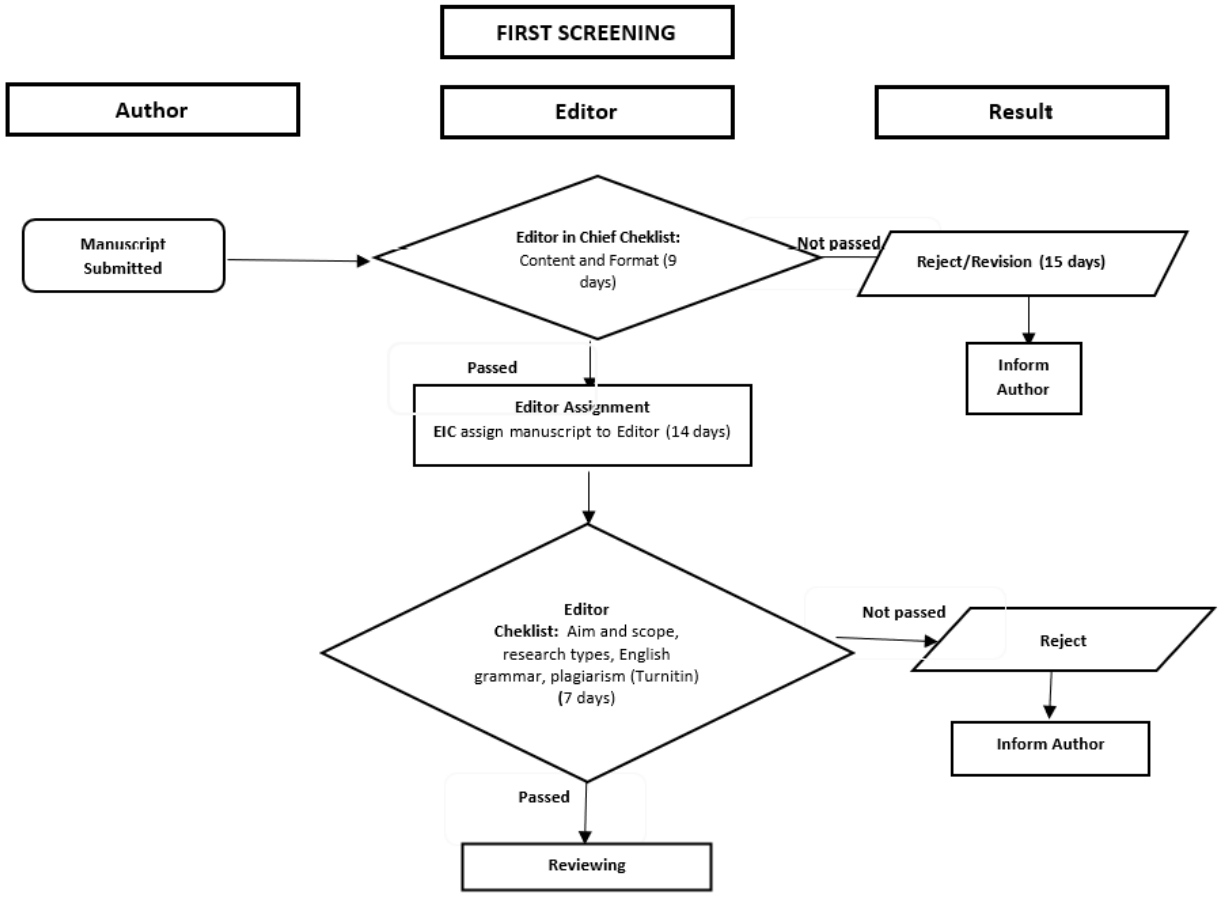

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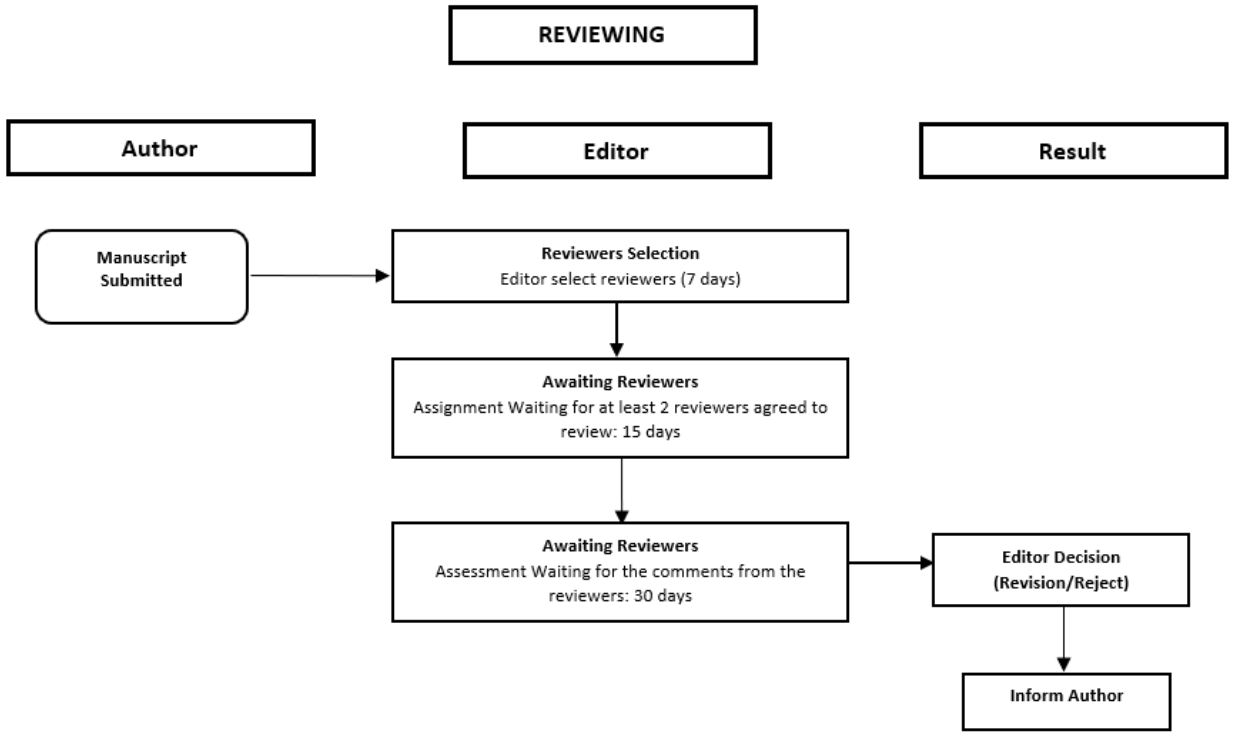
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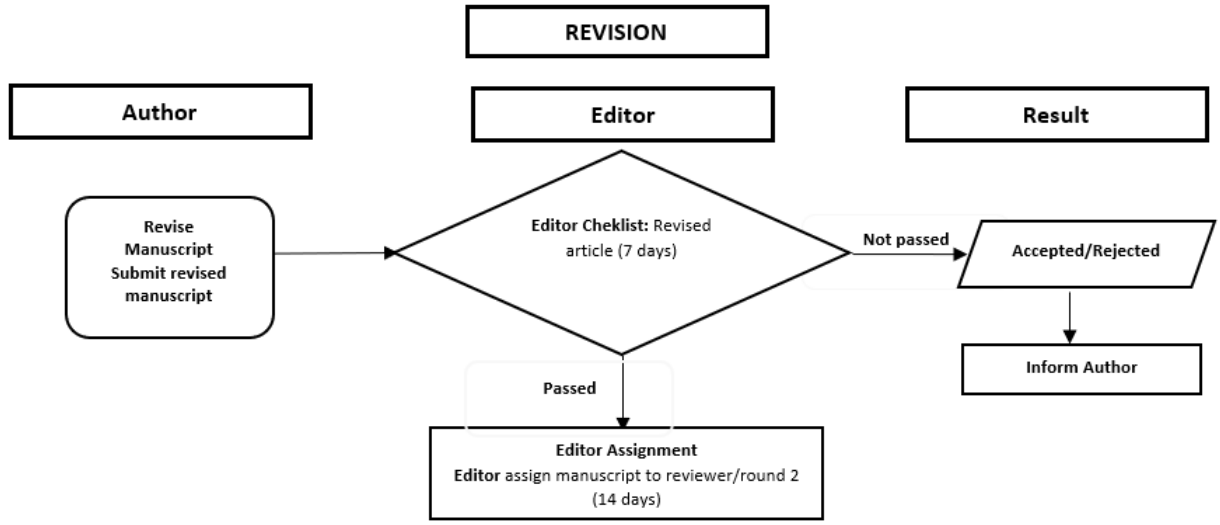
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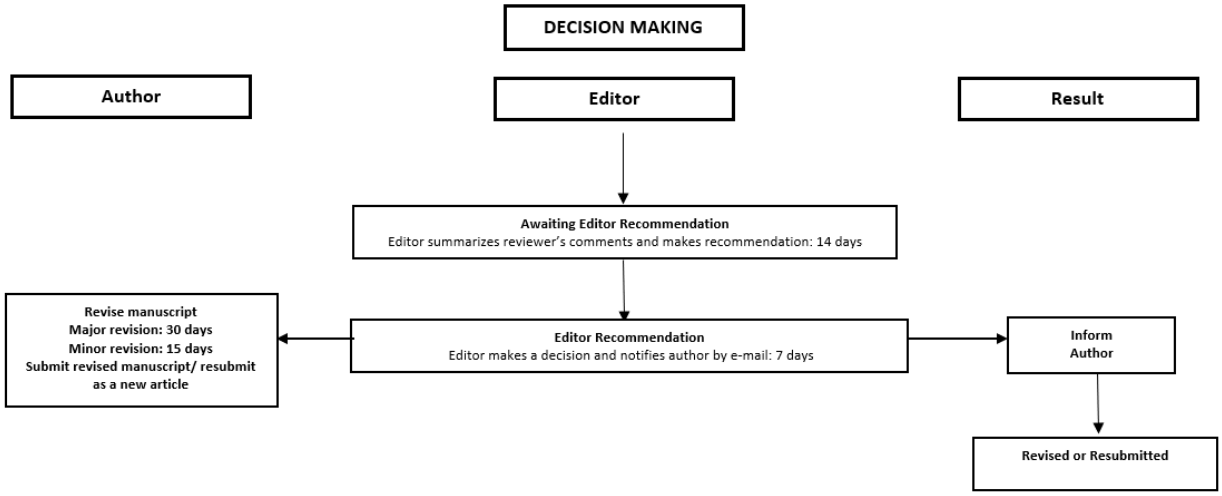
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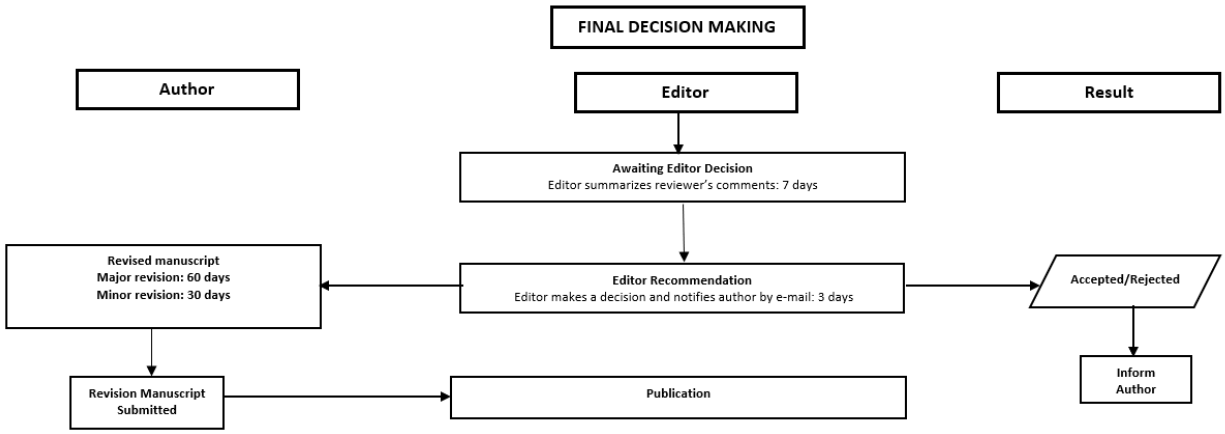
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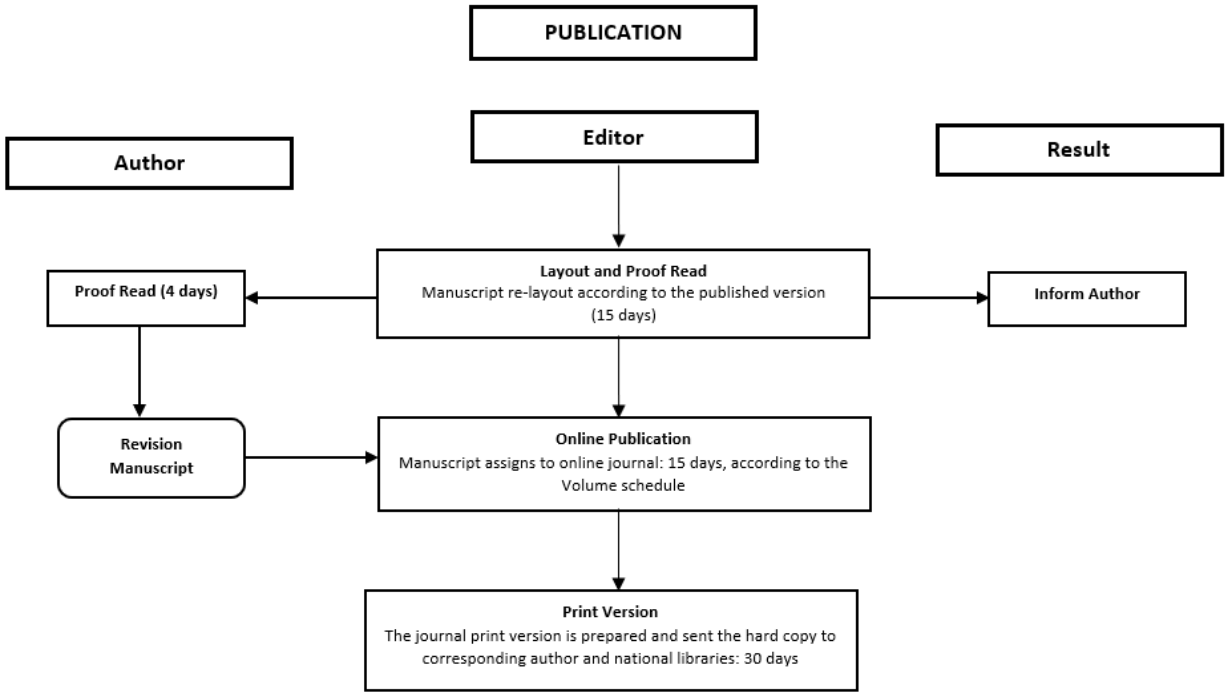
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Malini, H. et al. (2024)
Jurnal Keperawatan Soedirman – Vol 19, No 1 page 1-6
http://jos.unsoed.ac.id/index.php/jks/index

ORIGINAL ARTICLE

SELF-PROTECTIVE MOTIVATION AND COMPLIANCE WITH COVID-19 HEALTH PROTOCOLS AMONG UNDERGRADUATE NURSING STUDENTS

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Article Information
Received: 14 November 2022
Revised: 18 June 2023
Accepted: 4 February 2024

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DOI
10.20884/1.jks.2024.19.1.7163

ABSTRACT

Students who gather and do not pay attention to health protocols can be evidence of their low compliance with implementing health protocols. University students, particularly those who come from health faculties, are considered change agents in implementing health protocols. Thus, it is necessary to examine their motivation and attitude toward implementing health protocols. This study aimed to determine the relationship between self-protective motivation and compliance with the nursing students' health protocol. The study was carried out with 253 undergraduate nursing students selected through cluster sampling with a cross-sectional design. The results showed that most of the students complied with the health protocols; some already had motivations related to self-protective motivation against COVID-19 and some already had a positive attitude towards the health protocol. There is a significant relationship between self-protection motivation and compliance with the nursing student health protocol (p-value = 0.000). However, nursing students must increase self-protective motivation and positive attitudes by increasing their understanding and confidence in the dangers of COVID-19 to encourage their obedience to health protocols. More studies need to be conducted to investigate the causes of student non-compliance in implementing health protocols, especially in the campus environment.

Keywords: *Attitude; compliance; health protocol; self-protective motivation*

ISSN : 1907-6637 **e-ISSN : 2579-9320**

INTRODUCTION

Despite the global prevalence of COVID-19 cases, adherence to health protocols remains notably low, particularly within the early adult age group, specifically individuals aged 18-45 years. In Indonesia, the 17-30 year age group exhibited the lowest adherence to health protocols (Simanjuntak et al., 2020). College and high school students, characterized by high mobility, emerge as significant contributors to COVID-19 cases in Indonesia, as their proclivity to gather and neglect social distancing places them at heightened risk of contracting the virus (Driposwana Putra et al., 2021).

Previous studies have delved into the compliance of college students with health protocols, revealing that while a majority (72.8%) adhered to these protocols, a notable proportion (27.2%) did not comply, with an additional 14.2% displaying negative attitudes (Wildayati, 2021). Moreover, a study highlighted that most nursing students exhibit commendable adherence to health protocols, with 58.8% displaying positive attitudes toward COVID-19 health protocols and 41.2% exhibiting negative attitudes (Zuhana et al., 2021).

Compliance is a key indicator that influences the effectiveness of the health system. Meanwhile, attitude acts as a determinant of behavior. It is intricately connected to perception, personality, and motivation. Motivation, in turn, comprises enabling factors such as facilities and policies and strengthening factors such as environment, knowledge, and attitude. Numerous factors influence the community's compliance with COVID-19 health protocols, including age, education, knowledge, attitudes and motivation, the latter emerging as a dominant factor shaping an individual's adherence to health protocols ((Triyanto & Kusumawardani (2020); Rahmiati, Afrianti (2021)).

Motivation, identified as a powerful tool to predict future behavior, particularly in the context of compliance with health protocols, has been extensively studied (Guo et al., 2023).

Simultaneously, the implementation of health protocols among students is significantly influenced by their motivation, confidence, and understanding of these protocols, culminating in the development of positive attitudes and a consequent disposition of adherence (Sukesih et al., 2020).

When comparing nursing students with the general population on education and knowledge, it is evident that nursing students possess a more comprehensive understanding of COVID-19 and health procedures. However, despite this knowledge, instances of noncompliance persist among students. A study by Lathifa et al. (2021) underlined that students are aware of the importance of adhering to health protocols. However, some still exhibit noncompliant behavior. Another study by Wildayati (2021) found that many students at Universitas Andalas have adhered to health protocols effectively, with motivation playing a significant contributing role. However, the same study highlighted that nursing students from health faculties continue to exhibit negative compliance. This phenomenon suggests a plausible relationship between self-motivation and the behavior of adhering to health protocols. The motivation for an individual to adopt a confident attitude is rooted in their intention to protect themselves, a concept termed self-protected motivation. This self-protected motivation significantly influences the extent to which a person is willing to perform or adhere to expected behaviors. Hence, the current study investigates self-protected motivation as a specific factor that influences compliance with health protocols among nursing undergraduate students during the COVID-19 pandemic. The aim is to provide a nuanced understanding of the motivational aspects shaping adherence to health protocols within this specific demographic, thus contributing valuable insights to the broader discourse on pandemic management and preventive measures.

METHOD

Study design

This is a quantitative research with a cross-sectional design.

Samples

The population of this study comprised students from the Faculty of Nursing of the Universitas Andalas. The researchers used probability sampling, a sampling technique in which each subject in the population has a known chance of being selected as a sample. The probability sampling technique used is cluster sampling, which is performed randomly from a predetermined group. The total sample was 253 students, ranging from first- to fourth-year students.

Instrument

The instrument used in the study was a health protocol compliance questionnaire adopted from the five standards of health protocols by the Indonesian Ministry of Health. Compliance measurement was adopted from Fithriyana & Alini (2021) and Saras et al. (2021) using a Likert scale of 19 questions. The score for each question ranges from 1 to 4. The score ranges from 19 to 76, with belief, acceptance, and actions as indicators.

This questionnaire has been tested for validity and reliability with a Cronbach's alpha of 0.805 and an r table of 0.227. Based on the result, all the items in the questionnaire are valid and reliable.

The modified self-protective motivation questionnaires modified from Al-Rasheed (2020) consist of 20 items measuring the severity, vulnerability, intrinsic reward, extrinsic reward, response efficacy, self-efficacy, and response cost. The score for each question ranges from 1 to 5. Thus, the overall score ranges from 20 to 100.

The results of the validity and reliability tests showed that the Cronbach alpha value was 0.823 and the r table value was 0.227. Therefore, all the elements of the self-protection motivation questionnaire were declared valid and reliable.

Data collection

Data were collected through an online survey conducted via Google Forms. Additionally, the researchers utilized secondary data from various populations within the university's academic department.

Data analysis

Data were analyzed using univariate and bivariate analysis. A descriptive analysis was used to describe the distribution of the characteristics of the respondents, compliance, motivation to protect themselves, and attitudes related to health protocols.

A correlation test was used to analyze the relationship between self-protective motivation and compliance with COVID-19 health protocols using Spearman's rho.

Ethical consideration

All procedures performed in studies with human participants followed the ethical standards of the institutional research committee with the number 156/KP/2021 and met the standard of the Declaration of Helsinki for human research.

RESULTS

Characteristics of the respondents

Table 1. Distribution of the characteristic of the respondents of nursing students of the Universitas Andalas (n = 253)

Characteristics	n (%)
Gender	
Men	23 (9.1)
Women	230 (90.9)
Residence	
West Sumatra	179 (70.8)
Outside West Sumatra	74 (29.2)
Students' year	
2021	78 (30.8)
2020	83 (32.8)
2019	53 (20.9)
2018	39 (15.4)

Table 1 illustrates the distribution of the characteristics of the respondents, revealing that the majority were women, comprising 230 individuals (90.9%). Furthermore, most of the respondents resided in West Sumatra (70.8%). Meanwhile, the distribution of students' classification was uniform across all four academic years.

Table 2. Distribution of compliance with the health protocol and self-protective motivation of the students at the Faculty of Nursing of the Universitas Andalas (n = 253)

Variable	Median	Min	Max	SD
Health protocol compliance	61	42	76	5.77
Self-protective motivation	74	53	92	7.36

Table 2 shows the median compliance with the health protocol, 61, with a minimum score of 42 and a maximum score of 76. This result suggests that the respondents generally adhered to health protocols, as the majority approached the maximum compliance score. Furthermore, Table 2 reveals a median self-protective motivation score of 74, with a minimum of 53 and a maximum of 92. Based on these findings, the motivation of the respondents for self-protection with respect to health protocols appears moderate, as reflected in the overall median motivation scores of the respondents.

Table 3. Distribution of item scores on compliance with the health protocol and self-protective motivation of students at the Faculty of Nursing of Universitas Andalas (n = 253)

Variable Health protocol compliance	Median	SD	Min-Max
Washing hands	3.23	0.3	2.74 –3.41
Wearing a mask	3.71	0.6	2.49 – 3.89
Keeping a distance	3.28	0.4	2.98 – 3.73
Avoiding crowds	3.17	0.0	3.08 – 3.13
Reducing mobility	3.10	0.7	2.25 – 3.68
Self -protective motivation			
Severity	4.50	0.49	3.68 – 4.55
Vulnerability	4.09	0.26	3.81 – 4.32
Intrinsic rewards	2.72	0.56	1.96 – 3.06
Extrinsic rewards	3.59	0.83	2.23- 3.74
Response efficacy	4.13	0.27	4.00 – 4.51
Self-efficacy	4.24	0.44	3.93 – 4.55
Response cost	3.87	0.88	2.57 – 4.24

Table 3 shows the median compliance with the health protocol for each item. The highest median was observed when wearing a mask (3.71, min-max = 2.49-3.89), followed by maintaining distance (3.28, min-max = 2.98-3.73), washing hands (3.23, min-max = 2.74-3.41), avoiding crowds (3.17, min-max = 3.08-3.13), and the lowest median was recorded for reducing mobility (3.10, min-max = 2.25-3.68)./

Table 3 also presents the mean of seven indicators of motivation for self-protection. The highest medians for severity (4.50), self-efficacy (4.24), response efficacy (4.13), and vulnerability (4.09) were found. In contrast, the intrinsic indicator of motivation to self-protection had the lowest median (2.72).

Table 4. Correlation between self-protective motivation and compliance with health protocols of nursing students of the Universitas Andalas

Variable	Mean	p-value	Correlation coefficient
Self-protection motivation	74.06	0.000	0.419
Compliance	60.66		

Table 4 shows the relationship between self-protection motivation and compliance. The correlation coefficient of 0.419 indicates a positively correlated relationship with a moderate strength correlation (0.40 - 0.59). Therefore, it can be concluded that higher self-protective motivation is associated with increased compliance with health protocols.

DISCUSSION

This study is crucial as university students represent future change agents and serve as role models for the community, especially in demonstrating discipline in adhering to health protocols during nonnatural disasters to control the spread of diseases. The results of this study indicate a general correlation between self-protective motivation and the behaviors of the health protocol.

Compliance with health protocols

During the COVID-19 pandemic, the World Health Organization (WHO) provided several health protocols to protect ourselves and those around us (World Health Organization (WHO), 2023). These protocols include maintaining a physical distance of at least 1 meter from others, avoiding crowds, reducing mobility by staying at home unless except for essential needs, wearing a properly fitted mask when physical distancing and frequently cleaning hands with an alcohol-based hand rub or soap and water.

This study closely examines five health-related behaviors associated with these protocols and assesses compliance among university students. The behaviors investigated are hand washing, mask wearing, adherence to physical distancing, avoidance of crowds, and reduction of mobility. The study focuses on university students engaged in online learning during the COVID-19 era, some of whom may need to access the Internet through cafes or remain in rented accommodations. Therefore, understanding and evaluating these behaviors is crucial.

This study revealed a notable trend in overall compliance of students with health protocols. Despite their commendable adhesion, a notable challenge was observed with respect to the implementation of the reduced mobilization measure among students. This study found that high-compliant health protocols included wearing masks, followed by maintaining distance and hand washing. However, when it comes to avoiding crowds and reducing mobility, the results are less favorable.

The findings of this study reinforce those of previous research on compliance among different communities in Indonesia. Sitohang et al. (2021) provided contextual support by demonstrating regional variations, indicating that respondents from western Indonesia exhibit a higher adherence to COVID-19 protocols, particularly in self-protection and social distancing, compared to their counterparts in eastern Indonesia. According to that study, the implementation of health behavior can be influenced by a combination of government policies and the facilities available in the surrounding areas of the students.

Meanwhile, there are challenges with respect to behavior to avoid crowds and minimize mobility. The daily schedules of students, characterized by extensive participation in extracurricular activities such as organizational tasks, group projects, and campus events, have made reducing mobility challenging. Furthermore, the students' inclination to frequent open spaces such as cafes or public areas for group discussions further complicates the effort to enforce reduced mobilization measures. (Saras et al., 2021).

These findings align with Lathifa et al. (2021), who emphasized that the reduction of outdoor activities is a health protocol commonly ignored by students, indicating a persistent challenge to limit visits to public spaces, avoid physical contact and reduce social interactions. A study by Sondakh et al. (2022), which surveyed medical students,

reinforces these observations, revealing suboptimal practice of health protocols, particularly in aspects beyond mask-wearing and handwashing.

Despite these challenges, the study underscores the positive overall trend of compliance among health students. It recognizes the crucial role of nursing students, given a sufficient educational foundation, as potential change agents and social controllers. The suggestion that nursing students can contribute to public awareness through educational campaigns and preventive actions emphasizes the importance of instilling a comprehensive understanding of the current pandemic situation within the community (Saputra et al., 2021). The study echoes the sentiment that collective adherence to health protocols is paramount in preventing transmission and that effective prevention requires a communal effort (Hakim, 2021; Niman et al., 2021).

In essence, the study provides a nuanced depiction of the challenges and successes in complying with health protocols among university students, emphasizing the need for targeted interventions, educational initiatives, and a collective commitment to mitigating the spread of infectious diseases. The multidimensional nature of student activities and behaviors highlights the importance of comprehensive strategies to address the intricacies of adherence to health protocols in a university setting.

Challenges arise when studies reveal that the spread of COVID-19 is significantly influenced by human mobility. It is also linked to an increase in the resistance of the population to the virus through natural immunity and vaccination. Although the pandemic appears to be over, there is a new threat due to the increase in the number of new cases of COVID-19. Therefore, reducing mobility and avoiding crowds continue to be crucial, especially at points of interest.

Two key factors are taken into account: various types of points of interest (POIs), such as transit stations, groceries, pharmacies, retail and recreation venues, workplaces, and parks, and the emergence of the Delta variant. There is a correlation between the movement of people within these POIs and the emergence of COVID-19 variants (Albassam et al., 2023). The findings indicate that retail and recreational venues, transit stations and workplaces derive the greatest benefit from mobility restrictions, particularly when the fraction of the population is below 25%-30%. Groceries and pharmacies can also experience advantages from mobility restrictions when the population resistance fraction is low. On the contrary, there are minimal benefits in parks (Albassam et al., 2023).

Self-protective motivation

Self-protective motivation involves the desire to protect oneself from unfavorable self-perceptions. It represents a type of self-evaluative drive connected to the motivation to avoid negative outcomes. This motive focuses on steering clear of negativity in one's self-perceptions, in contrast to the self-enhancement motive, which strives to foster positivity in how one views oneself (Giacomin & Jordan, 2020).

This study investigates the self-protective motivation of students to investigate their personal motivation for self-protection. The study provides a detailed examination that looks at the intricate dynamics that influence their commitment to COVID-19 protocols. The results depict an overall moderate level of motivation among nursing students, with discernible variations in different motivation indicators. Identification of well-performing indicators, such as recognizing COVID-19 as a serious threat, fearing its contraction, and valuing external recognition for adhering to health protocols, underscores the multifaceted nature of motivation, involving both intrinsic and extrinsic factors.

A crucial finding in this study is the noticeable gap in motivation associated with intrinsic rewards, particularly self-pleasure. This gap is shown by how students exhibit behaviors such as removing masks during social interactions and neglecting physical distancing guidelines, suggesting a disconnect between their awareness of COVID-19 dangers and their intrinsic motivation. Recognizing the pivotal role of intrinsic rewards - marked by personal satisfaction and enthusiasm - in fostering sustained adherence, the study highlights the urgency of targeted interventions to address this gap.

The concept of intrinsic and extrinsic motivation is discussed by Al-Rasheed (2020), who emphasized that people with high motivation in both aspects are more likely to adopt a variety of protective behaviors. Furthermore, Saputra et al. (2021) research highlights high intrinsic motivation among nursing students to prevent the COVID-19 pandemic, which reinforces the central notion that cultivating robust self-protective motivation is crucial to ensure compliance with health protocols.

Beyond individual behaviors, this study investigated the broader significance of motivation in preventing COVID-19 transmission. The call for robust self-protective motivation among students highlights the crucial role of educational institutions in fostering awareness, belief, and intrinsic motivation. Strategies are proposed to enhance intrinsic rewards, including personalized education campaigns that emphasize the profound impact of individual actions on community well-being.

This study reveals a nuanced landscape of nursing student motivation, emphasizing the intricate interplay between intrinsic and extrinsic factors in shaping their adherence to the COVID-19 protocols. The identified gap in intrinsic reward motivation becomes a focal point for future interventions, urging educators and policymakers to tailor strategies that elevate students' awareness and belief in the significance of their actions. Harmonizing with existing research strengthens the generalizability of these findings, pointing toward shared challenges and opportunities to cultivate motivation for pandemic prevention among nursing students. Therefore, this study contributes to our understanding of student motivation and provides actionable insights for institutions aiming to enhance adherence to health protocols in the context of a global health crisis.

Relationship between self-protective motivation and health protocol compliance

Examining the correlation between motivation and compliance with health protocols among university students, as conducted in this study, provides significant information on the intricate dynamics that shape the adherence of individuals to preventive measures in the context of the COVID-19 pandemic. The results reveal an optimistic correlation with a weak unidirectional relationship, suggesting that higher self-protective motivation increases the likelihood of implementing health protocols. This finding aligns with Al-Rasheed's (2020) research, emphasizing a significant relationship between self-protection motivation and compliance with health protocols, underscoring the predictive role of behavioral intention in fostering public protective behavior.

Luo et al. (2020) linked motivation with healthy behavior. This statement supports the notion that behavior is influenced by the drive to achieve specific goals and aligns with the understanding that individuals with elevated self-protective motivation are more inclined to engage in actions that contribute to both personal well-being and the collective health of the community.

Embracing preventive health measures is one of the most effective strategies to combat the COVID-19 pandemic. A previous study explored how exposure to health information influenced individuals to adopt self-protective behaviors in the context of infectious diseases. The study showed that health consciousness positively impacted subsequent variables through interpersonal discussions and exposure to COVID-19-related information on social media (Guo et al., 2023). The interaction between interpersonal discussions and exposure to social media was found to have a positive association with elements derived from the theory of planned behavior and risk perception. In addition, the findings indicated that self-protective behavior was positively predicted by components of the theory of planned behavior and risk perceptions, with subjective norms being the main predictor, followed by attitudes and self-efficacy (Guo et al., 2023).

Meanwhile, this study delves into the complexities of motivation by differentiating between intrinsic and extrinsic reward motivations. The results suggest the connection between high intrinsic reward motivation and belief in compliance with health protocols. Therefore, personal satisfaction and enthusiasm play a critical role in fostering sustained adherence.

A study investigated aspects of protection motivation theory that influence compliance with social distancing policy in all public areas among the general adult population in Hong Kong. The study found that the compliance rate with behavior was high, 78%. A regression analysis showed that, among the four aspects of the protection motivation theory, including perceived severity, perceived susceptibility, perceived response efficacy, and perceived self-efficacy, perceived response efficacy and perceived self-efficacy, perceived response efficacy, and perceived self-efficacy were significantly and positively correlated with compliance with BG4PA ($p<0.05$) compared to other aspects. Therefore, it is recommended that health promotion efforts focus on improving coping appraisal (Yu et al., 2022).

Meanwhile, this study focused on a detailed analysis of several health protocols, such as handwashing, physical distancing, and avoiding crowds, to provide a more nuanced understanding of how motivation impacts specific preventive actions. However, this study has several limitations, particularly in how it broadly measured motivation among all students, regardless of their compliance levels. This acknowledgment stresses the need for more focused research to unravel the nuanced reasons for noncompliance among students. Moreover, considering the diverse motivations and behaviors within the student population, this approach highlights the importance of targeted interventions in addressing the specific challenges faced by noncompliant individuals.

Furthermore, the chosen online data collection method, while efficient, introduces another limitation by potentially excluding participants without internet access, thereby introducing a bias in the sample. This recognition of methodological constraints underscores the importance of nuanced interpretation and application of this study's findings.

CONCLUSION AND RECOMMENDATION

This study contributes significantly to our understanding of the interaction between motivation and compliance with health protocols. Its alignment with existing research strengthens the generalizability of the findings, while the identified limitations provide valuable information for future, more nuanced investigations. The call for specific research focusing on the causes of noncompliance and consideration of diverse data collection methods points toward a more comprehensive and targeted approach in developing effective public health interventions.

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Novrianda, D. et al. (2024)
Jurnal Keperawatan Soedirman – Vol 19, No 1 page 7-15
http://jos.unsoed.ac.id/index.php/jks/index

ORIGINAL ARTICLE

TRANSLATION, CULTURAL ADAPTATION, AND VALIDATION OF THE INDONESIAN VERSION OF THE QUALITY OF ONCOLOGY NURSING CARE SCALE (QONCS)

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Article Information
Received: 21 November 2023
Revised: 17 January 2024
Accepted: 4 February 2024

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DOI
10.20884/1.jks.2024.19.1.10331

ABSTRACT

A validated instrument is crucial for assessing oncology nursing care in Indonesia. This study focused on translating, adapting, and validating the QONCS among Indonesian cancer patients and families. Initial feedback from nursing academicians and pilot participants guided the adaptation process. Validation involved distributing the instrument via Google Forms to 8 cancer referral hospitals, gathering responses from 148 individuals. Confirmatory factor analysis (CFA) assessed validity, while Cronbach's alpha measured internal consistency. Synonyms and examples were added to enhance item clarity. Eight items were removed due to poor construct validity, resulting in improved statistics (r statistic: 0.653-0.818; average variance extracted: 0.742). The revised instrument demonstrated high reliability (Cronbach's alpha: 0.967). This study confirms the Indonesian QONCS version as a valid and reliable tool for evaluating oncology nursing care. It is recommended for oncology nurses to utilize the QONCS to enhance the quality of care provided.

Keywords: Oncology Nursing, *QONCS, Quality Assessment, Translation and Adaptation*

ISSN : 1907-6637 **e-ISSN : 2579-9320**

INTRODUCTION

Currently, cancer is one of the most common and second-leading causes of death in developed and developing countries. There is a trend of elevating new cancer cases and cancer deaths in the world. There was an increase in new cancer cases from 18.0 million in 2018 to 19.3 million in 2020. In addition, cancer deaths escalated from 9.6 million deaths in 2018 to 10.0 million cancer deaths in the worldwide (Bray et al., 2018; Sung et al., 2021). More than half of cancer incidence (56.8%) and cancer deaths (64.9%) occur in developing countries, with rates predicted to be higher in the future. In Indonesia, there is no accurate data on cancer incidence and mortality. The GLOBOCAN predicts by combining the average incidence of neighboring countries (Malaysia, Brunei Darussalam), cancer registration at the Dharmais Cancer Center, and Southeast Asian and national mortality models. In 2018, GLOBOCAN estimated that 291 out of 100,000 Indonesian people suffered from cancer (Gondhowiardjo et al., 2021). The high incidence of cancer in Indonesia requires attention to the provision of good and quality health and nursing services.

Quality of service plays a vital role in the service industry, including health services to patients with cancer and their families. Quality care meets all the patients' needs, meaning low-quality nursing care is associated with neglect of the

nursing care necessary to accommodate the patient's needs. Encountering the health needs of cancer patients is the nurses' role and responsibility of nurses, including ensuring and stabilizing psychosocial conditions and monitoring the side effects of chemotherapy drugs and other medical procedures. Additionally, cancer patients demand more personalized care and better communication with healthcare providers. The quality of oncology nursing plays a crucial role in the survival and prognosis of patients with cancer (Deribe et al., 2021).

The chemotherapy process includes doctors' and nurses' preparations, patient preparation, medication preparation, implementation or management, and monitoring and evaluation (Neuss et al., 2016). The American Society of Clinical Oncology (ASCO) establishes four standards for chemotherapy services, including 1) creating a safe environment, determining staff and general policies, 2) planning a treatment and patient consent, 3) preparing and managing chemotherapy treatment, and 4) monitoring after chemotherapy, including toxicity and complications and compliance chemotherapy treatment (Neuss et al., 2016). Nursing service standards in chemotherapy encompass educational qualifications and certificates or training related to chemotherapy service standards. Chemotherapy supervision is carried out at least by a nurse with chemotherapy training experience. Nurse competencies consist of regularly checking the patient's condition and vital status, communicating well, providing clear information about chemotherapy procedures, and documenting the patient's identity and processes after chemotherapy (Neuss et al., 2016).

Charalambous & Adamakidou (2014) reported ten instruments assessing the quality of nursing care in hospital settings, and only one questionnaire was developed specifically to measure nursing care in oncology settings, The Oncology Patients' Perception of the Quality of Nursing Care Scale (OPPQNCS). This questionnaire has several theoretical and conceptual limitations that hinder its ability to evaluate nursing care. Further, Charalambous developed a new instrument, the Quality of Oncology Nursing Care Scale (QONCS), to settle the limitations of previous questionnaires. The QONCS was developed using holistic nursing care theories and concepts. As such, it is expected to be able to identify areas of nursing care that require attention or intervention. Furthermore, this QONCS has been translated and validated into various languages, including Arabic (Sharour et al., 2021) and Chinese (Li et al., 2019). The Arabic and Chinese versions of Cronbach's alpha are 0.83 – 0.89 and 0.946, respectively.

To assess various dimensions of the quality of nursing care in oncology, it is necessary to provide a comprehensive, valid, and reliable quality assessment tool in the Indonesian version. However, the Quality of Oncology Nursing Care Scale (QONCS) has not been translated and validated in Indonesian. Research questionnaires are frequently unavailable in specific languages, including Bahasa Indonesia. Also, the questionnaires are not always translated appropriately according to the other cultural and linguistic settings. Thus, the research results using these instruments cannot reflect what is intended to be measured. This study aims to translate the QONCS into the Indonesian version and test the validity and reliability of the translated QONCS among cancer patients undergoing treatment in Indonesia.

METHOD

Study design

This quantitative research type aimed to translate and validate the Indonesian version of QONCS. Data was collected from August to November 2023 and divided into three processes: translation, cultural adaptation, and validation.

Population and samples

The population in this study were cancer patients or family members who cared for cancer patients in Indonesia. Two groups of participants were recruited for this study. The first Group consisted of 30 participants for the adaptation process of the Indonesian version of the QONCS. Another Group was recruited by sending a Google Form link to 8 cancer referral hospitals in Indonesia to validate the Indonesian version of the QONCS. The sample size in this study was estimated based on the 34 QONCS items, and at least five or more subjects were recommended for one item when conducting the validation process (n = 5 x 34 items, n = 170) (Gunawan et al., 2021). A study by Gunawan et al. (2021) and Anthoine (2014) found that the sample size for construct validity ranges from 50 to >1000. Participants were collected by purposive sampling and selected based on inclusion criteria. The inclusion criteria were cancer patients undergoing treatment at a referral hospital in Indonesia or their families aged 17 or older. Cancer patients or family members of cancer patients with cognitive impairment, central nervous system metastases, and psychiatric disorders were excluded from the study.

Participants involved in the validation process were recruited from seven of eight cancer referral hospitals in Indonesia: University of North Sumatra Teaching Hospital, RSUP Dr. M. Djamil Padang, Arifin Achmad Regional General Hospital, RSUP Prof. Dr. Sardjito Yogyakarta, RSUP Dr. Kariadi Semarang, Tlogorejo General Hospital, M. Natsir Solok Regional General hospital, and Kayu Aro Regional General Hospital.

Instrument

This study applied sociodemographic characteristics instruments and QONCS. The QONCS was developed by Charalambous et al. through three phases. In the first phase, a literature review will identify the area of concern and points of interest. The second phase included a pilot study of the QONCS instrument and a validation phase through a multicenter study in 3 hospitals, four departments, and 418 cancer patients treated in an inpatient ward. The QONCS is considered capable of measuring quality nursing care in the oncology setting for patients with various cancer diagnoses and at different phases of the cancer trajectory with adequate reliability (Cronbach's alpha 0.95) and validity (Charalambous et al., 2017; Charalambous & Adamakidou, 2014). This instrument has been translated into various languages, including Arabic, Mandarin, and Indian.

This instrument consists of 5 subscales that assess dimensions of the quality of nursing care based on the patient's perceptions and expectations of the consideration received during hospitalization, including 1) Being supported and confirmed, 2) Spiritual caring, 3) Sense of belonging, 4) Being valued, and 5) Being respected. All 34 question items were assessed on a 5-point Likert scale (1 = completely disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = completely agree).

Translation, cultural adaptation, and validation process

1. QONCS translation process

The translation was validated following cross-cultural adaptation procedures based on (Beaton et al. (2000). After obtaining permission from Charalambous & Adamakidou (2014), the original QONCS author, backward-forward translation was carried out to translate QONCS into the Indonesian version. Two translators handled the translation independently. Translator 1 (P1) was familiar with the quality of nursing care examined in the questionnaire to provide a measurement perspective. Translator 2 (P2) is native and less driven by academic purposes, which may reflect the language used by the target population. Next, two peer reviewers from academics in the nursing field discussed the QONCS translation and reached a consensus. Two native English speakers with no medical background and unaware of the original version performed the back translation fluently. A native English speaker with a nursing background reviewed the translated version to ensure it reflected the same item content as the original version. The principal author collated feedback from peer review and reported the information attained to the team to accomplish a consensus.

2. Adaptation process

The adaptation process included a pilot study with 30 outpatient cancer patients at RSUP Dr. M. Djamil Padang to test the feasibility of the QONCS Indonesian version. Respondents are tested for their understanding and acceptance of the items to detect whether they are confusing or misleading after the translation process and consensus. The translated version was feasible if the questionnaire was considered easy to understand.

3. Validation process

At this stage, the construct validity and reliability of the Indonesian version of the QONCS were examined. Participants were excluded from the psychometric analysis if more than 13% of the items were missing from the Indonesian version of the QONCS.

Data collection

Data was collected from August to November 2023 and divided into three processes: translation, cultural adaptation, and validation. After the forward and backward translation, the first Indonesian version of QONCS was obtained and evaluated. In the cultural adaptation process, feedback from 30 cancer patients and family members who cared for cancer patients in the hospital were collected and reviewed after ethical clearance to develop the final version of QONCS in Indonesian.

In the validation process, online links to the final version of QONCS in Indonesia were distributed via social media platforms (WhatsApp, Facebook, and Instagram) from 1 August 2023 to 4 November 2023. If respondents joined through various media, duplicate respondents were removed based on their initials and the hospital where they were treated.

Data analysis

In the adaptation process, after team discussion, pilot data was compiled and analyzed to obtain the most appropriate word choices through consensus. If differences of opinion were encountered during this process, the problem was resolved through agreement. The characteristics of participants in the adaptation phase were analyzed by univariate analysis.

Validity and reliability tests were used to analyze the psychometric properties of the Indonesian version of QONCS. Confirmatory factor analysis with principal component analysis was run to examine construct validity. To describe construct validity, validity was measured using outer loading, AVE, and latent values. Reasonable construct validity standards were statistically above the r table, latent values, and AVE >0.5 (Fornell & Larcker, 1981). Cronbach's alpha was used to examine internal consistency, and a Cronbach's alpha value above 0.7 indicated a reliable instrument (Dijkstra & Henseler, 2015; Nunnally, 1994). All statistical analyses used Smart PLS version 3.0 Pro.

Ethical consideration

This research was approved by the Research Ethics Committee of RSUP Dr. M. Djamil Padang, with ethical letter number LB.02.02/5.7/420/2023 on 31 July 2023. The study obtained authorization and consent from the President Director of each hospital before commencement. Before data collection, the researchers explained the study's objectives, information confidentiality, and the participant's right to withdraw at any point. The study exclusively involved cancer patients and their families, with no participation of children under 16. All participants received an informed consent form granting permission to collect demographic data, complete the questionnaire, and use excerpts from publications and reports. The participants' identities remained anonymous throughout the analysis and presentation of the results.

RESULTS

Adaptation process

Table 1. Respondents' characteristics (n=30)

Characteristics	Mean (SD)	f	%
Age	46.07 (13.17) Min 18 Max 65		
Gender			
Male		10	33.3
Female		20	66.7
Educational level			
Master degree		1	3.3
Bachelor degree		4	13.3
Diploma degree		3	10.0
High-school		15	50.0
Junior-school		7	23.3
Work			
Civil servant		1	3.3
Teacher		1	3.3

Characteristics	Mean (SD)	f	%
Trader, self-employed		5	16.7
Farmer		4	13.3
Retired		1	3.3
Housewife/not working		16	53.3
Patient diagnosis			
Mammary cancer		7	23.3
Colon cancer		9	30.0
Rectal cancer		4	13.3
Prostate cancer		4	13.3
Lung cancer		2	6.7
Pharyngeal cancer		1	3.3
Lymphoma		2	6.7
Leukemia		1	3.3
Treatment room			
Surgery		20	66.7
Integrated diagnostic installation		10	33.3
Relationship with patients			
The patient		8	26.7
The patient's parent		2	6.7
Patient's child		6	20.0
Patient's husband or wife		8	26.7
Sibling		3	10.0
Other family members		3	10.0
Start treatment			
2016		1	3.3
2018		2	6.7
2019		3	10.0
2020		2	6.7
2021		2	6.7
2023		20	66.7

At this stage, an adaptation of the questionnaire was conducted for 30 respondents who met the inclusion criteria, and an respondents' characteristics were displayed in Table 1. Most respondents were female (66.7%), had a high school education (50.0%), and were either unemployed or engaged in household duties (53.3%).

Table 2. Revision of the Indonesian version of the QONCS questionnaire items based on the adaptation stage

Item	Original version	Forward and backward translation into Indonesian	Final version in Indonesian (along with notes on changes that have been made)
4	The nurse is emotionally supportive?	Perawat mendukung secara emosional?	Perawat mendukung dengan penuh perhatian? (The word emotionally is changed to attentively)
5	The nurse expresses a real interest in you?	Perawat mengungkapkan minat nyata kepada Anda?	Perawat menunjukkan perhatian kepada Anda? (The word expresses a real interest is changed to showing concern)
7	The nurse appears knowledgeable in relation to your condition?	Perawat tampak berpengetahuan tentang kondisi Anda?	Perawat mengetahui segala sesuatu tentang kondisi Anda? (The word knowledgeable is changed to know everything)
8	The nurse provides the information in a comprehensive way?	Perawat memberikan informasi secara komprehensif?	Perawat memberikan informasi secara lengkap dan seksama? (The word comprehensive way is changed to complete and thorough)
18	The nurse initiates the discussion around spiritual issues.	Perawat memulai diskusi seputar masalah spiritual.	Perawat memulai diskusi seputar masalah spiritual (rohani atau keyakinan agama). (Adding the word spiritual or religious beliefs to explain the word spiritual)
19	The nurse was interested in clarifying what your religious preferences are.	Perawat tertarik untuk mengklarifikasi apa preferensi agama Anda.	Perawat tertarik untuk menanyakan kembali apa yang menjadi pilihan keyakinan Anda. (The word clarifying is changed to ask again, and the word religious preference is changed to a choice of belief)
20	The nurse was available to discuss spiritual issues and encouraged this conversation.	Perawat bersedia untuk membahas masalah spiritual dan mendorong percakapan ini.	Perawat bersedia untuk membahas masalah spiritual (rohani atau keyakinan agama) dan mendorong percakapan ini. (Adding the word spiritual or religious beliefs to explain the word spiritual)
24	The nurse encouraged the presence of your family while receiving the care.	Perawat mendorong kehadiran keluarga Anda saat menerima perawatan.	Perawat mendukung kehadiran keluarga Anda saat menerima perawatan. (The word encourage is changed to support)

Following the participants' feedback during the adaptation process, several alterations were showed related to word selection structure (Table 2). A total of 8 items were modified by altering the word choices, incorporating synonyms, or providing illustrative examples to facilitate the accurate interpretation of the context or content by the participants. These modifications included the terms "emotionally" (item no. 4), "comprehensively" (item no. 8), "competently" (item no. 13), "clarify" (item no. 23), and "encourage" (item no. 24). Additionally, two respondents indicated that items 17-22 were less relevant due to the absence of spiritual discussions with nurses. For instance, several participants were unfamiliar with the term comprehensive, and thus, it was revised to complete and thorough ("secara lengkap dan seksama").

Validation process

Table 3. Partisipants' characteristics (n=148)

Characteristics	f	%
Age		
Adult (17-45 years)	101	68.2
Pre-elderly (46-59 years)	38	25.7
Elderly (> 60 years)	9	6.1
Gender		
Male	34	23.0
Female	114	77.0
Level of education		
Elementary (Junior High School)	60	40.5
Intermediate (High School)	52	35.1
Higher (Diploma/S1/S2/S3)	36	24.3
Work		
Civil servant	14	9.5
Self-employed	13	8.8
Private/honoray employees	17	11.5
Teacher, nurse	17	11.5
Workers, traders, farmers	11	7.4
Housewife/not working	66	44.6
Student	7	4.7
Retired	3	2.0
Medical diagnosis		
Carcinoma	45	30.4
Sarcoma	14	9.5
Hodgkin's lymphoma and leukemia	80	54.1
Myeloma	1	0.7
Tumor	8	5.4
Hospital		
Dr. M. Djamil Padang Hospital	88	59.5
Arifin Achmad Pekanbaru Hospital	13	8.8
Kariadi Semarang Hospital	34	23.0
Prof. Dr. Sardjito Yogyakarta Hospital	8	5.4
Tlogorejo Hospital	2	1.4
M. Natsir Solok Hospital	2	1.4
Kayu Aro Hospital	1	0.7
Relationship with patients		
Parent	99	66.9
Child	12	8.1
Siblings	3	2.0
Husbanf or wife	11	7.4
Other families	23	15.5

Psychometric test of the Indonesian version of the QONCS questionnaire on 148 respondents from various cancer referral hospitals in Indonesia also reported in this study (Table 3). Most respondents were in the adult age (68.2%) and female (77.0%), Most participants completed junior and senior high school education (75.6%) and worked as housewives or unemployed (44.6%) Additionally, a substantial number of patients were diagnosed with Hodgkin's lymphoma and leukemia (54.1%), treated at RSUP Dr. M. Djamil Padang (59.5%), and had a familial relationship with the patient's parents (66.9%).

To construct the model in this study, confirmatory factor analysis (CFA) was employed, resulting in the identification of eight items from the Indonesian version of the QONCS questionnaire (items 18, 19, 20, 21, 22, 23, 24, and 27) that exhibited a statistical r value below 0.4, lower than the r table value (**Figure 1a**). Subsequently, these eight question items were removed. After reanalysis through CFA, the statistical r value increased above the table r-value (**Figure 1b**).

Table 4. Latent variables correlations

	Age	Gender	Level of education	Work	Medical diagnosis	Hospital	Relationship with patients	Quality of oncology nursing care
Age	**1.000**	-0.052	-0.089	0.045	-0.217	0.041	0.143	0.261
Gender	-0.052	**1.000**	0.152	0.289	-0.117	0.026	-0.064	-0.167
Level of education	-0.089	0.152	**1.000**	0.413	-0.162	-0.032	-0.176	-0.175
Work	0.045	0.289	0.413	**1.000**	-0.135	-0.010	-0.167	-0.176
Medical diagnosis	-0.217	-0.117	-0.162	-0.135	**1.000**	0.016	0.009	-0.142
Hospital	0.041	0.026	-0.032	-0.010	0.016	**1.000**	0.223	0.186
Relationship with patients	0.143	-0.064	-0.176	-0.167	0.009	0.223	**1.000**	0.212
Quality of oncology nursing care	0.261	-0.167	-0.175	-0.176	-0.142	0.186	0.212	**0.742**

The Average Variance Extracted (AVE) value for the oncology nursing care quality variable exceeded 0.5 and was more significant than the value in the model construct, specifically 0.742 (Table 4). The formula for determining the latent values for exogenous variables (age, gender, education level, occupation, medical diagnosis, hospital where one is treated, relationship with the patient) and endogenous variable (quality of oncology nursing care) was as follows:

Latent value of exogenous variable = $\sqrt{1^2} = 1$

Endogenous variable latent value = $\sqrt{0.550^2} = 0.742$

As indicated in Table 5, the reliability of the questionnaire items was reported to be satisfactory, with a value of 0.967 (above the reliability standard of 0.7). Therefore, based on

the outer loading, AVE, latent reliability, and Cronbach's alpha values, all question items in the Indonesian version of the QONCS questionnaire were considered valid and reliable in elucidating each variable.

Table 5. Reliability test

	Cronbach's alpha	Composite reliability
Age	1.000	1.000
Gender	1.000	1.000
Level of education	1.000	1.000
Work	1.000	1.000
Medical diagnosis	1.000	1.000
Hospital	1.000	1.000
Relationship with patients	1.000	1.000
Quality of oncology nursing care	0.967	0.969

DISCUSSION

The current investigation supports the Indonesian version of the Quality of Oncology Nursing Care Scale (QONCS) questionnaire as a trustworthy and dependable tool for assessing the quality of oncology nursing care in Indonesia. Validity and reliability are essential when investigating the quality of a scale such as the Oncology Nursing Care Quality Scale. Validity pertains to the extent to which a scale measures its intended construct, while reliability refers to the consistency and stability of the measurement.

During the initial phase, translation and peer review were conducted by two experts, resulting in the acquisition of an Indonesian version of the questionnaire. The translation and peer review are critical steps in ensuring the linguistic and cultural equivalence of the questionnaire (Squires et al., 2013). This aligns with best practices in survey development, especially in cross-cultural research, where nuances in language can significantly impact responses (Sha & Gabel, 2020). This version required pilot testing to assure linguistic adaptation.

The pilot study is a valuable step to identify potential issues and refine the instrument before full-scale implementation (DeVellis, 2017). The modifications based on participant feedback demonstrate a commitment to linguistic adaptation and respondent understanding. Ensuring validity within the context of oncology nursing care necessitates confirming that the scale accurately reflects the pertinent quality dimensions within this field. This may entail consulting an oncology nursing expert to validate the items and ensure the scale captures the subtleties of care provided.

The initial construct model showed that questions 18, 19, 20, 21, 22, 23, 24, and 27 have outer loading values lower than 0.6. These questions relate to issues surrounding the nurse's concern for the patient's spiritual needs and the presence of the family during care. Indonesian people believe in the Oneness of God and uphold religious beliefs as fundamental. Indonesia adheres to Pancasila as a moral-spiritual guideline in all national development policies in various fields (Dimyati et al., 2021). Apart from that, family ties in Indonesian society are relatively high. Based on this situation, we recommend retaining this question item so that it can be used to evaluate the importance of paying attention to achieving spiritual needs in oncology nursing care and the family presence in accompanying the patient.

Conversely, reliability is crucial in obtaining consistent measurements over time and across different situations. This can be evaluated through test-retest reliability, where the scale is administered to the same group on two occasions with a time interval in between, and the scores are compared to assess consistency.

Collaborating with oncology professionals, conducting meticulous statistical analyses, and continuously refining the scale based on feedbacks are able to enhance the validity and reliability of the Oncology Nursing Care Quality Scale. Regular updates and revisions may also be necessary to align the scale with evolving oncology nursing standards and practices. Consulting an oncology nursing expert is prudent to ensure the scale's validity within the context of oncology nursing care (Polit & Yang, 2016). Experts provide insights into the nuances and specificities of care in this field, contributing to the instrument's content validity.

Collaborating with oncology professionals is crucial in developing and refining the Oncology Nursing Care Quality Scale. These professionals deliver a wealth of clinical experience and a deep understanding of the intricate aspects of oncology nursing. Their suggestions can contribute to the scale's face validity, ensuring it appears to measure what it intends to measure.

This study has both strengths and limitations. The robustness of investigation lies in its nature as an adaptation and validation study of QONCS conducted in several prominent cancer referral Indonesian hospitals situated in Java and Sumatra Islands. This empirical research offered substantial evidence of the validity and reliability of the instrument across a diverse range of participants' backgrounds. In contrast, a drawback of this study was the onlineinstrument distribution to respondents through Google form might lead a potential for participant bias. As a result, we recommend that future research employs paper-based instruments to engage participants from varied social, economic, and educational background.

The sample size calculation used the rule of thumb (five respondents for one statement item) was unmet. This is due to the study's hardship in finding samples according to the specified inclusion criteria, even conducted in several Indonesian hospitals. This was in line with the previous study reported that two critical factors in sample size consideration were ease access and the general quantity of the target population. The numbers in studies that involve patients, especially for special conditions, such as cancer patients, are generally small. Therefore, hospitals may only have a limited number of eligible patients, and not all of them are willing to participate in the field of study (White, 2022).

CONCLUSION AND RECOMMENDATION

In conclusion, after undergoing rigorous psychometric analysis, the Indonesian version of the QONCS has been proven as a valid and reliable instrument for evaluating the standard of oncology nursing care, as perceived by patients and their families, within the Indonesian context. This research implies the importance of using valid and reliable instruments in assessing the quality of care for oncology patients, which may help nurses to enhance their health services.

ACKNOWLEDGEMENTS

We thank the respondents who participated in this study and the nurses involved in the data collection. The author (D.N)

received financial support for the research from the Faculty of Nursing Universitas Andalas.

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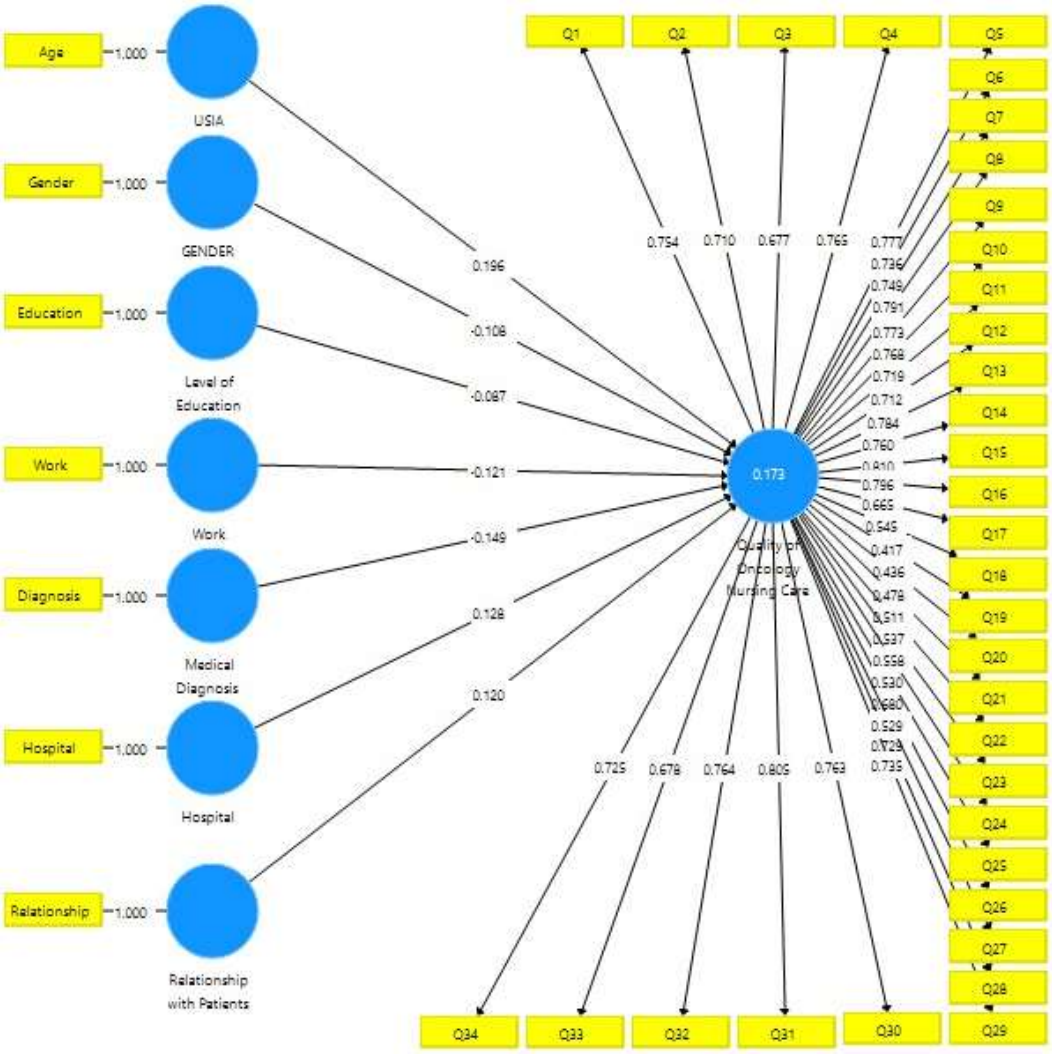

Figure 1a. Preliminary model construction

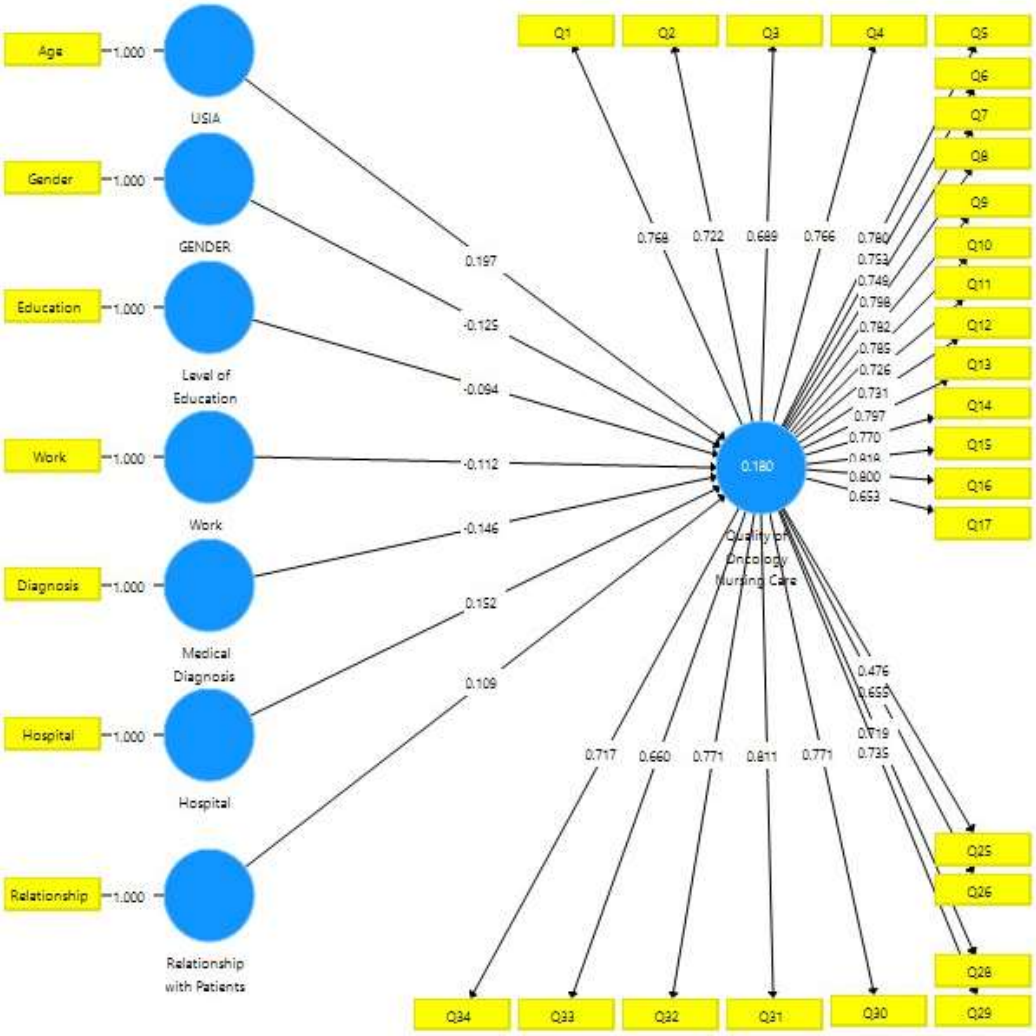

Figure 1b. Model construction after question items were removed

Hoseña, M. A. I. et al. (2024)
Jurnal Keperawatan Soedirman – Vol 19, No 1 page 16-21
http://jos.unsoed.ac.id/index.php/jks/index

ORIGINAL ARTICLE

RELATIONSHIP OF PROBLEMATIC INTERNET USE, FEAR OF MISSING OUT, LONELINESS AND NOMOPHOBIA AMONG FILIPINO NURSING STUDENTS

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Article Information
Received: 15 August 2023
Revised: 13 January 2024
Accepted: 14 February 2024

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DOI
10.20884/1.jks.2024.19.1.9476

ABSTRACT

The dominance of technology use has brought growing concerns regarding its influence on human living phenomena such as problematic Internet use, fear of missing out, and nomophobia. Hence, the study aimed to determine the relationship between problematic use of the Internet, fear of missing out, loneliness, and nomophobia among nursing students. A descriptive-correlational research design was conducted with 117 nursing students selected through purposive sampling. Data were collected using an online questionnaire consisting of the Generalized Problematic Internet Use Scale 2, Fear of Missing Out Scale, Nomophobia Questionnaire, and the UCLA Loneliness Scale. Data were analyzed using frequency distribution and percentages, means, standard deviations, and Pearson's r correlation. Results showed that problematic internet use significantly correlated with fear of missing out (r=0.223, p=0.015) and loneliness (r=0.289, p=0.002). In contrast, fear of missing out was revealed to have a significant negative relationship with nomophobia (r= -0.233, p=0.011). Despite the rise in digital activities among distance learning nursing students, loneliness and fear of missing out scores are low. However, higher nomophobia scores and strong relationships between concepts necessitate being alert to potential issues, keeping an eye on things, and adopting safety measures.

Keywords: *Fear of missing out; loneliness; nomophobia; problematic internet use*

ISSN : 1907-6637 **e-ISSN : 2579-9320**

INTRODUCTION

The internet offers a novel means of communication, enabling access to information on various subjects. The rapid progress of the internet has brought both positive and negative effects on society, particularly on its users. Scholars have investigated the consequences of internet usage, specifically when it is excessive, and the findings indicate issues such as problematic internet use, internet dependence, and pathological computer use (Liu, et al, 2020).

With this, nomophobia has been described as a relatively new psychological phenomenon that refers to discomfort, anxiety, nervousness, or anguish caused by dependence on mobile devices (Cain & Malcon, 2019). It occurs among individuals who habitually use Internet-based communication devices experience anxiety and distress when mobile devices are not available. They frequently fear not having access to the Internet as it opens the possibility of becoming unaware of messages, recent events, and various experiences shared on social media (Ayar et al., 2018). This may in turn cause feelings of distress and impair the function of the individual to perform daily activities (Yellowlees-Nissim, 2018) which is termed Problematic Internet Use or internet addiction.

Internet addiction may impair an individual's mental state of being, and its severity may be attributed to the well-being, self-esteem, and self-control of an individual (Roser et al., 2019). It has been revealed to be common among adolescents in Asian countries such as China, Hong Kong,

Japan, South Korea, Malaysia, and the Philippines, whereas its prevalence was highest in the Philippines with more than half (51%) of the population of the students having this problem (Mak et al., 2014). Social media allows individuals to manage and articulate their emotions, as many people involve themselves in social platforms to escape negative emotional states, such as feelings of loneliness. (Bottaro & Faraci., 2022). However, there have been concerns expressed regarding the potential for social media to cause lousy body image (harriger et al., 2023), increasing the risk of addiction and cyberbullying (Naslund et al., 2020), encourage phubbing practices (Chi et al., 2022), and harming mood. In addition, the excessive time spent on social networks due to the fear of not being able to keep abreast of developments in social networks reveals the Fear of Missing Out (FOMO) as a new type of addiction, especially the smartphones and other types of technology have developed (Gezgin et al., 2018).

FOMO has been described as the apprehensiveness that others might be experiencing fortunate events that are absent from the particular individual (Oberst et al., 2016). Its symptoms have been described as related to depression, less mindful attention, and other physical symptoms that affect an individual's physical, emotional, and cognitive health (Baker et al., 2016). Moreover, it is considered one of the underlying factors why individuals use social networking sites to constantly communicate and connect with friends, families, and other types of acquaintances (Muench & Muench, 2020). However, studies suggest that excessive use of smartphones resulting in nomophobia is correlated with loneliness. Loneliness has been defined as the outcome of a deficient social relationship that an individual experiences and a risk factor that may constitute a distressing affective experience and quality of life of a person in the future. People can feel lonely with or without being alone in a crowd. They spend less time on social activities, tend to talk less, and their attention and accession levels are significantly low (Gezgin et al., 2018).

The weight of this problem is now increasing globally at the same pace as the influence of technology on society. Therefore, the study was conducted to determine the relationship between Problematic Internet Use, FOMO, Loneliness, on Nomophobia Levels among nursing students.

METHOD

Study design

The study utilized a descriptive correlational approach. An online questionnaire was administered to the participants using a Likert-type scale to collect needed data. The data were collected from August 2021 to November 2021.

Sample/ Participants

The study utilized a purposive sampling technique involving nursing students selected Colleges of Nursing in Metro Manila, Philippines. A total of 117 nursing students between the ages of 18 to 21 participated in the study.

A priori analysis for a Pearson's r correlation was conducted using the statistical power analysis software G * Power (version 3.1). Sufficient sample size using an alpha of 0.05, a power of 0.95, and the required sample size was 115 based on the assumptions.

The study included male or female students with ranging from 18 to 22 years old and those who agreed to participate in the study. Students who are not regularly enrolled were excluded from the study.

Instrument

The study utilized a five-part questionnaire to determine the relationship between PIU, FOMO, Loneliness, and Nomophobia among selected nursing students. The following data-generating instruments were administered:

Personal Information sheet. This sheet includes information on the participants' year level, age, sex, place of residence, estimated family income, smartphone ownership, hours spent using a smartphone per day, data plan ownership, frequency of checking, number of phone calls made per day, number of phone calls received per day, number of text messages made per day, number of text messages received per day, number of applications on the smartphone, the context in which smartphone is used, and cause of fear when unable to use the smartphone.

Nomophobia Questionnaire (NMP-Q) was developed to explore the dimensions of nomophobia through a validated self-reported questionnaire (Przybylski et al., 2013). This tool has 20 items that use a 7-point Likert scale, which can be interpreted as 1 "Strongly Disagree" and 7 "Strongly Agree." The Cronbach's alpha for the NMP-Q is 0.945. The self-reported questionnaire includes four subscales such as not being able to communicate for items 10 to 15, losing connectedness for items 16-20, not being able to access information for items 1 to 4, and giving up convenience for items 5 to 9.

Generalized Problematic Internet Use Scale 2 (GPIUS2) was developed by Caplan to create a standardized tool to measure the five-factor model of PIU. This tool consists of 15 items to be rated on a 5-point scale with a Cronbach's alpha of 0.86. This instrument consists of five subscale including Preference for Online Social Interaction (POSI) for items 1, 6 and 11, Mood Regulation (MR) for items 3,8 and 13, Cognitive Preoccupation (CP) for items 5, 10 and 15, Compulsive Use (CU) for items 4, 9 and 14, and Negative Outcome (NO) for items 2,7 and 12 (Caplan, 2010).

Fear of Missing Out Scale was developed by Przybylski et al. (2013) to create robust individual differences to measure FOMO. It is a 10-item survey, with no corresponding subscale, that can be interpreted by computing the average of the individual responses (Przybylski et al., 2013). The instrument is a 5-point Likert scale, which can be interpreted as follows: 1=Not at all true of me, 2=Slightly true of me, 3=Moderately true of me, 4=Very true of me, and 5=Extremely true of me. The Cronbach's alpha of the questionnaire is.87 to .90.

UCLA Loneliness Scale (Version 3) was designed to measure the subjective feelings of loneliness and social isolation (Russell, 1996). It is a 20-item scale with no corresponding subscale, respondents rate each item on a scale from 1 (Never) to 4 (Often). The coefficient alpha is in the range of 0.89 to 0.94.

Data collection Procedure

The study involved primary data collection using self-administered questionnaires through online surveys using Google Forms. A letter of request to conduct the study was forwarded to the Office of the Dean. When approval had been obtained and ethical clearance had been secured, the researcher collected the data from the respondents using Google Forms. No face-to-face contact was involved in the data collection process. Further, the students' responses of the students in the questionnaires were collected.

Data analysis
The data were analyzed using frequency, percentage distribution, mean, standard deviation, and Pearson's r correlation. A Kolmogorov-Smirnov test was conducted and was revealed to be not significant (>0.05).

Ethical consideration
The study has conformed with the ethical standards of conducting research involving human participants. The study was approved by the San Beda University – Research Ethics Board (SBU-REB) with Protocol No. 2020-020

RESULTS

Demographic profile of the participants
Table 1 shows the demographic profiles of the participants. It can be seen that the mean age of the participants was 20.22 (±1.49). In addition, most of the participants were female (73.5%), single (66.7%), living in an urban area (69.23%), had prepaid data plan ownership (60.68%), and spent an average hour of 6.71 (±3.25) per day.

Table 1. Demographic Profile of the Respondents (n = 117)

Profile	n (%)	Mean (SD)
Age (Years)		20.22 (±1.49)
Sex		
Male	31 (26.5%)	
Female	86 (73.5%)	
Place of Residence		
Urban/City	81 (69.23%)	
Rural/Town	36 (30.77%)	
Data plan ownership		
Prepaid	71 (60.68%)	
Postpaid	46 (39.32%)	
Hours spent on smartphone		6.71 (±3.25)

The PIU, FOMO, Loneliness, and Nomophobia mean scores among the participants are shown in Table 2. It was revealed that the mean scores among the participants were 4.10 (±1.17) for PIU, 2.32 (±0.67) for FOMO, 45.23 (±10.30) for loneliness, and 82.78 (±22.19) for nomophobia.

Table 2. Problematic Internet Use, Fear of Missing Out, Loneliness, and Nomophobia among the participants (n=117)

	Mean	Standard Deviation
Problematic Internet Use	4.10	±1.17
FOMO	2.32	±0.67
Loneliness	45.23	±10.30
Nomophobia	82.78	±22.19

The relationships among PIU, FOMO, Loneliness, and Nomophobia were determined using Pearson's r correlation. Results showed that PIU is significantly.

Table 3. Relationships among Problematic Internet Use, Fear of Missing Out, Loneliness, and Nomophobia

	FOMO	Loneliness	Nomophobia
Problematic Internet Use	0.223*	0.289*	0.089
r coefficient	0.015	0.002	0.336
p-value			
FOMO		0.040	-0.233*
r coefficient		0.664	0.011
p-value			
Loneliness			0.061
r coefficient			0.512
p value			

**p value is significant at 0.05 level*

DISCUSSION

This study was conducted to determine the revealed relationship among PIU, FOMO, Loneliness, and Nomophobia Levels among University Nursing Students.

One of the significant findings of this study was that selected nursing students developed PIU, FOMO, and loneliness as a response to their social needs. The positive correlation of PIU with FOMO is supported by the study of Reyes et al. (2018) wherein it was found that the growing incidence of Internet dependence among people is precipitated by their need to satisfy their uncontrollable urge to engage with others to avoid missing out. The social interaction that students obtain from technological means is perceived to have significantly contributed to their state of feelings. Results also showed that the components of PIU have high statistical significance with FOMO. The link between internet use and FOMO is beneficial, as FOMO may positively enhance well-being if social media is used to increase social engagement (Roberts & David, 2020). However, psychopathology and addictive behavior which may predispose to excessive internet use, are rooted in FOMO and its associated negative affectivity (Alt, 2015; Blackwell et al., 2017; Elhai et al., 2020). This condition creates dependent behavior among internet users, which hinders their daily activities. Also, this can serve as an emerging threat to the social, mental, as well as physical health of nursing students. Nursing students also positively accept the peer learning experiment as a social environment (Hamzah et al., 2019)

It was also revealed that PIU was correlated with loneliness, which was supported by several studies (Kim et al., 2017, Simcharoen et al., 2018). This finding means that the higher the problematic internet use, the higher the loneliness among the participants. It will lead young adults to look for other ways to interact socially with other individuals who are not able to be owned when undertaking face-to-face social interactions. Utilizing social media on the Internet is one method. Costa et al. (2018) revealed that those who are lonely prefer to use the Internet for social contact provides credence to this. The use of social media, in particular, as a replacement for in-person social engagement can lead to young adults having trouble using the Internet. This is consistent with research by Reinaldo and Sokang (2016), which discovered that young adults with highly problematic Internet use are those who use the Internet more frequently than usual for social media access and other online activities.

Fear of Missing Out was also found to be significant with nomophobia, However, there needs to be more studies that looks at how FOMO affects nomophobia in the literature. Nonetheless, research findings that investigate the

relationships between the concepts either directly or indirectly can be obtained. For example, studies have reported that as the duration of smartphone use increases, the level of Internet addiction also increases (Erbil et al., 2020; Yayan et al., 2018), an increase of 1 h in Internet use elevates the risk of internet addiction by 10 % (Gunay et al., 2018), or students who use the Internet for >3 h a day are more at risk in terms of internet addiction (Anand et al., 2018). When this data is combined with the finding that students most commonly utilize mobile Internet to access the internet, it becomes even more significant. It is evident from the data that smartphone and internet addiction increased with the spread of the pandemic, as did the use of cell phones and excessive Internet usage. Specifically, the trend of distance learning has led to more people using cell phones and spending more time online (Eskin Bacaksiz et al., 2022). Hence, it is necessary to promote efficient and healthy use of mobile technology in learning spaces, to avoid the emergence of nomophobia and its consequences.

The current population has an abundant dependence on these devices, which makes them more vulnerable, with the adolescent population presenting a more significant risk factor. However, other literature revealed FOMO to have an association with nomophobia, but this study has shown to have a significant negative relationship between the two concepts. Results showed that regardless of not getting anxious when other people have fun without them, they still like to check on what others are doing. This justifies that the effects of FOMO on nomophobia remain understudied. Simply stating that similar fears were raised when the other technologies were introduced is not sufficient: the immersive and shared qualities of the virtual world, and its sheer penetrance, make it potentially more consequential.

It is noteworthy to reveal that the study's result showed that there was no significant relationship between loneliness and nomophobia. Although this study's outcome is not consistent with several studies (Yıldız-Durak, 2018; Özdemir et al., 2018), it is accordance with the results of the studies of Çelebi et al. (2020) and Chethana et al. (2020). One of the possible reasons is that the majority of smartphone use is intended for communication. Additionally, it makes their lives easier by giving them access to many programs that help them quickly maintain everyday needs. In other words, individuals may experience nomophobia not because they are lonely but as smartphones facilitate their work and ease their lives.

Another key finding revealed that loneliness was not significantly correlated with nomophobia and FOMO. This coincides with the study by Twenge that the relationship between the increasing number of smartphone and internet use and loneliness has yet to be proven, but its rapid spread may be connected with the rise in loneliness (Twenge et al., 2021). Thus, the relationship between FOMO on nomophobia remains understudied. Simply stating that similar fears were raised when the other technologies were introduced is not sufficient: the immersive and shared qualities of the virtual world and its sheer penetrance, make it potentially more consequential.

In light of the findings of the study, there were also several limitations. First, the study only included nursing students as the sample, including other students from other programs and people of different ages would confirm the psychological basis of the variables under study. Second, the data were collected during the peak of the COVID-19 pandemic when there was a community lockdown in our country. Hence, this affected the internet-related activities of the participants as therewere no other ways to communicate with their friends and other family members.

CONCLUSION AND RECOMMENDATION

The study concluded that PIU is significantly correlated with FOMO and loneliness while, FOMO has a significant negative relationship with nomophobia. Despite the rise in digital activities among distance learning nursing students, loneliness and fear of missing out scores are low. However, higher nomophobia scores and strong relationships between concepts necessitate being alert to potential issues, keeping an eye on things, and adopting safety measures.

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Pamungkas, R. A. et al. (2024)
Jurnal Keperawatan Soedirman – Vol 19, No 1 page 22-30
http://jos.unsoed.ac.id/index.php/jks/index

ORIGINAL ARTICLE

PREDICTIVE FACTORS OF DIABETES MELLITUS SELF-MANAGEMENT (DMSM) PRACTICE: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Article Information
Received: 21 November 2023
Revised: 13 February 2024
Accepted: 23 February 2024

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DOI
10.20884/1.jks.2024.19.1.9899

ABSTRACT

The diabetes mellitus self-management (DMSM) is integral to controlling blood glucose and preventing diabetes complications. There were still gaps in the analysis controversy of the outcome that need to be explored by systematic review and meta-analysis. The review aimed to synthesize the predictive factors associated with practice DMSM practice among Type 2 Diabetes Mellitus (T2DM). This study applied the systematic and meta-analysis method. Three databases, Scopus, PubMed, and Medline, were included in this study to obtain the relevant articles. Keywords used were “self-management”; “diabetes mellitus”; self-care; factors associated with self-management". Comprehensive Meta-Analysis (CMA) was used to analyze and interpret the effect size of the review study. The results showed that 15 predictive factors were associated with DMSM practice, including age, sex, education level, illness duration, and financial barriers. Diabetes knowledge, insulin in treatment, belief of treatment, social support, occupational, personality, diabetes-specific emotional distress, perception of the disease, quality interaction with healthcare providers, and self-efficacy were considered predictive factors. The findings suggested that a wide range of personal and environmental factors were the most influential factors associated with the implementation of DMSM in health care services. Therefore, it is vital to construct theory-based strategies to improve DMSM practice among diabetes population.

Keywords: *Diabetes mellitus self-management; meta-analysis; predictive factors; systematic review; type 2 diabetes mellitus*

ISSN : 1907-6637 **e-ISSN : 2579-9320**

INTRODUCTION

The prevalence of diabetes mellitus (DM) is increasing steadily around the world. The World Health Organization (WHO) calculated that 422 million people live with DM. Among the Asian region, it could be predicted that about 60% of diabetes patients by 2030 (World Health Organization [WHO], 2018). The International Diabetes Federation (2021) reported that the prevalence of diabetes was in the range of 537 million people, and it could be predicted that it will be 643 million people in 2030 and 783 million people by 2045. Most people (80%) lived in low- and middle-income countries, including Indonesia (International Diabetes Federation [IDF], 2013).

Diabetes mellitus (DM) is a noncommunicable disease, and one of the ways to manage DM is through diabetes mellitus self-management (DMSM). DMSM is defined as the ability of patients with Type 2 DM (T2DM) to manage physical and psychosocial symptoms and behavioral challenges to deal with their conditions (Grady & Gough, 2014; Qi, et al., 2021). In the context of diabetes, DMSM is comprised of five domains, including 1) diet control, 2) physical activity, 3) blood glucose monitoring, 4) adherence to medication, and 5) prevention of diabetes complications. T2DM patients are required to make a multitude of daily self-management decisions and perform complex care activities. DMSM is crucial to helping diabetic patients navigate decisions and improve a healthy lifestyle to improve health outcomes (Brunisholz et al., 2014). The practice of diabetes mellitus self-management (DMSM) is an effective strategy to

strengthen blood glucose control over time. This led to improving 24-hour daily living and often included changes in lifestyle behaviors (Pamungkas & Chamroonsawasdi, 2020). DMSM requires patients to reconcile their resources, values, and preferences with a healthy lifestyle that includes diet, active physical exercise, avoiding smoking and alcohol consumption, adherence to medication, monitoring blood glucose, and prevention of complications (Pamungkas et al, 2017). DMSM is also closely related to the concept of self-management practice, which can be connected to the practice of activities that individuals initiate and complete in their own behavior to maintain life, health behaviors, and well-being (Pamungkas & Chamroonsawasdi, 2020). According to the concept of self-management, the individual learns and performs the purposeful activity that requires a certain level of maturity, enabling them to perform effective activity, persistent, controlled, and consistent actions. Therefore, self-management activity is not only a process directed inward, but also the ability to perform activities that are also affected by knowledge, social support, psychological issues, and the ability to participate in DMSM practice.

Some evidence showed that patients who received diabetes self-management training can manage their blood glucose levels, dietary habits, and glycemic index (Emara et al, 2021; Pamungkas et al., 2015). Reyes et al. (2017) also described the importance of DMSM in achieving optimal glycemic control, decreasing diabetes morbidity and mortality, and maintaining health status, including self-monitoring and medication adherence in daily living.

However, barriers to practicing DMSM are unavoidable and are associated with stress or other emotional distress, low self-commitment, lack of knowledge, low self-efficacy, and insufficient support from family (Miller & Dimatteo, 2013; Tong et al., 2015). Previous studies reported some tendencies toward predictive factors of DMSM practice. However, there were still gaps in the analysis controversy of the factors that need to be explored by systematic review and meta-analysis to determine the factors associated with the practice of DMSM and estimate the most substantial factors by meta-analysis. The study aimed to synthesize the findings of factors associated with the practice of DMSM among T2DM patients.

METHOD

Data sources

This study applied systematic review and meta-analysis to determine the factors associated with DMSM among T2DM patients. Three databases, PubMed, Scopus, and Medline, were extracted from relevant articles. More than 582 articles were obtained and evaluated using a systematic review following the PRISMA framework. Predictive factors in DMSM were applied as the medical subject heading (MeSH) in an abstract and the title of an article. Thirty-eight articles were almost fit for the meta-analysis.

Search strategy

We applied a term to obtain the relevant articles in this review, including “predictive factors on diabetes self-management; “self-management”; “diabetes mellitus”; self-care management; factors associated with self-management". Available titles and abstracts related to the predictive factors in diabetes mellitus self-management were systematically reviewed to find the most suitable articles. To ensure updates and relevant articles, the search for articles was limited to those published between 2014 and 2022.

Eligibility criteria for the study

This study used the PICO model (Participant-Intervention-Comparison-Outcomes) to create inclusion criteria for synthesizing and assessing the articles as follows;
P: Uncontrolled type 2 diabetes mellitus (T2DM) patients I: Predictive factors
C: -
O: The practice of diabetes mellitus self-management (DMSM)

The inclusion criteria for the selected article included 1) published journals in the English; 2) complete articles of correlation study; and 3) the outcomes measured were predictive factors associated with DMSM practice. Studies of quasi-experiments, randomized control trials (RCT), qualitative research, and mixed-method studies were excluded. We excluded review articles, such as literature review, concept analysis, systematic review, and dissertation.

Screening process

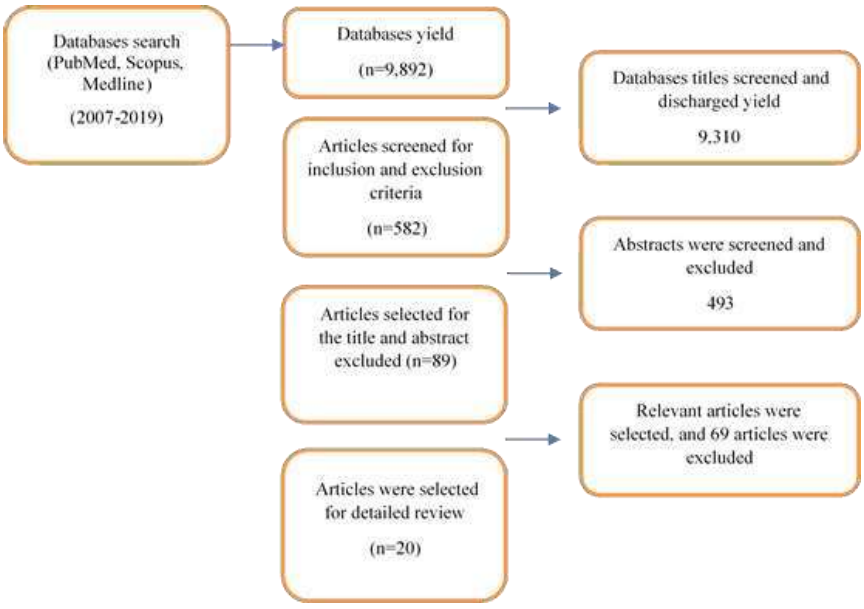

Figure 1. Articles screened process

The first reviewer selected articles according to the inclusion criteria. Two reviewers independently analyzed each title and abstract on an unblinded standardized basis. In this step, studies that measured unclear information on predictive factors in DMSM practice were excluded in this step. The second reviewer re-evaluated the included articles on whether these studies met or not with the inclusion criteria. All studies have been identified and extracted from the matrix table by two authors (Figure 1).

Quality assessment and controlling the risk of bias

A nine-checklist system for observational studies was used to assess the quality of each article. The key domains of this instrument comprised nine items, including 1) study questions, 2) study population, 3) comparability of subjects, 4) exposure, 5) outcome measurement, 6) statistical analysis, 7) results, 8) discussion, and 9) funding/sponsorship. Each item was coded as fully met (Yes = 2), partially met (Partial=1), or not met (No =0). Total scores were estimated for all studies, such as low instrument validity was 0–7; moderate validity of instrument presented scores of 8-14, and high instrument score validity was 15–20.

Statistical analysis

Meta-analysis was performed using Comprehensive Meta-analysis (CMA), Version 3.0. The standard error and the 95% confidence interval (CI) of β, correlation coefficients or OR were collected to understand the association between predictive factors and DMSM practice. The random-effects model was used to generalize the study results. The Cochran Q statistic and the I^2 statistic were considered for the testing of heterogeneity. Beta coefficients were pooled only when using a similar DMS. Pooled β ratios or Fisher's z scores were estimated using the inverse-variance weighted DerSimonian and Laird procedure for random-effects meta-analysis.

Table 1. Summary of quality assessment for correlational studies (n=20)

Quality assessment of correlational studies	No	Yes	Validity
Design			
1. Was the study prospective?	0	20	19.5
2. Was probability sampling used?	1	19	
Sample			
1. Was the sample size justified?	0	20	20
2. Was the sample drawn from more than one site?	0	20	
3. Was anonymity protected?	0	20	
4. Response rate of more than 60%	0	20	
Measurement			
1. Was the factor measured for reliability?	3	17	18.5
2. Was the factor measured using a valid instrument?	0	20	
Measurement of DV			
1. Are the effects observed rather than self-reported?	4	16	17.6
2. Did the scale used to measure the results have an internal consistency of more than 70?	1	19	
3. Was a theoretical model/framework used for guidance?	1	19	
Statistical analysis			
1. If multiple factors were studied, are the correlations analyzed?	0	20	20
2. Are outliers managed?	0	20	

Overall study validity rating:
(0-7 = low; 8-14 = medium; 15-20 = high

RESULTS

Description of studies

A total of 9,892 studies were obtained from the databases and 20 studies were included in this meta-analysis. A detailed quality assessment of the selected studies is shown in Table 1. The number of studies tested and the results of the meta-analysis results of this study are shown in Table 2.

Eligible factors associated with DMSM practice

Eligible factors associated with the practice of DMSM consist of age, sex, diabetes knowledge, being insulin in treatment, belief in the effectiveness of treatment, social support, occupation, personality traits, diabetes-specific emotional distress, illness perception, quality interaction between a patient and a healthcare provider, and self-efficacy.

1. Age

Age was often associated with poor glycemic control among diabetic patients. Six studies (Ausili et al., 2018; Gharaibeh, 2018; Rachmawati et al., 2019; Yang et al., 2016) investigated the positive association between age and use of the DMSM practice. In aging, people were significantly related to poor DMSM practice due to multiple comorbidities and physical disability.

2. Gender

Two studies examined the association between gender and implementation of DMSM practice (Ausili et al., 2018; Gharaibeh, 2018). After combining the data, it was found that women had better overall DMSM practice than their male counterparts.

3. Diabetes knowledge

Knowledge is essential in implementing the practice of DMSM and preference factors to avoid misconceptions among T2DM patients. This meta-analysis examined the association between knowledge and DMSM practice. The pooled findings confirmed that diabetes knowledge was positively associated with DMSM practice (Ausili et al., 2018; Barengo et al., 2014; Dao-Tran et al., 2018; Jiang et al, 2019; Rachmawati et al., 2019; Tahmasebi & Tavafian, 2015; Yang et al., 2016).

4. Insulin treatment

Insulin therapy helped T2DM patients to control their blood glucose levels in the normal range and prevent diabetes complications. In this study, two studies examined the relationship between insulin in treatment and DMSM practice (Benrazavy & Khalooei, 2019; Houle et al., 2015).

Table 2. A meta-analysis of a fixed effect model on predictors for DMSM practice

Predictors	Studies (n)	Participants (n)	ES	95%CI	Q-statistic	I^2-value(%)	Fail-safe N (Z)	Study references
Age	7	7487	0.037	0.014-0.060	86.866	94.244	3.235	(14-19, 34)
Fixed effect			0.037	0.014-0.060			3.235	
Random effect			0.045	-0.102-0.191			0.601	
Gender	3	6807	0.033	0.009-0.057	57.388	96.514	2.752	(17-19)
Fixed effect			0.033	0.009-0.057			2.752	
Random effect			0.011	-0.205-0.228			0.105	
Level of education	7	8357	0.051	0.029-0.072	11.729	40.320	4.674	(15, 17, 18, 20, 25, 26, 35)
Fixed effect			0.051	0.029-0.072			4.674	
Random effect			0.069	0.029-0.109			3.374	
Duration of illness	5	7065	0.049	0.026-0.072	10.866	63.188	4.176	(15, 18, 20, 25, 26, 35)
Fixed effect			0.049	0.026-0.072			4.176	
Random effect Financial barriers	7	2166	0.079	0.010-0.147			2.266	(14, 15, 19, 20, 26, 32)
Fixed effect Random effect								
Diabetes knowledge	9	10009	0.084	0.065-0.103	137.10	94.165	8.466	(14, 15, 18-24)
Fixed effect			0.084	0.065-0.103			8.466	
Random effect			0.123	0.021-0.222			2.375	
Being insulin in the treatment	2	895	0.166	0.101-0.229	47.141	97.87	5.010	(25, 26)
Fixed effect			0.166	0.101-0.229			5.010	
Random effect			0.245	-0.226-0.623			1.021	
Belief in treatment effectiveness	3	962	0.064	0.001-0.128	37.001	97.29	7.972	(15, 22, 27)
Fixed effect			0.064	0.001-0.128			7.972	
Random effect			0.057	-0.500-0.166			1.423	
Social support	6	1714	0.193	0.147-0.238	86.782	95.39	8.079	(15, 16, 21, 22, 27, 28)
Fixed effect			0.193	0.147-0.238			8.079	
Random effect			0.166	-0.057-0.374			1.459	
Occupation	2	904	0.268	0.207-0.328	7.745	87.08	8.261	(15, 19)
Fixed effect			0.268	0.207-0.328			8.261	
Random effect			0.253	0.073-0.417			2.741	
Personality	2	906	0.108	0.043-0.172	78.42	98.72	3.262	(21, 29)
Fixed effect			0.108	0.043-0.172			3.262	
Random effect			0.144	-0.411-0.622			0.490	
Diabetes-specific emotional distress	2	1090	0.114	0.069-0.158	17.93	94.42	4.996	(23, 30)
Fixed effect			0.114	0.069-0.158			4.996	
Random effect			0.324	-0.160-0.682			1.324	
Illness perception	3	556	0.270	0.191-0.345	517.49	99.80	6.495	(20, 21, 31)
Fixed effect			0.270	0.191-0.345			6.495	
Random effect			0.627	-0.878-0.993			0.686	
Quality interaction of the patient-healthcare provider	2	526	0.337	0.259-0.411	0.474	0	8.019	(21, 32)
Fixed effect			0.337	0.259-0.411			8.019	
Random effect			0.337	0.259-0.411			8.019	
Self-efficacy	10	4954	0.049	0.021-0.077	238.49	96.22	3.466	(15, 16, 20-24, 27, 28, 33)
Fixed effect			0.049	0.021-0.077			3.466	
Random effect			-0.007	-0.157-0.143			-0.092	

5. Belief in the effectiveness of treatment

T2DM patients with positive beliefs about treatment could influence individual decisions on their diabetes management. Three studies (Barengo et al., 2014; Dao-Tran T, 2018; Gunggu et al., 2016) examined the association between belief in the treatment and DMSM performance. After combining the three previous studies, the results showed a positive association with the practice of DMSM among T2DM patients.

6. Social support

Social support crucially influences the availability and quality of cultural diabetes self-management. Six current studies discussed the importance of support from family, community, and healthcare providers to strengthen DMSM practice (Barengo et al., 2014; Dao-Tran, 2018; Gunggu et al., 2016; Banda et al., 2019; Tahmasebi & Tavafian, 2015; Wardian & Sun, 2014).

7. Occupation

Two studies examined the association between occupation and the implementation of DMSM practice among T2DM patients (Ausili et al., 2018; Barengo et al., 2014).

8. Personality traits

Personality traits, especially types A and D, have been linked to adverse outcomes in various somatic diseases. This could lead to certain aspects of suboptimal health behaviors. In this review, two studies examined the positive relationship between personality traits and DMSM practice among T2DM patients (Morikawa et al., 2019; Tahmasebi & Tavafian, 2015).

9. Diabetes-specific emotional distress

Diabetes-specific emotional distress is the emotional response and relentless burden due to daily self-management. A study was considered to explore the association between diabetes-specific emotional distress and suboptimal DMSM practice among T2DM patients (Quek et al., 2019).

10. Illness perception

The perception of illness was found to be a significant factor influencing self-care practices, psychological distress, and other health outcomes among people living with T2DM patients. After data fooling, two studies showed a significant association between illness perception and DMSM practice to control health behaviors (Kugbey et al., 2017; Tahmasebi & Tavafian, 2015).

11. Quality interaction between patients and healthcare providers

Patient-provider relationships have recently emerged as cornerstones of quality healthcare. Empathy, secure communication, and shared decision making are essential for a positive patient-provider relationship. In this review study, two studies explored the quality interaction between patients and healthcare providers as predictive factors in DMSM practice (Hyman et al., 2017; Tahmasebi & Tavafian, 2015).

12. Self-efficacy

Self-efficacy plays a significant role in the management of diabetes. Self-efficacy can directly induce motivation to take health-promoting behavior through efficacy expectations and influence the abilities of patients to perform their behaviors. Ten previous studies showed positive effects of self-efficacy on the DMSM practice (Alvarado-Martel et al., 2019; Barengo et al., 2014; Dao-Tran, 2018; Gunggu et al., 2016; Jiang et al., 2019; Banda et al., 2019; Tahmasebi & Tavafisn, 2015; Wardian & Sun, 2014; Zulman et al., 2012).

Summary of weight effect sizes of predictors on DMSM practice

Table 3 summarizes the weight effect sizes of the predictors in the DMSM practice, failsafe N, homogeneity test, and the 95% confidence intervals (CI) for each predictor. Twenty observational studies contributed to this meta-analysis and were pooled to identify predictive factors in DMSM practice. Table 3 summarizes the weighted effect sizes of various predictor variables on the performance of the Diabetes Self-Management Support Measures, along with their heterogeneity as measured by the I^2-value and the number of studies investigating each predictor. A higher number of studies can provide more confidence in the estimation of effect size. "Self-efficacy" has been studied in 10 different studies, which is the highest number in this table. Here is a detailed explanation of the table.

Table 3. The weight effect sizes of predictors (with n ≥ 2) on DMSM practice

Predictor variables	Effect size	I^2-value (%)	Number of studies
Age	0.037	94.244	7
Gender	0.033	96.514	3
Level of education	0.069 (Random effect)	40.320	7
Duration of illness	0.049	63.188	5
Financial barriers	0.08	96.52	7
Diabetes knowledge	0.084	94.165	9
Being insulin in the treatment	0.166	97.87	2
Belief in treatment effectiveness	0.064	97.29	3
Social support	0.193	95.39	6
Occupational	0.268	87.08	2
Personality	0.108	98.72	2
Diabetes-specific emotional distress	0.114	94.42	2
Illness perception	0.270	99.80	3
Quality interaction of patient-healthcare provider	0.337 (Random effect)	0	2
Self-efficacy	0.049	96.22	10

Effect size

The effect size is a quantitative measure of the magnitude of the experimental effect. It represents the strength of the relationship between each predictor variable and the DMSM practice. The larger the effect size, the stronger the relationship. For example, the "quality interaction patient-healthcare provider" has the highest effect size of 0.337, indicating a strong relationship with the practice of DMSM.

I^2-value

The I2-value represents the percentage of variation between studies that is due to heterogeneity rather than chance. A

high I^2 value (close to 100%) suggests that there is substantial heterogeneity, which means that the effect sizes of different studies vary widely. For example, "Illness perception" has an I^2-value of 99.80%, indicating very high heterogeneity among the studies.

DISCUSSION

Age and sex associated with DMSM practice among T2DM patients. According to previous studies, a study in Tunisia showed that 94% of younger patients have poor glycemic control related to a lack of experience in managing their self-management behaviors (Alberti, 2007). Another study conducted in Korea reported that women have less consent to glycemic control than men (Choe, Kim, Ro, & Cho, 2018). However, older patients are likely to adhere more to medical therapy, consume a healthy diet, and tend to keep their follow-up appointments more regularly than younger patients. Those who keep their appointments can achieve better glycemic control. Regarding the gender factor, some studies also reported that women were likely to have poor glycemic control compared to men. This condition was associated with women having less physical activity to control their disease and less of a priority in maintaining healthy behavior (Juarez et al., 2012; Mohamed, Mahfouz, & Badr, 2020). Five studies reported the association between the duration of the illness and the practice of DMSM. A study showed that a longer duration of the disease managed better diabetes management, including self-monitoring blood glucose (SMBG), diet modification, and physical activity (Zhao et al., 2019).

Knowledge of diabetes is one of the most important predictive factors to improve healthy behavior. Lack of knowledge is a preference factor for misconceptions on perceived health information and misconceptions within DMSM practice. Diabetes patients always face some barriers to misconceptions of insulin risk (Peyrot et al., 2012), myths, and doubts about specific types of foods and food preparation for diabetes patients (Laranjo et al., 2015).

Insulin injection is an essential strategy to manage blood glucose levels and maintain successful x self-management behavior of duration among T2DM patients. The injection has been recommended for patients with diabetes and healthcare providers as an integrated part and an option after behavior modification to improve the blood glucose level of DMSM practice (Gorska-Ciebiada, Masierek, & Ciebiada, 2020). However, its impact as a psychological effect on patient uptake and adherence to CBG tests and insulin injection remains significant and important for T2DM patients to cope with (Shlomowitz & Feher, 2014). Intense fear of self-injection is the most plausible reason for precipitating psychological distress (Pamungkas & Chamroonsawasdi, 2020).

Social support crucially influences the availability and quality of cultural diabetes self-management. A study reported that family support affects patient self-management behaviors (Miller & DiMatteo, 2013). Patients who received support could solve the problem and establish positive communication for diabetes care. It could influence the positive relationship among them on managing and maintaining self-management behaviors. For this reason, family social support was effective in improving diabetes self-management behaviors.

Predictors of diabetes-specific emotional distress had a large effect size with respect to DMSM practice. Patients with emotional distress led to uncontrolled diabetes self-management, which will affect emotional responses, including discouraged about treatment goals, worrying about hypoglycemia condition or severe complications, and incorrectly defining the concrete goals for DMSM (Zulman, Rosland, Choi, Langa, & Heisler, 2012). The previous study reported that depressive problems and health-related distress and perceived family support significantly effect dietary behavior practice (Rondhianto, Ridha, & Budi, 2023). Illness perception has been considered an influencing factor in self-care practice. A study showed the positive effect of diabetes management practice, psychological issues, and health outcomes among patients with T2DM (Kugbey et al., 2017). The relationship between disease perception and diabetes outcomes was influenced by participation in self-management with the representation of their illness (Nyarko, 2014).

Regardless of the interaction between patient and provider, communication skills are needed for DMSM practice. A healthcare provider must have a positive communication skill and relationships with patients to provide support in an appropriate way for DMSM practice. Good interpersonal relationships between patients and providers could achieve optimal goals and improve diabetes outcomes (Renaldi, Riyadina, Qamar, & Sauriasari, 2021). Unfortunately, many patients confirmed that there are some barriers to collaborative DMSM practice, which affects adherence (Pamungkas, Chamroonsawasdi, Vatanasomboon, & Charupoonphol, 2019).

Bandura (1997) introduced the concept of self-efficacy in the context of cognitive behavior modification in patients with chronic diseases. Stronger personal efficacy has been reported among individuals to be interconnected with healthy physical outcomes, meeting goals, and greater social integration. When patients believe that they can perform self-management behaviors, it can positively impact their confidence in practicing self-management activities (Dehghan et al., 2017). A study reported that people with the highest self-efficacy effect significantly control blood glucose (Cosansu & Erdogan, 2014).

STRENGTH AND LIMITATION

This systematic review focused on predictive factors associated with health outcomes. It was considered as the rigorous information to obtain factors associated with DMSM practice. Another strength was concerned on representative of the studies with variety of cultural groups among different countries. However, the limitation of this study was concerned on only 20 published articles. The total number of studies might not cover all target group in different setting. Another limitation found in this study included the difficulty of generalization of the contribution of factors and the relatively small number of studies in some factors were included in the meta-analysis.

CONCLUSION AND RECOMMENDATION

In conclusion, this study was the first study in Indonesia and provided 15 predictive factors associated with DMSM including age, sex, level of education, duration of the illness, financial barriers, diabetes knowledge, being insulin in treatment, belief in the control of treatment, social support, occupational, personality, diabetes-specific distress, perception of the illness, quality interaction between patient and healthcare provider, and self-efficacy. The implication for clinical practice was to provide information on the factors that influence DMSM. This study was also the first step to developing the best theory-based intervention for diabetes patients. Future research should be conducted with a wide range of personal and environmental factors that were the

most significant factors associated with the implementation of DMSM in health care services. Therefore, theory-based strategies must be constructed to improve DMSM practice among the diabetes population.

ACKNOWLEDGMENTS

The authors thank DRTPM of the Ministry of Education, Culture, Research, and Technology, Republic of Indonesia, for granting this research

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Hidayat, I. S., Damiati, N., & Al-Ayubi, M. T. A. (2024)
Jurnal Keperawatan Soedirman – Vol 19, No 1 page 31-38
http://jos.unsoed.ac.id/index.php/jks/index

ORIGINAL ARTICLE

NURSING STUDENTS' EXPERIENCES OF PALLIATIVE CARE FOR DYING PATIENT

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Article Information
Received: 3 March 2022
Revised: 1 June 2023
Accepted: 14 February 2024

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DOI
10.20884/1.jks.2024.19.1.5499

ABSTRACT

A nurse requires to acquire the proper ability to care for dying patients. In nursing education, palliative care is a complex action that tends to be challenging for nursing students. This is because there is an interaction among learning professionalism, emotional empathy, and other grieving feelings related to the palliative conditions of the patient. Palliative care interventions provide various challenges and learning for nursing students according to socio-cultural and demographic characteristics. This study aimed to determine nursing students' experiences of caring for dying patients. This research was qualitative research with a phenomenological design. The data was obtained through in-depth interviews. Based on data saturation, 12 informants had experiences of caring for dying patients within a previous year, obtained through a purposive sampling method. The audio recordings were collected and analyzed using the Collaizi technique. This study identified four themes: 1) feelings of caring for dying patients; 2) caring for dying patients; 3) self-influence in caring for dying patients; and 4) barriers to caring for dying patients. Feelings of fear, tension, confusion, and anxiety emerged when first time caring for a dying patient. The results of this study are expected as a reference for further research related caring for dying patients.

Keywords: *Care; dying; end-of-life; experiences; nursing student*

ISSN : 1907-6637 **e-ISSN : 2579-9320**

INTRODUCTION

The demands for end-of-life care in hospitals increase in line with the incidence of chronic diseases escalation. The Global Report on Non-Communicable Diseases (NCD) by World Health Organization (WHO) states that the percentage of deaths was 63% compared to infectious diseases. In Indonesia, the trend of deaths from NCDs elevated from 37% in 1990 to 57% in 2015 (WHO & Ministry of Health RI, 2017). Death is a natural occurrence that requires a special approach or intervention and well-known as part of palliative nursing concept (Garrino, Contratto, Massariello, & Dimonte, 2017). Palliative nursing care is aimed to improve the quality of life of patients and their families by assisting to defeated various physical, psychological, social, and spiritual problems suffered by patients who are no longer responsive to curative measures. Schell and Puntillo's research revealed that all critically ill patients should receive aggressive care in order to emphasize a peaceful death facilitation (Gillan, van der Riet, & Jeong, 2014).

Previous research showed that dying patients had diverse needs including physical, psychological, spiritual, and social support needs. These needs are not able to be separated from the importance of improving attitudes toward caring for dying patients. The success of care for dying patients is influenced by the nurses' attitude in their care process (Gallagher et al., 2015). Health workers, including nurses, should play an active role in caring for dying patients. Nurses are health workers who provide direct care to the patients almost 24 hours, so they are able to recognize patients' needs (Kieft, de Brouwer, Francke, & Delnoij, 2014). Patients' care dependence to the nurses could not be avoided, especially for patients with total care. The study stated that negative attitudes of nurses, such as feelings of indifference, fear, and anxiety in providing nursing care may reduce the quality of service in patients before death (Grubb & Arthur, 2016). Nursing students have two phases in their educational process. The first phase is the academic stage where students learn about nursing theories. While the second

phase is professional education when they deal with patients directly.

Attitudes in end-of-life care are competencies that should be possessed by nursing students who are undergoing the professional stage to accommodate caring for dying patients. In Islamic State University Syarif Hidayatullah Jakarta, Not only learn about the field of nursing, but also nursing students learn about the Islamic religion. Nursing students are required to be able to integrate nursing and Islamic sciences. Previous research demonstrates that a positive attitude toward end-of-life care can be a measure of the success of nursing students in developing therapeutic relationships with dying patients. Newly graduated nurses and nursing students frequently deliver negative attitudes such as anxiety, fear, and sadness to patients when providing palliative care (Grubb & Arthur, 2016). According to Schroeder & Lorenz (2018), the experience of dealing with palliative patients can increase nursing students' commitment to being better prepared to care for dying patients. Research by Strang *et al.* (2014) also revealed that nursing students in Sweden felt calmer and less afraid to deliver palliative care at the further opportunity.

As the novelty of this research, we also assess the Islamic palliative care management as a part of university curriculum. Dying patients require special care, care before death is important for the world of nursing and Islam. Palliative care for dying patients is conducted through the prevention and reduction of suffering by early identification, proper assessment and treatment of pain and other stressors (Connor, 2020; Tambunan & Kristiana, 2022). At the same time, Islamic management for dying patient has oriented on the readiness of the patient and family's spiritual aspects in accepting Allah's provisions, as well as helping the patient's mentality to be able to die in a state of "*husnul khotimah*" (Ghaljeh *et al.* 2016). Furthermore, when patients' conditions are getting worse, something needs to be done, such as having a positive prejudgment toward Allah, leaving a will before death, "*talqin*" (leading the pronouncement of the shahada), and facing to the Qibla (Suprayitno & Setiawan, 2021). Students of the nursing profession at Islamic State University Syarif Hidayatullah Jakarta as prospective Islamic professional nurses are required to have competence in this issue. This study focused on a case study of nursing students' experiences in caring for dying patients.

METHOD

Study design

This research was qualitative research with a descriptive phenomenological approach that examined an event that was felt and known through one's experience (Cresswell & Poth, 2018).

Informants

The selection of informants in this study used a purposive sampling technique by distributing forms to be filled out by the research population. There were 43 out of 61 informants filled in the consent, but only 18 people were relevant with inclusion criteria. The inclusion criteria of this study included students who experienced caring for dying patients within a previous year. Pietkiewicz & Smith (2014) stated that the sample size for qualitative research generally consists of six to eight people based on the homogeneity and similarity between individuals. In this research, the data saturation reached out 12 informants. The collection of data was discontinued when it reached data saturation or when no new information emerged (Cresswell & Poth, 2018). After conducting the interviews, the researchers classified the meanings contained in the interview results, helped by the observer. This was performed to get concise information from informants through one-by-one interview. The similar procedure repeated until all informants' data was saturated and could be analyzed together.

Data Collection

The research was conducted from May to July 2019 at Islamic State University Syarif Hidayatullah Jakarta. Data collection applied in-depth interview techniques. Interviews were conducted informally, interactively and through open-ended questions and answers (Nursalam, 2020). This in-depth interview involved asking participants to explore information, perspectives, insights, knowledge, feelings, attitudes, experiences, or phenomena that can be observed (Whitehead & Lopez, 2016). The tools used were in-depth interview guidelines, the Sony tape recorder recorded participants' verbal expressions or responses.

Data analysis

This study used the Colaizzi analysis method to describe the interview transcripts and to classify the transcripts based on the meaning clusterization obtained from the informants (Nursalam, 2020). In the first step, the researcher read the description of each informant who participated in the study and solicited participants' understanding. The researchers then extracted important statements to the research question, such as nursing students' descriptions of their feeling in first time encountered patients with palliative care. Also responses and body gestures of informants were observed to validate the information conveyed. To accurately reflect research data, key statements should be direct quotes from participants. To analyze key statements, researchers clarified the statements meanings and created themes from those meanings. Researchers grouped similar themes and organized them into several categories. Finally, researchers integrated the results into a comprehensive description of the topic and returned to each participant to review the results.

Trustworthiness

The trustworthiness at this research follow the framework of Lincoln and Guba, consisted of credibility, transferability, dependability, and confirmability (Stahl & King, 2020). The credibility test in this study used the member checking method, peer debriefing and negative case analysis, and the theoretical triangulation for the interview response guideline (Whitehead & Lopez, 2016). As a transferability aspect, we provided a detailed description of the research process and setting, including the methods and time frame for data collection. This allows someone wishing to transfer the findings of the data to decide whether or not the transfer is feasible based on their personal context (Stahl & King, 2020). As dependability, we implemented interviews with two interviewers, one was a peer interviewer and the other was an observer (also as a note taker to validate the interview result). Apart from having no influence at the research location, researchers also limited their influence on changes in informants' perceptions that might alter informants' answers. In this way, the use of precise instruments, including alternative probing, was an implementation of confirmability in this research.

Ethical considerations

This study was approved by the Research Ethics Committee, Faculty of Health Science Islamic State University Syarif Hidayatullah Jakarta with the certificate number was Un.01/F10/KP.01.1/KE.SP/05.06.024/2019.

RESULTS

Table 1 showed that 7 out of 12 informants had a previous senior high education from Islamic senior high school (58,3%) with age range from 22 to 24 years old. Based on gender, 8 out of 12 informants were female nursing students (66,7%).

Table 1. Informants Characteristic

Informant characteristic	n	%
Previous Education		
Islamic senior high school	7	58,3
Public senior high school	5	41,7
Age		
22	5	41,7
23	6	50,0
24	1	8,3
Sex		
Female	8	66,7
Male	4	33,3

Theme 1: Feelings of caring for a dying patient

The results of in-depth interviews conducted to all informants showed that when they first experienced in dealing with dying patients, the feelings were different and were tended to acquire negative feelings such as confusion, fear, tension, sadness, or anxiety. Six out of twelve informants reported that when they first cared a dying patient, what they felt was sadness.

"...Sad to be honest…. Because someone wants to die, Oh God, what will happen to the family. It's been like that for a week with him, right, so we really take care of him like that, so it's sad…" (P5)

This was because, at the time, they empathized with the dying patient, therefore sentiments of melancholy emerged immediately. Three informants said that when they first treated a dying patient, they felt tense. This was because that was the first time for the informants encountered such a condition. As explained by the following informants:

"...At first, I was shocked, then I was also tensed, which was definitely tense and scared, yes, when we faced a patient who was in a state of death, yes, the term was..."(P2)

Five informants said that when they first took care a dying patient, they felt confused. This was because when dealing with palliative patients, they did not obtain the courage and did not notice what actions should be taken. The following was the quote:

"...He's (patient) confused, that's why he's still asking what to do...also me, dealing with the confused patient make me confused too. It's like all of the memories that were taught for me in university were forgotten. I was just like 'oh my god what will I to do'…" (P4)

"…I experienced it when I first started practicing, so I was still scared and very confused". (P12)

Three informants revealed that when they first cared a dying patient, they felt anxious. That was because they were seeing the condition of the patient as if he was about to die. It was different with another informant who admitted that the informant was worried because the informant still felt he or she did not perceive anything because he was still in the education stage. Here was the quote:

"...I was really worried, especially since her family is asking what it's like, we did not know, because we were still young enough... with the minimum bar of experience to handle it" (P4)

Seven informants stated that the first time they cared a dying patient they felt fear. This was because at that time they did not obtain the courage to treat dying patients.

"… the first time we were afraid, actually we already knew but in applying it we were not brave enough…" (P5)

"...I was also worried, at that time he seemed to be dropping like he was about to die. So, it's like I was scared too…" (P1)

Theme 2: Care for dying patients and their families

a. Physical care

Several types of physical care carried out by the informants in dying patients were reducing pain, fulfilling daily living (ADL) activities, performing CPR, and monitoring the vital signs. Seven out of twelve informants stated that in providing care to palliative patients, the physical cares they delivered was pain management including pain symptom assessment, relaxation techniques, and respiratory management.

"…There I was able to teach some relaxation techniques to patients who experienced anxiety while reducing pain…" (p3)

There was one informant who admitted to performed activity daily living (ADL) assistances to patients when conducted palliative care.

"…Yes, it was like fulfilling his ADL, how could his nutrition be fulfilled as long as he was still prosperous until the end of his life…" (P1)

The results showed that two out of five informants had performed CPR while provided palliative care to patients.

"...patients who have CHD, and were critical, need to do CPR, and after doing CPR, thank God the patient had a returned heart rate..." (P2)

The results showed that one in five informants monitored TTV (vital signs) while provided palliative care to patients.

"…Yesterday was the first TTV monitoring. Then sometimes I just checked the acceleration, saw the O2 saturation" (P4)

"I checked the patient's vital signs regularly and helped fulfill the patient's need". (P9)

b. Psychological Treatment

Psychological treatments for patients carried out by informants included psychological strengthening and motivation.

"...I was educating he/she, her/his mother, 'be patient, this is a test, God willing, you will be rewarded in the eyes of Allah, all mother's illness, God willing, would wash away your sins'..." (P3)

Regarding psychological treatment for palliative patients' families, all informants revealed that motivating, strengthening, and calming their families were very influential for the family psychological condition in dealing with dying patients.

"…If I went to his/her family, I recommended them being patient, all of this had a reward, the problem was usually in communication, at that time, at first I was shaking, but thank God in the end their family understood, and the communication I did to calm them went smoother" (P3)

In addition, there were also informants who carried out psychological treatment by collaborating in delivering information to families,

"…then collaborating with the palliative team to explain that his condition had been terminated…" (P3)

Table 2. Theme, Sub-Theme, and example quotes from the informants

Theme	Sub-Theme	Example quote
Feelings of caring for dying patient	sadness	*"...Sad to be honest …"(P5)* *"…That was so sad, caring for a patient with stage 4 cancer, suffering from severe pain and having no support system other than his sister" (P7)*
	tense	*"...At first, I was shocked, then I was also tensed…"(P2)* *"… I was tense because I was alone in that room…" (P8)*
	confused	*"... dealing with the confused patient made me confused too …" (P4)* *" … I confused as well, because that was my first time…" (P7)*
	Anxious/worries	*"...I was really worried…" (P4)* *"I was also worried, at that time he was dropping really like he was going to die like that, then his family was also waiting there..." (P1)*
	fear	*"… the first time we were afraid …" (P5)* *"…I got goosebumps, and my body trembled..." (P9)*
Care for dying patients and their families	Physical care	*"…There I was able to teach some relaxation techniques to patients who experience anxiety while reducing pain…" (p3)* *"…I monitored the patient's vital signs every 15 minutes" (P11)* *"…monitoring vital signs as usual" (P12)*
	Psychological Treatment	*"...I was educating he/she, her/his mother, 'be patient, this was a test, God willing, you would be rewarded in the eyes of Allah, all mother's illness, God willing, would wash away your sins'..." (P3)* *"…I motivated the patient's family to be strong" (P10)*
	Islamic Nursing Management	*"…We guided or talqin…" (P2)* *"…I guided him to ask God for forgiveness" (P6)* *"…I asked the family to stay with the patient and guided her/him to do talqin…" (P8)* *"… her family and I recited the Holy Qur'an." (P9)* *"…as my lecturer had taught me in college, I guided her to recite the prayer and did talqin" (12)*
Influences on self in caring for dying patients	being calmer and ready to treat dying patients afterward	*"The effect was to be more prepared to treat dying patients" (P4)* *"I was more ready for caring the dying patients" (P11)* *"...I felt more prepared when I met those situations and felt grateful to be able to help patients remember God in those conditions." (P12)*
	getting closer to Allah and being more grateful	*"I just wanted to be closer to God, so remembered that we too would die." (P3)* *"…because of that, I was getting closer to Allah." (P6)* *".. I wanted to be closer to God…" (P8)* *"…I become more and more convinced that everyone would die, and become more religious." (P10)*
	Becoming more aware of the patient's psychological conditions	*"We often forget that physically ill patients could also be mentally ill, so we must also be aware of their psychological condition". (P7)*
	Being more aware of the family's health conditions	*"…It really affected my life, making me more attentive to my family's health condition". (P9)*
Barriers when caring for a dying patient	First time to dealing with it (lack of experience)	*"... the first time we met a dying patient...." (P2)* *"…I confused as well, because that was my first time…" (P7))* *"…It was the first time dealing with that condition" (P11)*
	Lack of confidence	*"...it was just like having a conflict with ourselves, maybe we should be more confident like that…"(P1)*
	hospital's limitations were less focused on the psychological and spiritual problems of patients	*"...Honestly, in the hospital, it's still only physiological, right, even though it's nearing death, especially Islam, it needed to be taught from a psychological point of view, so preparing for death must be taught... (P4)* *"…my lack of experience made me less confident in caring for dying patients" (P12)*
	obstacles in terms of psychological measures to calm the family	*"...When she died, her mother didn't seem to accept it, she screamed and then wanted to sue the nurse. So, the obstacle was also from the temperament of the family…" (P5)* *"…The family was uncooperative, which hindered me from caring the patient.." (P8)*
	Communication limitations	*"…Caring for elderly patients required effort, let alone caring for elderly patients who suffer from severe pain due to stage 4 cancer and she had no children, so communication become difficult". (P7)*
	Difficulty controlling feelings	*"… I felt sympathy and shared the sorrow of" (P10)*

c. Islamic Nursing Management

The results of in-depth interviews conducted by researchers to all informants showed that informants carried out different Islamic-based treatments when dealing with dying patients, including: (1) praying for patients; (2) guiding patients; (3) listening to murottal. The first thing the informants did for the patient was to pray for the patient. This was stated by nine out of twelve informants. Five of the twelve informants did "Talqin" or guided to recited the shahada to the patient at the time of the patient's death.

"... If you (patient) hade time, helped with dhikr, prayed and assisted reading the Qur'an" (P2)

Six out of twelve informants played "*murottal*" (holy Qur'an recitation) to the dying patients. In addition, there were informants who recited the Qur'an to palliative patients.

"… her family and I recited the Holy Qur'an." (P9)

The results of in-depth interviews related to Islamic nursing management for patients, four out of five informants performed prayer activities with patients, included helping the patient to "tayammum" or wudhu, following the expression of a 22-year-old male informant

"…we should maintain the worship of a patient, right, so the patient during his prayer time, we prayed, we continued to help pray, also we helped (the patient) to tayammum (we assisted it for his/her)" (P2)

Theme 3: Influences on self in caring for dying patients

The effects of caring for dying patients varied, including: (1) being calmer and ready to treat dying patients afterward; (2) getting closer to Allah and being more grateful; (3) Becoming more aware of the patient's psychological conditions; and (4) being more aware of the family's health conditions. Six out of twelve informants stated that after caring a dying patient for the first time, they were better prepared to care for a dying patient afterward. Two out of five informants stated that after caring for a dying patient, they got closer to Allah.

"I was more ready for caring the dying patients" (P11)

"I just wanted to be closer to God, so remembered that we too would die." (P3)

In addition, one informant revealed that after caring for a dying patient, he/she felt more grateful because he/she was given health.

"… If it affected him, he would be more grateful, meaning that he was grateful for being given health…" (P5)

One informant become more aware of the patient's psychological conditions especially for dying patient and another was more aware of the family's health conditions.

"We often forgeted that physically ill patients could also be mentally ill, so we must also be aware of their psychological condition". (P7)

Theme 4: Barriers when caring for a dying patient

The results of in-depth interviews showed that five out of twelve informants reported to have obstacles such as lack of experience in providing Islamic actions or guiding to read the "*talqin*" because they never did like that before.

"... the first time we met a dying patient, we must have stammered, confused about what we wanted to do, so we needed help from a nurse or family who was on guard to help us guide or talk..." (P2)

In addition, one in twelve informants experienced lack of confidence as an obstacle in caring for dying patients

"...it was just like having a conflict with ourselves, might be we should be more confident like that, like when the family wasn't around, we could help pray like that, at least..." (P1)

Three of the twelve informants revealed that the hospital's limitations were less focused on the patients' psychological and spiritual problems.

"...Honestly, in the hospital, it was still only physiological, right, even though it was nearing death, especially Islam, it needs to be taught from a psychological point of view, so preparing for death should be taught... (P4)

Three out of twelve informants reported to have obstacles in psychological measures which was how to calm the family of the patient who sometimes became temperamental in waiting for the patient.

"...When she died, her mother didn't seem to accept it, she screamed and then wanted to sue the nurse. So, the obstacle was also from the temperament of the family…" (P5)

Our results also identified the communication limitation and controlling feelings hardship while dealing with the dying patient.

"…Caring for elderly patients required effort, let alone caring for elderly patients who suffer from severe pain due to stage 4 cancer and she had no children, so communication become difficult". (P7)

DISCUSSION

Theme 1: Feelings of Caring for Dying Patients

The results showed that most nursing students felt negative feelings such as sadness, confusion, fear, anxiety, and tension. When delegated to provide palliative care to dying patients. This was similar with Catherine Grubb & Arthur (2016) which stated that newly graduated nurses and nursing students frequently obtained negative attitudes such as anxiety, fear, sadness to patients when providing palliative care. This was different from Strang *et al.* (2014) conducting a research on nursing students and found that the majority of students felt comfortable, confident, and not anxious when dealing with patients receiving palliative care. The different results with previous studies might occur due to disparity in research methods, instruments, and the psycho-social-cultural conditions of the study population.

The feeling of fear appeared among nursing students was the students' first experience in caring for a dying patient. This was in accordance with Strang et al. (2014) reported that having no experience with a psychological object leads to a negative attitude towards it. The behavior that emerges would be influenced by experience and an description of the consequences that would be confronted (Biglan, Hayes, & Wilson, 2015). Several previous studies also revealed that the length working length actually assisted nurses in understanding palliative nursing from affective, cognitive, to behavioral aspects (Fitri, Natosba, & Andhini, 2017; Giarti, 2018). The longer the nurse works, the more experience caring for palliative patients, the more positive the attitude has obtained when dealing with palliative patients or patients' families, and vice versa.

Cherny et al. (2015) stated that the basic principle of palliative nursing is an active and holistic approach in caring for patients with limited living conditions in order to improve the quality of life in terms of the physical, emotional, social, and spiritual needs of patients and their families. It was further explained that nurses must be able to give positive and

psychological impressions, strengthen and support patients and make patients receive a good end-of-life before death.

In nursing care, palliative nursing is not identified as apriority in nursing education, but generally nurses must provide the best service to patients, including when the patient enters the end stage of life. The results of the previous study displayed that nurses frequently deal with the negative attitudes (anxiety, sad, afraid, and did not strengthen the patient's psychology) in any nursing care (A'la, 2016; Grubb & Arthur, 2016). Result from Strang *et al.* (2014) showed that nurses should learn to behave and position themselves in providing palliative to assist the family and patient maximum.

Therefore, supporting the educational curriculum from lecturers for nursing students is one of the crucial factors in sharing added value and experience. the previous study has shown that the curriculum and lecturer lead the impact of behavior for the three themes: moral attitude and action, supportive and disruptive interaction, and personal model and professional model (Tambunan & Kristiana, 2022).

Theme 2: Care for family patients in the face of approa ching death

Most informants always provide the physical care for palliative patients such as pain management and relaxation techniques. This is in accordance with Kieft et al. (2014) reported that nursing students always look for palliative care which includes physical and psychological care. This is also in line with Fitri et al. (2017) stated that in palliative care, some treatments carried out by nurses are pain management, management of other physical complaints, and nursing care. One of the most prominent aspects of palliative care is symptoms and pain management (Giarti, 2018). Symptoms management is part of palliative care to deal with the pain suffered by the patient. The interventions include assessing pain, pain causes, main interventions to reduce the pain including pharmacological and non-pharmacological therapy, pain killer drugs administration, or pain diversion techniques. One of the recommended pain diversion techniques is relaxation techniques as performed by one informant. However, although physical care is the most prominent care, Morsy (2014) in Giarti (2018) said that there is still a need for formal nursing education related to palliative care and nursing interventions to optimize pain management and to improve the quality of life of a dying patient.

Cherny et al. (2015) stated that the scope of palliative care does not only focus on the patient, but also on the patients' family or relatives. This study showed that all nursing students always had the initiative to accompany, calm and strengthen the patients' family. These findings is in accordance with research conducted by Fitri et al. (2017) at Bhayangkara Hospital which showed majority of nurses (66%) always attempt to participate holistically in palliative care. The other studies in Vietnam and Italy also reported that nursing students provide education and communication to families undergoing palliative care (Garrino et al., 2017; Nguyen, Jansen, Hughes, Rasmussen, & Weckmann, 2014).

Based on its origin, palliative care interventions include performing initial diagnosis of patients' grieving phase, helping the family to complete the death certificate and providing psychological support to the bereaved family in order to improve the patient's quality of life and ensure the patient died peacefully (Fitri et al., 2017). This is in accordance with previous research regarding the validity of the instrument for measuring palliative care attitudes, the Frommelt Attitudes Toward Care for the Dying Care form B (FATCOD-B) (A'la, 2016). Some of the comforting family attitudes consist of inviting the family to remember the best or most beautiful memories with the patient, welcoming them to accept emotionally the changes in the patient's behavior before death, and calling for them to keep the surrounding environment conducive and normal, and others. (A'la, 2016). In addition, nurses can establish relationships, listen to complaints and share feelings with the family (Garrino et al., 2017).

In addition, the interesting finding in this study was two informants who also invite the family to provide palliative care such as doing "*talqin*". The results of this study are similar with Nguyen *et al.*, (2014) showed that nursing students also actively involve their families in providing palliative services to patients. Family involvement is one of the mechanisms to encourage patients to live the days without despair. It is also a psychological and spiritual support for the patient concerned (Giarti, 2018).

Several spiritual approaches to palliative patients include helping patients pray, guiding the patient's "*talqin*", listening to "*murottal*", and inviting prayer. This study is accordance with Al-Shahri (2016) where the religiosity aspect of palliative care is carried out by guiding prayer and doing "*talqin*". Another research conducted by Ghaljeh *et al.* (2016) reported that nurses always investigate the best possible emotional and spiritual approach to palliative patients. The results of research by Judith & Stouffer (2014) in Iran also showed that nurses explore comprehensive spiritual approach that adapts to the religious beliefs of each palliative patient.

In nursing science, a good spiritual approach is useful for patients, who even though they will eventually die, are not stressed, and burdened spiritually in the face of death (Giarti, 2018). Even so, not all nurses are able to carry out spiritual management in palliative care as reported by Fitri et al. (2017). This is because there is still a lack of skills and knowledge of nurses/nursing student in carrying out spiritual care such as guiding prayer, reading "*talqin*", etc. The results of the study also showed that there was one respondent who involved the family to guide reading the "*talqin*" because of the informants' unpreparedness. On this basis, palliative care can be carried out together across health professionals because of the need for a holistic approach in the dying patient management. This is supported by the results of Kieft et al. (2014) regarding the readiness of cross-professional cooperation in providing comprehensive and optimal palliative care, including with the religious leaders assistance who have religious understanding inproviding spiritual guidance to peacefully dying process. Another possible way is the provision of spiritual palliative care training for nurses and/or families (Avisha et al., 2017).

Theme 3: the influence on oneself in caring for dying patients

The study indicates that there is an impact for nursing students after caring for dying patients, such as increasing experience in dealing with patients with palliative care and getting closer to God. Most informants reported that after providing palliative care, they became calmer and ready to care palliative patients, have more awareness about patient's psychology and family's health conditions. This is in accordance with Kieft et al. (2014) displayed that the experience of dealing with palliative patients is able to escalate nurses' commitment to be better prepared in caring for dying patients. This finding is also similar with Garrino *et al.*(2017) in Italy. Research conducted by Strang *et al.*(2014) also supports this study by showing nursing students in

Sweden perceive calmer and unfrighten to provide palliative care at the further opportunity.

The amount of nurses experience or working length provide knowledge and learning in palliative care (Giarti, 2018). This is in accordance with a behavioral theory claimed the experience aspect is one of the dominant factors influencing behavior change (Rogers, 2019). In addition, the learning by doing method can be applied by nursing students. This is in accordance with the psychological theory of social behavior describes a person's actions can be caused by mistakes or consequences of his behavior in the past (Biglan et al., 2015). This study finding are also similar to Strang *et al.*(2014) reported nursing students remember death after handling palliative care in Sweden. On the spiritual aspect, especially in Islam, remembering death is the most powerful way in remembering the transience of the world. In Islam, one of the ways to remember death is to pay homage to the deceased people and to make pilgrimages. This way can remind human sooner or later will leave this mortal world (Baderi, 2014). In addition, it also warn the people about the afterlife so people should be more active in carrying out religious law.

Theme 4: obstacles in caring for dying patients

This study showed some obstacles in caring for the dying people, such as lack of experience in palliative care, psychological care for the patient's families, communication hardship, controlling feelings difficulties, and limited Islamic services in hospitals. This is in accordance with Adhisty (2016) displayed that palliative care implementation frequently faced several obstacles for nurses including limited knowledge in providing holistic and optimal palliative care, discomfort, fear, sadness, losing feelings when dealing with deceased patients, burnout, and the lack of Islamic standards for palliative care in hospitals so that the care provided is frequently as nursing care and public services. This is supported by Fitri et al. (2017) showed although 58% of nurses had a good attitude in carrying out palliative care, there was still a lack of learning about palliative care in formal nursing education and training. This study obtained some limitations. The researchers did not review the nursing activities carried out by the informants in the hospital based on the values of the lecturers/field guidance. So that, even though the researcher has assessed the experiences carried out by the informants, conclusions about the suitability of the actions compared to the curriculum guidelines is not able to be accomplished.

CONCLUSION AND RECOMMENDATION

Nursing students tend to have negative attitudes in caring for dying patients, such as sad, afraid, anxious, confused, tense, etc. However, students continue to investigate the holistic care for dying patients including physical, psychological, and spiritual care. The experience of caring for a dying patient has some positive influences on students, such as increasing self-confidence, courage to care for a dying patient afterward, and desire to be closer to God. Professional students in caring for dying patients have various internal and external obstacles, such as lack of students' experience, and family psychological condition of difficult acceptance toward patient's condition. The results of this study are expected to be an additional reference for nursing students performing further research on the care of dying patients, and future studies are recommended to apply quantitative or mixed approaches, especially from the curriculum and lecturer support about palliative care knowledge and practice.

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Rahayu, S. et al. (2024)
Jurnal Keperawatan Soedirman – Vol 19, No 1 page 39-44
http://jos.unsoed.ac.id/index.php/jks/index

ORIGINAL ARTICLE

USABILITY OF A MOBILE APPLICATION ON ANEMIA PREVENTION AMONG ADOLESCENTS

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Article Information
Received: 16 May 2023
Revised: 16 October 2023
Accepted: 23 February 2024

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DOI
10.20884/1.jks.2024.19.1.8674

ABSTRACT

The availability and usability of a smartphone application in Indonesia for preventing anemia, particularly for adolescents, are understudied due to the large number of health applications available for hematologic diseases. This research aims to provide a comprehensive overview of a mobile application development process to prevent anemia among adolescents and test its usability to the end user. The study analyzed the usability of a hybrid application called "AneMia-Prev" at a junior high school in Serang, Banten, Indonesia. The application was developed through conducting a content review, creating a prototype, and undergoing expert development. The usability was assessed by 15 adolescents using a Think Aloud and Smartphone Usability questionnaire. Meanwhile, data analysis was conducted using Jaspers' iterative 3-cycle model. The AneMia_Prev (TA) application was developed using server-client architecture, MySQL database, Apache Tomcat, and Spring Framework. A usability test was conducted on 15 female end users, with a mean age of 16.8 years and 60.0% of them in grade 8. The application received an overall usability average of 112.5 points, indicating good usability. The study demonstrates the high usability of the prototype, indicating its effectiveness, efficiency, and satisfaction, suggesting that future research could use TA methods with larger sample sizes.

Keywords: *Adolescent; anemia prevention; development; mobile application; usability*

ISSN : 1907-6637 **e-ISSN : 2579-9320**

INTRODUCTION

The World Health Organization's Global Observatory for eHealth defines mobile health (mHealth) as public health and medical strategies enabled by mobile technology such as mobile phones. mHealth goes beyond the mobile phone services of the past and uses more advanced functionality and applications (Organization, 2011). More than 53,000 medical applications were available on the Android Play Store (one of the main download platforms) at the start of 2021 (Narrillos-Moraza et al., 2022). Diabetes (Kalhori et al., 2021; Kebede & Pischke, 2019), pain (Dantas et al., 2021; Kwan et al., 2019), rheumatic (Collado-Borrell et al., 2020; Terhorst et al., 2018), and psychiatric illnesses (Salehinejad et al., 2021; Singh et al., 2020), and cancer (Ali et al., 2019; Amor-García et al., 2020; Jongerius et al., 2019), have all been targeted by medical applications. Applications for patients with hematologic diseases are also available on the major download platforms, but little information is available about them. Moreover, adolescents have a low adoption of online education platforms due to a lack of awareness and low quality perceptions.

A previous meta-analysis indicated that 8 (9%) of 88 mHealth applications were available on both digital distribution platforms, while 54 (61%) were exclusively available on the Android Play Store, and 26 (30%) were only available on the Apple App Store. Furthermore, only 6 (7%) of these 88 applications required payment (mean cost: € 3.16 [US $3.60], SD € 1.57 [US $1.79]). (Narrillos-Moraza et al., 2022). In terms of purpose, most of the apps (60/88, 68%) were informative, followed by preventive (23/88, 26%) and diagnostic (5/88, 6%). Of the 88 applications, 43 (49%) were

updated in the previous year, and 23 (26%) were designed and built with the help of a healthcare organization. The distribution of applications for hematologic conditions was as follows: anemia (23/88, 26%), leukemia (12/88, 14%), hemophilia (11/88, 13%), thrombosis (8/88, 9%), thalassemia (7/88, 8%), hematological cancers (leukemia, lymphoma, or myeloma; 5/88, 6%), hemorrhage (5/88, 6%), and lymphs (Narrillos-Moraza et al., 2022). Given the vast number of health applications accessible for patients with hematological diseases and the growing interest in tools that promote patient self-care, a thorough examination is required. However, there is no clear agreement on the best way to evaluate the quality of health applications (Agarwal et al., 2021).

In Indonesia, there is a mobile application for the prevention of anemia for adolescents called CERIA. The application focuses on body weight and height measurements, as well as Fe tablets (source and records). No other application provides comprehensive health education, monitors Fe table consumption, and dietary patterns (Darmawati, 2019), and provides online consultation. Little is known about the current availability of a smartphone application in Indonesia to prevent anemia, and there are no studies on the overall development and usability of existing mobile applications that focus on anemia prevention for adolescents. Therefore, this research aims to provide a thorough account of the procedure to establish the feasibility of a mobile application designed to prevent adolescent anemia.

METHOD

Study design

This study investigated the usability of the hybrid application "AneMia-Prev," a mobile application that prevents anemia among adolescents. The users evaluated the application's prototype usability and tested its efficacy sequentially.

A total of six distinct algorithms make up the AneMia_Prev application (shown in Figure 1: 1) identification creation, 2) teenage education quiz (choose the right or wrong answer), 3) adolescent education film, 4) a meal log, 5) iron intake, and 6) communication online. The "AneMia-Prev" prototype is an innovative application that uses the user's mobile device without requiring an active Internet connection. To be suitable for Android systems, AneMia-Prev uses User-Centered Design, HTML, CSS, and JavaScript across its 10 menus and 63 screens.

Setting

The study was conducted in a junior high school in Serang, Banten, Indonesia, during February 2023.

Sample

Fifteen teenagers used the application during the experimental phase. A modest number of evaluators (between three and five) was suggested to ensure interface precision and evaluation using the specified heuristics (Gresse von Wangenheim et al., 2014). The participants were selected using convinience sampling. Those with severe physical or mental disabilities were not considered.

Testing was planned ahead of time to evaluate usability in three groups. However, statistical significance could not be attained. The respondents met the predetermined qualifications: they were between 15 and 19 years old, they were registered at the health center, they owned a mobile device for personal use and they were familiar with and competent in the usage of applications. The test results were based on the prototype performance during a maneuverability evaluation.

Instrument

The SURE (Smartphone Usability Questionnaire) usability measurement instrument was administered after an average of 20 minutes of handling or when the user felt that they had used the application over a sufficient time (Gresse von Wangenheim et al., 2014). SURE is comprises 31 items, all are smartphone-centric and created using Item Response Theory (IRT). The respondents rated their level of agreement with each statement using the following criteria: 1 = Very Poor, 2 = Fair, 3 = Good, 4 = Excellent, and NA = Not Applicable. The tool's overall score was calculated by adding all the participants' responses. When all item scores are added together, a maximum possible score of 124 is obtained. Level 30 indicates a chance of fully or partially disagreeing, level 40 indicates a chance of agreeing, level 50 indicates a failure to go from partially to strongly agreeing, level 70 indicates a strong agreement, and level 80 indicates complete agreement (Gresse von Wangenheim et al., 2014).

Data collection

The researchers approached the students during class breaks. They were briefed on the study and those interested in participating were led to a private room to discuss the study's goal. They were also shown the application prototype features through a tutorial delivered via PowerPoint, and then shown the application prototype. Participants signed the free and informed consent term after consenting to the study. They started with practical tasks following the Think-Aloud (TA) protocol. Each participant was informed that the researcher was primarily concerned with application performance and was urged to speak for more than 5 seconds (Ericsson & Simon, 1980). The main purpose of the application requires six tasks. Every TA activity was recorded.

The application was made available on the user's choice of mobile device (smartphone or tablet).

Data analysis

Videotaped TA sessions were transcribed and analyzed. The transcripts of the TA sessions included the participant's actual words and the elapsed and necessary processing times for each task. We used Jaspers' (2009) iterative 3-cycle model to probe the overarching ideas. We started by analyzing two TA meetings thoroughly and writing a report on the attendees' usability problems. Next, we sorted the codes into categories to find the overarching ideas. The reliability of the verbalizations was assessed by assigning codes to them. When we encountered a new problem, we evaluated it to see if it fit into any of the existing categories or if it was something entirely different. Tables were used to display the data. The data were then compared in the context of the relevant literature. Descriptive statistics, including frequency, percentage, mean, standard deviation, and test mean, were used to examine variables. The result of the usability test were compared using the adopted scores of the SURE instrument. Due to its foundation in the IRT, data reliability is ensured by the fact that each rater's reaction to an item indicates the probability of the item's parameters and ability (Gresse von Wangenheim et al., 2014).

Ethical considerations

The Ethics and Research Committee of Faletehan University approved the study (023/A.1/ETIK/2023). After receiving information about the study, each participant signed a

consent form. Participants are named by alphanumeric codes during the investigation to maintain anonymity.

Figure 1. The mobile application “AneMia-Prev”

RESULTS

Characteristics of the participants

Fifteen end users participated in the usability test. All participants were female with an average age of 16.8 (SD = 1.32) and 60% were in the 8th grade.

Task Performance

We evaluated participant performance and task completion using completion rates, timeframes, and usability concerns. Table 1 shows completion rates and times. Due to connectivity troubles and the application's size, Task 1 (downloading and installing) took longer than the other tasks. All participants completed task 1 (downloading and installing the application), 10 of 15 completed task 2 (filling in the questionnaire), 13 of 15 completed task 3 (create an account) and 14 completed task 5 (finding the video education), 15 completed task 4 (finding the right homepage), 13 completed task 6 (finding the online chat) and 13 completed task 7 (finding the account/profile page). The download and installation of the application took the longest, followed by the filling out of the questionnaire and creating an account. Task 4—find online chat—took the least time.

Table 1. Completion of the participant task and time (n = 15)

Tasks	Completion rate	Times (minutes/seconds)
Downloading and installing the application	15/15	5/35
Filling in the questionnaire	10/15	7/15
Creating account	13/15	5/15
Finding the right homepage	15/15	0/24
Finding the video education	14/15	0/30
Finding the online chat	13/15	1/20
Finding the account/profile page	13/15	0/50

Usability

Table 2 shows the results of the SURE heuristic evaluation of the usability of the application prototype by end users.The scores of most of the participants for SURE items ranged from 3 to 4. Most of the participants (n = 12) agreed that the terminology used in texts, labels, titles, etc., is easy to understand. About 11 participants rated 4 for the following item: *“I would recommend this app to others. I found the app to be consistent. For example, all functions can be performed in a similar manner, and I found the texts easy to read”*.

Table 2. Responses of participants to each SURE item

Item	Score			
	1	2	3	4
1. I found it easy to enter data in these applications. For example, using QR code, picklist, etc.	-	2	3	10
2. When I made a mistake, it was easy to correct it.	-	3	5	7
3. I found the app help/tipto be helpful.	-	2	7	6
4. It was easy to find the information I needed.	-	1	5	9
5. I felt in charge when using this app.	-	-	7	8
6. I found the time it took to complete the tasks to be adequate.	-	3	6	6
7. It was easy to learn how to use this app.	-	4	3	8
8. The sequence of actions in the application corresponds to the way I usually perform them. For example, the order of buttons, data fields, etc.	-	2	3	10
9. It is easy to do what I want using this app.	-	3	4	8
10. It was easy to navigate the application menus and screens.	-	2	4	9
11. The app meets my needs.	-	3	3	9
12. I would recommend this app to others.	-	-	4	11
13. Even in a hurry I would be able to perform the tasks in this application.	-	2	4	9
14. I found the app to be consistent. For example, all functions can be performed in a similar manner.	-	1	3	11
15. It is easy to remember how to do things in this app.	-	4	4	7
16. I would use this app often.	-	3	3	9
17. The organization of menus and action commands (such as buttons and links) is logical, allowing you to easily find them on the screen.	-	4	5	6
18. I can successfully complete the tasks using this app.	-	3	7	5
19. I enjoyed using this app.	-	5	4	6
20. The app provides all the information needed to complete tasks clearly and in a straightforward way.	-	4	3	8
21. I found the app very complicated to use.	-	3	2	10
22. Symbols and icons are clear and intuitive.	4	1	3	7
23. I found the texts to be easy to read.	-	-	4	11
24. I found the application to be too complex. I had to recall, research or think hard to complete the tasks.	1	3	2	10
25. The terminology used in texts, labels, titles, and more is easy to understand.	-	-	3	12
26. I would need the support of one person to use this app.	2	3	2	8
27. I felt comfortable using this app.	-	3	5	7
28. The app behaved as expected.	-	1	8	6
29. I found it frustrating to use this app.	-	4	1	10
30. I found that the various functions of the application are well integrated.	-	2	7	6
31. I felt very confident in using this app.	-	3	8	4

The SURE tool's proposed assessment level for each user is listed in Table 3. Table 3 shows that the range of usability scores ranges from 87 to 117, with an average of 112.5. Therefore, we framed usability as a single level (80 = fully agree), which is indicative of the prototype's high level of usability.

Table 3. Scores obtained from end-user assessment using the SURE usability tool

Respondent	Total SURE	Level
1	110	Totally agree
2	104	Totally agree
3	98	Totally agree
4	118	Totally agree
5	112	Totally agree
6	114	Totally agree
7	116	Totally agree
8	117	Totally agree
9	119	Totally agree
10	87	Totally agree
11	113	Totally agree
12	95	Totally agree
13	106	Totally agree
14	118	Totally agree
15	120	Totally agree

Think-aloud evaluation
In this section, we look at the major usability concerns with identifying terms and other issues with the app's informational value.

Issues of terminology interpretation
Before they could start using the app, participants had to take a survey to determine their degree of social media addiction. Misunderstandings of key concepts in the TA analysis made it challenging for participants to obtain actionable insights. The participants had difficulty collecting specific personal information in the end due to widespread misunderstandings of the words used in the TA analysis, as follows:

> *'Table iron supplements are difficult to interpret, as are some phrases in the food record; but when pictures are used in conjunction with words, the process becomes relatively simple.'*

Filling out food diary and iron consumption
Some users were confused by the limited space given to the food diary and iron intake on the main page. The two participants who went straight to the tips section had the following remarks.

> *"I found it challenging to keep track of the daily food that needs to be documented, particularly when it comes to identifying various types of food with names that are not always universally recognizable."*

DISCUSSION

The end users strongly agreed that Anemia_Prev has good usability, as evidenced by the SURE and TA evaluation results. Respondents found the product useful since it allows them to easily enter and edit data. Such capabilities are similar to those found on currently available devices. In addition, the interface is user-friendly and interactive, the content is simple and straightforward, and the language used is understandable and accessible. At the highest level, users agree that the application's assistance and advice are excellent. Therefore, this finding suggests that the application is easy to learn and use in daily life.

Furthermore, the respondents stated that the design and presentation of the application greatly affected the enthusiasm and commitment of certain adolescents to using it. Despite the fact that most users felt they had accomplished the application's primary purpose, their expectations were not reached. This finding is consistent with previous TA-based research on mHealth and digital health (Bolle et al., 2016; Van der Vaart et al., 2013). Although survey participants reported finding data on an online tool to be simple, Bolle et al. (2016) found that many users could not do so. Thus, games and animations could be used in future anemia prevention apps.

The field of human-computer interaction has recently paid much attention to the usability of mobile apps, and with good reason (Hoehle et al., 2016). As a result, various usability assessment methods have made their way into published works. However, these models may not apply to any particular mobile app due to their complexity and lack of proper definitions for determining usability measures such as usability dimensions, criteria, and metrics (Zahra et al., 2017). The exponential rise of applications, the widespread availability of poor-quality apps, and the proliferation of app categories, and various platforms are all additional considerations. Since each app category has unique functional and nonfunctional requirements, usability assessment techniques cannot universally evaluate their properties. Therefore, unique usability models may be needed to evaluate these different apps (Zahra et al., 2017). The usability of this mobile health app has been evaluated according to the standards established by the Healthcare Information and Management Systems Society. Although the criteria were wide and included usability engineering factors to measure efficiency, effectiveness, user pleasure, and platform optimization, the Likert scale used to categorize them does indicate their quality (Marques et al., 2020). Before this research, there was no established method for determining the effectiveness of mobile health apps in terms of usability. There are usability models for mobile applications, but they have not been thoroughly investigated, and most are not useful. Due to unique qualities and changing application context, current usability principles are insufficient to design effective app interfaces (Zahra et al., 2017).

Total usability rating was determined after assigning points to each category using a Likert scale from 1 to 5. The application mainly received a score between 3.0 and 4.0, making it a moderate to mediocre option at best, especially for its limited feature sets. Three main factors defined usability: prompt and clear feedback, an intuitive interface, and easy identification of clickable areas. These factors are considered before making an app available to the public. Usability testing provides a technical foundation for users to become accustomed to the capabilities of mobile technology before conducting comprehensive context applicability assessments. This paves the way for more detailed user feedback on feature needs and potential applications (Vélez et al., 2014). Furthermore, an app's content is one component that can ensure its usefulness. On this basis, the government has proposed strategies for anemia prevention apps at the individual, healthcare provider, and software engineer levels (Rose et al., 2019). The specific setting requires that the present app conforms to clinical practice and provides the most fundamental requirements. Future studies could use TA methods to test usability by incorporating a larger sample size.

One of the weaknesses of this study is the small size of the sample population. In addition, we have no way to know whether each respondent read and considered each question carefully when completing the questionnaire.

CONCLUSION AND RECOMMENDATION

The results of the usability test showed that the Anemia_Prev app was very usable. The users agreed on the above criteria, indicating that the product was designed with their needs in mind and offered high usability. Therefore, mobile health technology can improve the effectiveness of clinical treatments for the prevention of anemia by providing users with increased access to information and less paperwork.

ACKNOWLEDGMENTS

The authors would like to thank all of the adolescents who participated in this study.

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Jurnal Keperawatan Soedirman – Vol 19, No 1 page 45-51
http://jos.unsoed.ac.id/index.php/jks/index

ORIGINAL ARTICLE

THE EXPERIENCES OF WOMEN GIVING BIRTH WITH *TOHU DANGA'S* ASSISTANCE IN INDRAGIRI HULU REGENCY

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Article Information
Received: 4 November 2022
Revised: 21 May 2023
Accepted: 19 December 2023

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DOI
10.20884/1.jks.2024.19.1.7120

ABSTRACT

Tohu Danga are believed to be maternity assistants who care for women and infants before and after birth. This study aimed to explore the experiences of women in the Indragiri Hulu Regency who gave birth with the assistance of *Tohu Danga*. This study used a descriptive phenomenological approach with a total of 12 women. Participants were obtained by the snowball method until data saturation was reached. Data was collected through in-depth interviews. The Colaizzi analysis technique was used. The findings of this study generated six themes: (1) the significance of childbirth for women who give birth with *Tohu Danga*, (2) the context that determines the women's choice of birth attendant, (3) the cultural practice of Tohu Danga's birth aid, (4) the difficulty of the longer birth process, (5) the relationship between *Tohu Danga* birth care and traditional medicine, and (6) the positive and negative responses of women regarding the birth process with *Tohu Danga*. Nurses are forced to think critically when a woman's cultural practices can affect health and provide nursing care according to their patient's cultural requirements.

Keywords: *Cultural practice; labor; women's experiences*

ISSN : 1907-6637 **e-ISSN : 2579-9320**

INTRODUCTION

The maternal mortality rate (MMR) in Indonesia remains high, at 305 cases per 100,000 live births in 2019. Meanwhile, the Sustainable Development Goals (SDGs) aim to reduce MMR to 70 per 100,000 live births by 2030 (Fatahillah, 2020). In 2019, the number of maternal deaths in Riau reached 125 maternal deaths, which increased compared to the previous year (Riau Provincial Health Office, 2019). The high MMR rates should raise concerns and drive prevention actions to mitigate any further maternal and infant mortality. An example of an effort that can be made is to encourage every birth to be assisted by skilled health professionals in health facilities (Ministry of Health of the Republic of Indonesia, 2015).

The Ministry of Health of the Republic of Indonesia (2015) recorded that 16.7% of births in the country took place at home without the assistance of a health professional. Data from the Riau Provincial Health Office (2019) indicated that between 2015 and 2019, only 77% of births in Indragiri Hulu were conducted in hospitals, falling short of the goal of equity compared to 100% in Dumai, Riau. Thus, health initiatives are necessary to boost success and achieve equity (Riau Provincial Health Office, 2019).

Power, passage, passenger, and women's psychology are four vital and impactful aspects of the birthing process. Surtiningsih (2018) asserted that the function of birth attendants is equally significant and goes beyond these four parameters. In Indragiri Hulu, women who opt to have a birth outside hospitals are helped by *Tohu Danga.* In the Nias language, *Tohu Danga* refers to a person with expertise and training in childbirth who assists a woman during the birthing process. P. Akpabio et al. (2020) reported that traditional birth practices can cause high maternal mortality rates. The threat of death for women and infants is greater because traditional birth attendants can only work alone and use minimal tools. Birth assisted by nonprofessional health workers, such as *Tohu Danga*, can cause complications in the birthing process for women and infants because they may not have sufficient scientific knowledge regarding the physiology and pathology of a woman's body and lack understanding of antiseptics (Nurhidayanti et al., 2018).

Most women who opt for *Tohu Danga* as their birth attendants have received help from *Tohu Danga* during their previous childbirth experiences (Fajriani, 2016). In general, it is challenging for nurses to provide comprehensive nursing care in the childbearing process of women, particularly due to the cultural and social structures of women and their families (Adila et al., 2020). Therefore, the objective of this study is to learn more about the experiences of women assisted by *Tohu Danga* in their labor process. It is hoped that nurses can communicate effectively with women by drawing on their experience and cultural values when providing nursing care to transcultural women.

METHOD

Study design

This qualitative study used the descriptive phenomenology technique. In this study, we explore the experiences of women who were assisted by *Tohu Danga* during their birth process.

Setting and participants

The target population was women who were assisted by *Tohu Danga* during their birth process in Indragiri Hulu Regency, Riau Province, Indonesia. The 12 participants were collated using the purpose-sampling technique. The study was conducted between September 2021 and July 2022. The number of samples was limited based on data saturation (Polit & Beck, 2017). In this investigation, data saturation occurred when the responses of the participants were the same. At that point, the researcher stopped collecting other samples.

Data collection

The researcher is the main instrument for collecting data in this qualitative research (Polit & Beck, 2017). At the start of the implementation process, the researcher described the objectives and purpose of the interview approach. The timing of the interview was then decided between the informant and the researcher. The data collected by the researchers were documented via written forms and recordings. The researchers also took field notes to capture informant facial expressions during interviews, and digital recorders were used for audio recording during both phases of the process. The questions that are posed to them are based on the interview criteria. The women's perspective is the primary query.

Data analysis

After the data were evaluated, the researchers produced a matrix table (clarification). The data were then sorted into basic descriptive units, categories, and patterns as part of the data analysis process. Qualitative analysis aims to find themes, patterns, concepts, insights, and knowledge. Therefore, researchers used observations, documentation, and informant interviews to conduct a qualitative analysis of the collected data.

The study started by creating a summary of the phenomenon under investigation, which is women's experiences of giving birth assisted by *Tohu Danga*. The researchers then interviewed the participants to collect data and created verbatim transcripts of the interviews. After reading the participants' full transcript numerous times, the researchers determined the essential phrases in each participant's remark. Subsequently, the investigators arranged and clustered the gathered information into several themes. Then comprehensive descriptions of the outcomes were obtained from an in-depth examination of the participants' emotions and viewpoints for each theme. Next, the researchers asked the participants to confirm the findings. They also included any new information collected from the validation to create a more comprehensive description.

Trustworthiness

Credibility

The credibility test was conducted to build a trusting relationship between the participants and the researcher. Obtaining the trust of the participants is important as it allows researchers to acquire in-depth information. Then, the verbatim form of the interview data was created and consulted with the supervisor. The researchers also confirmed or clarified the data obtained with the participants. Additionally, the researcher and participants resolved any issues during the validity check for any categories, subthemes, and themes that do not align with the participants' perceptions.

Dependability

Dependability is a criterion used to measure confidence in qualitative research. The researchers made several efforts to improve the reliability test, including consulting and discussing with the tutoring/inquiry audit lecturer and research examiner for various processes of data analysis techniques, ranging from the data collection stage, interview analysis, transcription writing, theme determination, research results, and analysis of results about the experience of the participants.

Confirmability

In this study, the researcher improved confirmability by, among other things, having a lecturer guide this research, conducting a literature search to confirm or validate the existence of new theories that can be discovered and derived from this research, and developing a plan to disseminate the implementation of the results obtained.

Transferability

Transferability testing means that the data can also be applied elsewhere so that other researchers on the same topic can obtain the same results. Therefore, the researcher provided an explanation of women's experiences of childbirth with the help of *Tohu Danga* in detail, logically, and rationally to ensure transferability in this study. This explanation was provided to provide the reader with an in-depth picture of the results of the phenomenological study on women with *Tohu Danga*-assisted childbirth experiences.

Ethical consideration

The ethical license was obtained from the Ethics Commission for Health Research and Development of the Saint Carolus School of Health Sciences No. 013/KEPPKSTIKSC/2022.

RESULTS

Participants' characteristics

The characteristics of the 12 participants can be seen in Table 1.

Table 1. Participants' characteristics

No	Age (year)	Education	Occupation	Status Obstetric
1	26	Elementary school	Employee	P1A0
2	35	Elementary school	Workers	P7A0
3	27	Elementary school	Housewives	P5A0

No	Age (year)	Education	Occupation	Status Obstetric
4	28	Elementary school	Housewives	P2A0
5	21	Elementary school	Housewives	P2A0
6	20	Elementary school	Housewives	P1A0
7	35	Elementary school	Farmers	P4A0
8	23	Junior high school	Housewives	P2A0A1
9	32	Junior high school	Housewives	P2A0
10	29	Elementary school	Housewives	P4A0
11	30	Elementary school	Farmers	P5A0
12	25	Elementary school	Farmers	G3P2A0

Six main themes and their subthemes were found and described in Table 2:

Table 2. Themes and subthemes

Theme	Subtheme
1. The significance of being a mother	
2. Background that affects women's decisions in the selection of obstetric assistants	a. Family support b. Feeling secure and at ease when giving birth with *Tohu Danga* c. Women's refusal to utilize health services and facilities d. Financial constraints
3. The cultural practices conducted by *Tohu Danga* while providing childbirth support	a. Preparation before childbirth b. Taking care of for the newborn c. Actions for women following childbirth
4. Lengthening a difficult labor process	a. Difficult childbirth b. The cultural conceptions of protracted work
5. Childbirth care with *Tohu Danga* related to traditional medicine	a. Herbal medicine aids in the treatment of women's pain b. Herbal medicines can help reduce postpartum bleeding c. Herbal remedies aid in childbirth d. Helping out with the placenta e. Providing a sense of calm f. Mother is getting better g. Checking fetus position by tracing h. Checking on the baby's health
6. Women's psychological response to *Tohu Danga*-assisted childbirth	a. Negative response b. Positivity response

Theme

1. The significance of being a mother

Four participants expressed that giving birth, delivering the fetus safely, and finally becoming a mother are valuable experiences.

'As a mother, I am prepared to give birth and strive to deliver my child safely.' (P1)

'... (I will) risk my life to deliver my child safely.' (P4)

Eight of the 12 participants reported experiencing pain during labor.

'I must suffer whatever amount of pain to give birth to a child.' (P3)

'... When I gave birth, I experienced pain. I cried from the pain I felt.' (P6)

Giving birth to a child alters a woman's status as she becomes a mother in the eyes of her children.

'...to be a unique and ideal mother' (P10)

"Giving birth is evidence that I am now a mother. "(P11)

Giving birth is significant for the mother, as they feel happy after giving birth and feel as if their child is a gift to them.

'I feel the happiness of being a mother after giving birth and now having a child.' (P9)

"My heart is filled with joy because my child has been born. I am happy that my child has been born... (P11)

Some women disclosed that childbirth allowed them to continue their family lines.

".. I can provide an offspring to my husband '... (P5)

2. Background that affects women's decisions in the selection of obstetric assistants.

This theme is formed from four found subthemes. The first subtheme is family support. The participants stated that they chose *Tohu Danga* as their birth attendants after reaching a consensus with their husband and parents.

'... I decided to have a baby with Tohu Danga after consulting with my husband and our families...' (P9)

"Mother-in-law… Additionally, our parents were opposed to giving birth in a hospital. (P11)

The second subtheme is feeling secure and at ease when giving birth with *Tohu Danga*. The help provided by Tohu Danga allows home births to be more comfortable for women.

'... I felt comfortable giving birth at home with the help of Tohu Danga' (P5)

'Especially if I have a family member at home, that gives me courage.' (P4)

'I delivered the baby at home with the help of Tohu Danga. I have believed in them for a long time. "(P11)

Several mothers selected *Tohu Danga* again as their delivery attendant because their previous birth experiences went smoothly when assisted by *Tohu Danga*.

'Yes, experience, as I had already delivered my first child with the help of Tohu Danga.' (P2)

In addition, *Tohu Danga*'s compassionate demeanor during childbirth had a favorable impact on women, making them feel more at ease, contributing to their decision to choose *Tohu Danga* as their birth attendants.

"... I am glad to be monitored after giving birth... Tohu Danga continues to observe us... and provide care until we have completed the birthing process. ' (P12).

The women's refusal to utilize health services and facilities is the third subtheme. Five women reported that the distance

between their home and the health facility was one of the factors that drove them to select *Tohu Danga* over health services.

'Well, we are quite a distance away, ma'am, there is no hospital nearby, we live in a village.' (P7)

Furthermore, some women have observed that when a woman in labor arrives at a medical institution but is unable to give birth for days and has a late-term pregnancy, the medical staff would offer to perform an urgent cesarean section.

"When it was time to give birth, we went back and forth to the hospital, we even spent three days and two nights there, but I couldn't give birth. So the health workers there said that we need to perform a cesarean section as the baby is overdue. ' (P3)

As a result of their anxiety about giving birth via Sectio Caesarea, some women decided to trust *Tohu Danga* with the task of helping them give birth naturally.

'I was suggested to have surgery and because I didn't want to do a cesarean section, I decided to have a home birth with a Tohu Danga.' (P3)

Another reason why women do not want to have a birth with Sectio Caesarea is because of cost.

'If the operation is expensive, where will the funds come from?' (P3)

Furthermore, some women's prior experience giving birth in a medical facility had a poor effect on them. Their disappointment and trauma led them to lose faith in medical services.

'Due to what happened with our first child, I no longer trust hospitals.' (P8)

The fourth subtheme is financial constraints. Several women expressed the following concerns regarding budgetary constraints:

"First, due to the price, ma'am... I heard that at a hospital, the cost would be enormous, it could be millions (of rupiah) '... (P7)

In contrast, some women believe that *Tohu Danga* services are more affordable, which encourages them to use the service.

'There is no such thing as a costly Tohu Danga. The amount requested is always modest." (P7)

3. The cultural practices conducted by Tohu Danga while supporting the delivery process

This study divides the cultural practices conducted by the *Tohu Danga* while supporting the delivery process into three acts based on the delivery process; the first is preparation before childbirth. The first step in this cultural ritual is to examine the abdomen of the woman.

'They inspected my stomach' (P4)

'Yes, the first time I saw her, she checked my stomach.' (P8)

Eight mothers disclosed that the next step was to drink the herbal medicine created by the *Tohu Danga* for them to give birth. The formulation comprises plants that have long been a part of the Nias tribe's tradition.

'... gave me medicine, like traditional medicine ' (P2)

"... gave medicine... herbal medicine" (P4)

A woman said that the tools utilized were very distinctive and simple.

'Lime, safety pins, scissors, thread, and gloves' (P10).

The second subtheme is taking care of the newborn. After the baby is born, the *Tohu Danga* has a role in the cultural custom of tied the umbilical cord with a thread before cutting it.

'After the placenta and the baby have left the body, the cord is tied. (P3)"

"They tied the baby's umbilical cord with thread." (P8)

'They used scissors to cut the umbilical cord.' (P11)

The method of tying the umbilical cord of the baby differs depending on the sex of the newborn.

"We believe that when you tie the umbilical cord, you should do so twice for a girl and three times for a man. It depends on the gender of the baby..." (P3)

The *Tohu Danga* also cleans the placenta of the baby.

'The baby's placenta was then washed, dusted with powder, wrapped in a fresh cloth, and the mother was instructed to bury the placenta.' (P5, P3)

The last subtheme is actions for women following childbirth. The *Tohu Danga* bathes and cleans the women after childbirth.

'Clean up following the birthing process' (P4)

After bathing and changing women's clothes, the *Tohu Danga* binds the women's belly tightly with *gabi* cloth (to form a type of corset).

'The cloth is tied to the woman's belly after giving birth...' (P7)

4. Lengthening a difficult labor process

Two subthemes were found in the fourth theme; the first is difficult childbirth. This condition includes labor complications and prolonged labor.

"Since it is difficult to give birth... The problem for the mother is that the baby took a long time to emerge. ' (P4)

'... It was a long labor process. Perhaps it was because the child is overweight.' (P4)

During the labor process, the mother stated that she did not have the strength to push, causing the process to be impeded and long.

'It was difficult during the birthing process, because I didn't exhale for long enough and push hard enough.' (P8)

Two out of 12 women reported that their labor was slightly prolonged due to the retained placenta.

'Yes, it took a long time for the placenta to come out.' (P5)

The second subtheme is the cultural conceptions regarding extended birthing processes. According to the Nias perspective, a lengthy birth process is caused by witchcraft.

'... Someone might have sent a curse through witchcraft; therefore, the birthing process is prolonged' (P2)

Tohu Danga Childbirth Care Related to Traditional Medicine

Eight subthemes emerged from the fifth theme. The traditional treatment that *Tohu Danga* performs during the labor process is a form of care believed to have a variety of benefits and ensure a smooth labor process.

The first subtheme is herbal medicine administered to treat the women's pain. Participants revealed that the traditional medicine given by *Tohu Danga* helped them manage the pain they felt during the birth.

"Yes, I felt like I had lost a little pain in my stomach." (P2)

"My body is in pain when I stand up... Then I was given medication by the Tohu Danga," (P3)

The second subtheme is herbal medicines to help reduce postpartum bleeding. The *Tohu Danga* administered traditional medical care that was effective in reducing postpartum hemorrhage.

'No bleeding. She stopped it. I took the medication and in approximately thirty minutes it stopped... no more bleeding.' (P7)

The third subtheme is herbal remedies that aid in childbirth. The participants stated that traditional medicines were given to stimulate the activity of the baby.

"After taking the medicine, the movement of the baby in my stomach became strong and healthy." (P3)

"Let the baby heat up in the belly so that it can be born quickly." (P12)

The fourth subtheme is helping with placental expulsion. *Tohu Danga* provided them with traditional herbal medicine to aid in the expulsion of the placenta.

'She administered medication so that the placenta could be easily extracted.' (P5).

Next, giving a calming presence is another subtheme. Traditional medicine can also address the psychological demands of women by offering a sense of serenity and comfort after consuming the herbal combination of *Tohu Danga.*

'Yes, I felt relaxed after taking the medication.' (P11).

Another sub-theme is 'the woman feeling better', where the participants felt more relaxed and a sense of relief and improvement after taking the herbal remedy.

"I was treated by the Tohu Danga. I took their medication and now I feel better. '(P3)

The next subtheme is checking the position of the infants by tracking.

'... The location of the head of the fetus was checked by squeezing the mother's stomach to see if the fetus is pointed downwards.' (P4, P5, P6, and P10)

The last subtheme is checking the baby's health.

'She examined the condition of the baby to determine whether the fetus is healthy or not.' (P5)

5. Mother's psychological response to Tohu Danga-assisted childbirth

Two subthemes were revealed in this theme. The first subtheme is negative response. Some women reported feeling uncertain after giving birth to a *Tohu Danga* for the first time.

'What did I feel?' I felt a feeling of dread... (P3)

Some women also expressed their fear when they were about to give birth with a *Tohu Danga.*

'I was afraid too. But there was no doctor in the village to help with the birth" (P7, P1)

The second subtheme is the positive response. Some women said that they were happy to give birth to a *Tohu Danga* and that they felt grateful after a successful delivery.

'Tohu Danga makes one happy, eliminates all concerns and takes care of all needs'. (P4, P6)

The participants were also happy with all the *Tohu Danga* had done to assist them in childbirth.

'I am relieved and delighted that Tohu Danga has taken care of everything and eliminated all my problems.' (P6)

DISCUSSION

The results indicate that the birthing experience is significant for the participants and serves as a bond between the woman and her infant. Childbirth is a precious experience where women strive to give birth to their infants safely. However, women risk their lives and feel pain during the birthing process (Sulyastini & Armini, 2020). This result is consistent with research indicating that some women's ideal goal is to conceive and have children after marriage (Rachmawati & Masykur, 2016).

Participants in this study chose to rely on family support due to financial constraints. They also chose to experience a sense of security and comfort during childbirth and refused to use medical facilities. A woman's decision to use services is significantly influenced by the emotional support she obtains from her family or spouse (Agustina et al., 2017). Pregnant women can choose traditional birth attendants over medical professionals due to the customs and culture that have been passed down from generation to generation (Nanur et al., 2020) (Prihatini et al., 2017). Openness and communication appear crucial to their decision, as the women's closest friends and family members are her greatest sources of support while dealing with difficult circumstances. According to Sinaga et al. (2020), assistance from the community, family and medical professionals can help women with difficulties in giving birth to overcome their grief and cope with the loss so that they can resume their normal activities.

According to the results of this investigation, the services rendered by *Tohu Danga* consist of her empathic actions toward women in the form of caring words and gestures. Although they are often ignored by local health workers, women feel at ease with *Tohu Danga* as their birth attendant (Nanur et al., 2020; Nurhayati & Sugiharto, 2019; Prihatini et al., 2017). The sense of security and comfort provided by *Tohu Danga* makes women choose their services. The community typically chooses traditional birth attendant services over those of healthcare institutions, as they can offer better services compared to health facilities (Cheptum et al., 2017). Some women choose *Tohu Danga* because medical services are far from their homes. The patients' decision to consult traditional practitioners is also primarily influenced by long distances to health facilities and transportation problems (Widaningsih & Achmad, 2021). This finding aligns with previous research that indicates a relationship between facility access and birth attendant choices (Mokoagow et al., 2020). (Gogoi, 2021; Tabong et al., 2021) also supported that woman preferred home births over hospital births due to low quality and unpleasant labor experiences.

Furthermore, the cultural practice named "*Lomo Tabina*" in this research is defined as a belly tuck or abdominal massage technique that is still used and trusted by the Nias people as a cultural practice, especially for pregnant women and women who are giving birth. The skills for performing abdominal massages are believed to have been passed down from their ancestors. These massages aim to regulate and change the position of the fetus. This practice is a common belief in Asian countries and is believed to improve the health of women and infants and is performed by *Tohu Danga* (*dukun bayi*) (Withers et al., 2018).

The *Tohu Danga* would also give a drink to women in the postpartum period. The drink is made according to hereditary

cultural beliefs in the form of a herbal plant formulation and a prayer that *Tohu Danga read.* This drug is believed to provide benefits for postpartum care. This is consistent with the literature (Mawoza et al., 2019; Tabong et al., 2021).

Cutting the umbilical cord of infants is another unique local cultural practice. The *Tohu Danga* connects the infant's umbilical cord with white thread; the number of ties depends on the baby's gender: two knots for baby girls and three knots for baby boys. The umbilical cord is then severed with unsterilized scissors. This practice contradicts Andersson & Mercer (2021) statement regarding umbilical cord management of newborns, as they stated that keeping the umbilical cord intact until the placenta is ready for delivery and delaying cord clamping for at least three minutes increases iron stores in infants and promotes their health and developing child.

Another cultural practice after birth is cleaning the placenta before burial. The participants believed that washing the placenta of the infant is comparable to cleaning a newborn and is a sign of respect before burying the placenta. According to Adila et al. (2020), each culture has unique characteristics for removing the placenta, including the method, the place of disposal, the time of disposal, and the ritual of disposal, depending on the gender of the newborn.

In this study, the women believed that a long-held placenta and a long-term baby are caused by an evil spirit, sent by witchcraft. Therefore, traditional medicine is perceived as the best option to prevent any complications of childbirth. Gogoi's study (2021) also revealed that obstetricians used traditional methods to treat labor complications, such as prolonged labor pain, resuscitation problems, spinal position, placenta retention, and twins. Instead, doctors do not know how to handle complications such as postpartum hemorrhage, eclampsia, and preeclampsia at home. If the obstetric assistant does not help, the pregnant mother may die.

This study discovered that *Tohu Danga* provided women with herbal medications to reduce labor pain. This finding aligns with Jogdand & Bhattacharjee (2017), who found that turmeric (Curcuma longa linn.) has a strong analgesic action in rats. In terms of pain relief, turmeric at a level of 400 mg/kg is comparable to aspirin 90 and 120 minutes after treatment, respectively. Another study found that additional turmeric gel with concentrations between 5% and 15% promotes faster wound healing (Adeliana et al., 2021).

The positive response of women to labor with traditional birth attendants is attributed to the preparedness of *Tohu Danga,* which makes them feel secure; hence, most women in Nias intend to use traditional birth attendants during childbirth (Sutrianita et al., 2018). Typically, the *Tohu Danga* appears to be well prepared, competent and knowledgeable enough to help women give birth, from the beginning to the end of the labor process, which impressed and satisfied the participants.

The limitation of this research is the language used during interviews, where some participants have difficulty understanding the research questions because they have a limited understanding of the Indonesian language. The solution the researchers chose is to ask for help from a trusted woman, who can speak both Indonesian and Nias languages, to help the research by translating the questions from the researchers to some participants who had difficulties in speaking Indonesian.

CONCLUSION AND RECOMMENDATION

The research findings have allowed researchers to infer an in-depth description and comprehension of women's experiences with *Tohu Danga*-assisted births in the Indragiri Hulu Regency. Cultural interconnection in healthcare is essential in the effort to provide qualified nursing care and services that follow the attitudes of societies with different cultural beliefs. Additionally, family participation in providing services, especially for women in labor, is important.

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Aungsuroch, Y. et al. (2024)
Jurnal Keperawatan Soedirman – Vol 19, No 1 page 52-58
http://jos.unsoed.ac.id/index.php/jks/index

ORIGINAL ARTICLE

TRANSLATION, ADAPTATION, AND PSYCHOMETRIC VALIDATION OF THE INDONESIA VERSION OF JOB DIAGNOSTIC SURVEY: HOSPITAL NURSE SETTING

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Article Information
Received: 25 September 2023
Revised: 19 January 2024
Accepted: 15 February 2024

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DOI
10.20884/1.jks.2024.19.1.9619

ABSTRACT

A job diagnostic survey is used to measure work or job characteristics. However, there is limited study exploring the psychometric properties of the Indonesian version. This study aimed to validate the Indonesian version of the Hack and Oldham Job Diagnostic Survey.
Cronbach's alpha coefficient value showed a significant value for all evaluated dimensions. As for concurrent validity, a significant correlation was discovered between all dimensions. Construct validity for job characteristics, experienced psychological states, and affective responses to the job were significant. Cronbach's alpha coefficient value was ≥0.825 for all evaluated dimensions. As for concurrent validity, a significant correlation was found between all dimensions (r = 0.357-0.752). Construct validity for job characteristics, experienced psychological states, and affective responses to the job were significant ($\chi 2$ = 0.00, CFI = 0.99, GFI = 0.91, RMSEA = 0.06 and SRMSR = 0.05). The Job Diagnostic Survey Indonesian version (JDS-I) has been validated, exhibits good psychometric properties, and retains the original features of the instrument.

Keywords: *Job characteristics; job diagnostic; nurse working conditions; translation; validation*

ISSN : 1907-6637 **e-ISSN : 2579-9320**

INTRODUCTION

The work dimension plays a crucial role in enhancing productivity and quality (Juanamasta et al., 2018). Hackman and Oldham introduced the notion of job characteristics, building upon the work of Turner and Lawrance (1965) as well as Hackman and Lawler (1971). Hackman and Oldham (1974, 1975) developed a model that incorporates the fundamental dimensions of work, crucial psychological states, personal and work outcomes, and the importance of individual growth (Kamani, 2020). This model, known as the Job Characteristics Theory, suggests that certain job characteristics such as skill variety, task identity, task significance, autonomy, and feedback are able to lead to higher motivation and satisfaction levels among employees (Ali et al., 2014; Hackman & Oldham, 1975). Additionally, the theory emphasizes the importance of individual growth and development through meaningful work experiences, which can ultimately contribute to enhanced productivity and work quality (Juanamasta, 2018).

Based on the job characteristics model, a Job diagnostic survey (JDS) assess job characteristics, worker reactions, and growth and development needs (Sever & Malbašić, 2019). The tool consists of three critical psychological states, such as knowledge of results, responsibilities, and the meaning of work (Oldham & Hackman, 2010; Pedroso et al., 2014), which have the potential to impact motivation in the workplace. These critical psychological states play a

significant role in determining an individual's level of motivation and satisfaction with their job. According to Chang Junior and Albuquerque (2022), work management cannot influence them. Knowledge of results refers to the extent to which employees receive feedback on their performance, allowing them to gauge their progress and to make necessary improvements. Responsibilities refer to employees' autonomy and decision-making authority, contributing to a sense of ownership and empowerment. The meaning of work relates to how employees perceive the purpose and significance of their job, which can influence their level.

Hackman and Oldham (1975) propose two supplementary dimensions, i.e extrinsic and interpersonal feedback relationships, which enhance comprehension of the nature of work and workers' behavior concerning their work. Extrinsic feedback refers to the external rewards or recognition that employees receive for their work, such as promotions or bonuses. It acts as a motivator and can increase job satisfaction. In contrast, Interpersonal feedback relates to the quality of relationships and communication between employees and their supervisors or colleagues. Positive interpersonal feedback fosters a supportive work environment and enhance employee engagement.

The critical psychological state influences both personal and work outcomes. The findings can be categorized into four dimensions: internal work motivation, overall work satisfaction, satisfaction with productivity, and absenteeism and replacement (Gil Sánchez, 2017; Hackman & Oldham, 1975; Juanamasta et al., 2023). These dimensions highlight that positive interpersonal feedback impact on various aspects of an employee's experience at work. For instance, when employees receive constructive feedback and feel valued by their supervisors or colleagues, they are motivated to perform well and to feel satisfied with their overall work experience. Additionally, this positive feedback may also contribute to lower absenteeism and turnover rates, and tend to feel a sense of loyalty and commitment to their organization.

Individual growth is closely linked to key aspects of work and personal outcomes. These factors are both influenced by and impact critical psychological states. They are also considered dimensions of analysis in the assessment of work (Gil Sánchez, 2017). For example, when employees have opportunities for growth and development within their organization, they tend to experience higher job satisfaction and engagement. It can increase productivity and performance as individuals continually feel motivated to improve their skills and knowledge. Additionally, organizations prioritizing individual growth frequently attract top talent and have a competitive advantage in the market.
Furthermore, when employees are allowed to develop their skills and knowledge, they become more valuable assets to the organization (Dong et al., 2017). Not only benefits the individual employee, but also it contributes to the company's overall success. By investing in the growth and development of their workforce, organizations can foster a culture of continuous learning and improvement. This condition leads to a more skilled and adaptable workforce better equipped to handle challenges and seize opportunities. Moreover, employees given opportunities for growth and development are more likely to feel valued and appreciated by their organization, which can enhance their commitment and loyalty.

This instrument would give many benefits to measure employees' situation and thoughts about their job. Additionally, this instrument is widely used worldwide compared to other instruments (Charalambous et al., 2013; Martinez-Gomez et al., 2016). Work and multimethod job design questionnaire were developed based on the JDS concept. Moreover, the majority of studies in Indonesia applied JDS (Bagus et al., 2021; Muhammad Nazri et al., 2022; Saputra et al., 2022). However, limited studies have been conducted to establish the validity and reliability of the job design survey used in Indonesia. This study aimed to develop and validate an Indonesian version of the Hackman and Oldham Job Design Survey instrument.

METHOD

Research design

This research was conducted in May 2021–June 2022 and applied a cross-sectional design.

Setting and samples

Selecting a sufficient sample size is a crucial decision. Regrettably, no agreed-upon criteria for validation studies exist in the existing literature (Gunawan et al., 2021). In the majority of studies, approximately ranged from 3 to 20 items per variable (Mundfrom et al., 2005). There were 80 items on the JDS scale, so the 299 participants fall within the established norms.

Two hundred and ninety-nine nurses from various Indonesian hospitals participated in this study. Convenience sampling was used in this study.

Most respondents were women (79.5%), and 55.7% held at least a high school diploma. A random number generator was applied to pick the eight participating hospitals. All registered nurses from the hospital's medical, surgical, intensive care, and outpatient settings involved in this research. Nurses who did not have permanent contracts with the hospital were also included. Nurses on leave or vacation during data collection were excluded from this study.

Measurement and data collection

Procedures for translation and cultural adaptation of the instrument

A researcher-adopted procedure was used for the translation and cultural adaptation of the instrument (Tsang et al., 2017). The survey was originally in English, then translated to Indonesian, and back into American English. Two translators were recruited to translate the American English questionnaire into Indonesian. Both translators had degrees and prior experience translating in the medical and nursing fields. Each translator obtained a copy of the tool and translation instructions. The English and Indonesian versions of the JDS were combined to form a single and definitive edition. The consolidated version of the Indonesian translation was delivered to two bilingual translators with experience in the in medical and nursing fields and back-translated from Indonesian to American English. Once both versions were available, their discrepancies were discussed and resolved so that the translated version was as faithful to the original version and continued to final version revision.

Measures of JDS's validity and reliability were tested. The JDS's ability to accurately assess the state of the practice setting was evaluated using internal consistency and reliability analyses. The level of overall correlation between all questionnaire items, as internal consistency was assessed.

All questions of the instrument have been arranged in their original order. In some passages, the answer scale appears

only at the beginning of the section, and the respondent is instructed to mark the number on the scale that corresponds to the question. The answer scale was placed after all instrument questions to facilitate and avoid errors in filling out the instrument.

Content validity index (CVI)
Content validity refers to the extent to which the components of an assessment tool are pertinent and indicative of the intended construct for a specific assessment objective (Yusoff, 2019).

Six registered nurses with doctoral degrees and substantial clinical experience, fluency in English and Indonesian, recent experience in the healthcare system, and familiarity with the research process were sent the translated questionnaire. They were asked about how accessible the English version was, how effectively it accounted for Indonesian cultural norms, and whether it could be used in Indonesia to evaluate ideas that were originally measured in the United States. The nurses obtained a file with two columns for each language to compare in both version and add notes in the next column.

Concurrent validity
Concurrent validity showed how well test scores predict an individual's performance on a given measure by comparing those estimates to a set of criterion scores obtained simultaneously. Both scales could evaluate similar or identical constructs (Lin & Yao, 2014). Pearson correlation between JDS variables was applied to analyze concurrent validity.

Structural validity
Measurements (usually questionnaires) are considered to have construct validity when they can consistently test the hypothesis or theory being measured. The test results accurately anticipate the theoretical attribute, which is an important component of construct validity (Ginty, 2013). The JDS has three variables: job characteristics, experienced psychological responses, and affective job responses.

Internal consistency reliability
The focus of internal consistency reliability analysis is measurement instruments' ability to generate comparable results for the same construct(Rodríguez-Martín et al., 2022). The study measured reliability in the four variables of JDS that make up the instrument in all scores and questions.

The Job Design Survey measures job dimensions, psychological work experience, affective responses to work, and the strength of growth needs (Table 1). Answers have a score range of 1–7, with 1 strongly disagreeing and 7 strongly agreeing. This questionnaire uses favorable and unfavorable questions. Questionnaires were distributed in envelopes and online. The form must be filled out completely, with no missing pages and all questions completed.

Table 1. Job Design Survey Instruments Summary

Variable	Define
Job Characteristics	
Skill variety	The degree to which a wide variety of skills are necessary for a certain position
Task identity	The degree to which one's work entails completing a whole, well-defined task with a measurable outcome, as opposed to just a subset of tasks
Task significance	The degree of impact of the substance of work on the lives and works of others, both within the organization and the external environment
Autonomy	The degree to which the job provides freedom and independence in making decisions about the work schedule as well as the procedures that must be followed to carry out the work
Feedback from the job itself	The degree to which, during the activities required to carry out the work, direct and objective feedback is obtained in regard to their work performance
Feedback from agents	The degree to which employees receive clear information about their work performance from their supervisors and colleagues. This dimension is not a part of the job itself but it is included in this prospectus to add additional information in the feedback dimension.
Dealing with others	The degree to which the job itself requires employees to work in contact with others during their work, including relationships with external organizational members and customers
Experienced psychological states	
The meaningfulness of the work	The extent to which workers perceive their work as meaningful, valuable, and useful
Experienced responsibility for the work	The degree to which workers feel responsible for the results of their work
Knowledge of results	The degree to which an employee knows and comprehends ss how well he or she is doing a job
Affective response to the job	
General satisfaction	The level of satisfaction and happiness that workers have with what they do
Internal work motivation	The degree to which the worker is motivated to develop his or her job, meaning the positive internal feelings he/she experiences when his/her performance at work is satisfactory and the negative internal feelings he experiences when his/her performance at work is unsatisfactory,
Spesific satisfaction	It involves different determinants for the job satisfaction, salary and other compensation, job security, partners and co-workers, supervision, and growth opportunities.
Individual growth needs strength.	It discusses the individual and specific differences that each worker has, with a focus on the degree to which workers desire to obtain satisfaction related to their growth and development as a result of work. The strong trend in this measure is indicated by positive responses with high satisfaction and motivation internally at work in complex and competitive positions. Weak tendencies toward this measure are evident when the position is unsatisfying or unmotivating.

Data analysis
Indexing for Content Validity (CVI) was used to analyze the content quality. Conventional valuing and assessing (CVI) is commonly used in survey instrument development. Six experts rated the questionnaire and provided feedback. They

were a professor in nursing field, a medical doctor, a nurse director, and three doctoral degree nurses.

Then, the 10 registered nurses who had previously completed the questionnaires were asked to provide feedback on the items' relative importance from 1 to 4 (1 = not relevant, 2 = somewhat relevant, 3 = relevant, and 4 = very relevant).

The concurrent validity was determined using Pearson's correlation to quantify how close one another (the r = 0.10–0.29, weak relationship, r = 0.30–0.49, medium relationship, and r =0.50–1.0, strong relationship) (Hair et al., 2018).

A confirming factor analysis was carried out with LISREL 8.72 (CFA). Hair et al. (2018) established criteria for evaluating measurement model fit with research data, including a p-value of 0.02, a goodness-of-fit index (GFI) of >0.90, a normed fit index (CFI) of >0.97, a root-mean-square error of approximation (RMSEA) of 0.08, and a standardized root-mean-square residual (SRMR) of 0.08. To include items with a factor loading of 0.4 or higher in the analysis, at least 200 respondents are required (Hair et al., 2018).

Cronbach's alpha is the most commonly used metric of internal consistency and reliability (Rodríguez-Martín et al., 2022). The coefficient was calculated using SPSS version 22. Means were used to report correlations between items and the total. When the former falls between 0.3 and 0.7, it is regarded normal, but the latter is appropriate when it exceeds 0.3. (Juanamasta et al., 2023).

Ethical considerations

This research obtained an ethical license from the Bali Health Institute with the number 04.0437/KEPITEKES-BALI/V/2022. Before completing the major surveys, participants were acquired the informed consent form by applying the principles of beneficence, nonmaleficence, confidentiality, equity, and voluntary participation. Before data is collected, a participant involved should give their consent to the information shared. The respondent was able to discontinue the survey at any time. The informed consent was documented at the time of the study's Ethics Review and Consent Form submission.

RESULTS

Content validity index (CVI)

CVI score from six experts ranged from 0.75 to1 for each item with the overall score was 0.82-0.98 (Appendix Concurrent validity)

The validity of the criteria was carried out using the Pearson correlation coefficient from each other's dimensions, and the following results were displayed in Table 2).

Table 2. Correlation between variables of the job design survey

	1	2	3
Job characteristics (1)			
Experienced psychological states (2)	0,723**		
Affective response to the job (3)	0,729**	0,752**	
Individual growth needs strength.	0,357**	0,419**	0,330**

*p < 0,01 = ***

Structural validity

The loading factors of job characteristics ranged from 0.05 to 0.76; experienced psychological states were between 0.14 and 0.88, affective responses to the job score were from 0.01 to 0.83; and individual growth needs strength ranged from 0.16 to 0.94. Regarding with Hackman and Oldham's (1975), the majority of dimensions obtained loading factor higher than 0.4, except for internal work motivation.

Table 3. Job design survey loading factor on each dimension

Job Characteristics	Factor Loading	Experienced Psychological States	Factor Loading	Affective Response to The Job	Factor Loading	Individual Growth Needs Strength	Factor Loading
Skill variety	0.70	The meaningfulness of the work	0.56	General satisfaction	0.62	Would like	0.88
	0.76		0.40		0.66		0.93
	0.08		0.88		0.21		0.94
Task identity	0.59		0.44		0.79		0.93
	0.66	Experienced responsibility for the work	0.48		0.31		0.90
	0.05		0.14	Internal work motivation	0.64		0.90
Task significance	0.70		0.38		0.12	Job choice	0.16
	0.68		0.33		0.01		0.23
	0.18		0.88		0.83		0.52
Autonomy	0.51		0.88		0.13		0.14
	0.44	Knowledge of results	0.43		0.55		0.72
	0.26		0.35	Specific satisfaction	0.70		0.66
Feedback from the job itself	0.73		0.86		0.74		0.41
	0.74		0.26		0.78		0.07

Job Characteristics	Factor Loading	Experienced Psychological States	Factor Loading	Affective Response to The Job	Factor Loading	Individual Growth Needs Strength	Factor Loading
	0.74				0.74		0.31
Feedback from agents	0.54				0.69		0.91
	0.53				0.79		0.59
	0.10				0.83		0.69
Dealing with others	0.76				0.81		
	0.73				0.65		
	0.18				0.78		

In measuring the fit of indexes, items with factor loadings below the standard were deleted (<0.4). Modification indices of error covariance were carried out to assess the fitness of the model (Table 4).

Table 4. Fit of Indexes

Fit Index	χ2 (p value)	CFI	GFI	SRMR	RMSEA
Job characteristics**	0.0023	0.99	0.96	0.059	0.071
Experienced psychological states	0.073	0.99	0.98	0.035	0.057
Affective response to the job	0.00	0.99	0.91	0.051	0.064

***Job characteristics are measured with five dimensions (skill variety, task identity, task significance, autonomy, and feedback) and modification indices.*
Following modification indices, error covariance

The initial model of job characteristics had a significant result for χ2 (.00), CFI (.99), GFI (.96), RMSEA (.07), and SRMSR (.06). The results showed that five dimensions and 10 items were significantly constructed validity of job characteristics of the I-JDS.

The initial model of experienced psychological states demonstrated significant results for χ2 (.07), CFI (.99), GFI (.98), RMSEA (.05), and SRMSR (.03). The findings revealed that three dimensions and eight items had significant construct validity for I-JDS-experienced psychological states. While affective responses were considerably construct valid across three dimensions and 20 items, with χ2 (.00), CFI (.99), GFI (.91), RMSEA (.06) and SRMSR (.05) respectively.

Internal consistency reliability
Internal consistency of work diagnosis was measured through item-total correlation and Cronbach's alpha coefficient in the four dimensions that made up the instrument in all scores and questions (Table 5).

Table 5. Cronbach's alpha coefficient

Item	Cronbach's alpha (item-total correlation)
Job characteristics	0.872 (0.436-0.678)
Experienced psychological states	0.839 (0.342-0.701)
Affective response to the job	0.947 (0.374-0.805)
Individuals Growing Need Strength*	0.911 (0.642-0.819)
All scores	0.825
All questions*	0.963

The highest Cronbach's alpha was affective response to the job (0.94) and the lowest was experienced psychological states (0.84). Overall questions displayed good reliability (0.96). Additionally, all item-total correlation were greater than standard (0.3).

DISCUSSION

The researchers discovered that 60 of the 83 items met the construct validity and reliability criteria. The majority of adverse questions and reversed score were neither genuine or dependable. These results were consistent with those of a prior study (Codery & Sevastos, 1993), which revealed that negative questions affected construct validity more than positive ones (Clark & Watson, 2016; Clark & Watson, 2019). They discovered that the negative questions contained contradictions. To retain construct validity and reliability, some questions were eliminated and modification indices was applied to determine model fit. Further research utilizing positive questions is required. Job characteristics (skill variety, task identity, task significance, autonomy, and feedback) were validated with 10 out of 15 questions, two questions on each dimension. When compared with the prior study (Cordery & Sevastos, 1993), the current study achieved a better model fit. The previous study found that the revised JDS with positive questions had greater construct validity and reliability (Buys et al., 2007). Furthermore, favorable and unfavorable questions were difficult to measure through CFA, which did not produce significant results (Hair et al., 2018; Hair et al., 2021). More research with positive questions is required to compare the model fit amongst studies in similar settings.

Meanwhile, 10 of 14 items tested positive for psychological state experience, and 19 of 25 items were valid for affective responses. These are the new findings because no studies examined the construct validity of these variables.

The Cronbach's alpha coefficient literature did not specify a reference value to determine whether or not the results are consistent or not. Typically, for the questionnaire to be declared compatible with the Cronbach alpha coefficient, the question must have an index equal to or greater than 0.70 (Hair et al., 2018; Hair et al., 2021). Cronbach's alpha coefficient scores and questions showed significant in all dimensions, indicating that the instruments' internal consistency is satisfying. Because several items were removed in order to get a strong Cronbach alpha, test-retesting may be preferable for the questionnaire.

The Indonesian version of the Hackman and Oldham Job Diagnosis Survey instrument was validated, demonstrating satisfactory psychometric properties while retaining the instruments' original characteristics. This procedure avoids errors in data collection for hypothesis testing in research with

instruments.

All questions in the instrument have been kept in their original sequence and sections. To facilitate the interpretation of the response scales, some of which have a modified structure in sections, just the aesthetics of the questionnaire were changed, without deviating from the original instrument.

This study had several drawbacks. First, the study did not assess the composite reliability since the number of items in one item was less than three. The result may not meet the standard. Second, the study did not measure test-retest reliability. It is suggested for further investigation. Finally, because data collection occurred nearly entirely during the pandemic, several circumstances may have influenced the nurses' responses to the questionnaire.

CONCLUSION AND RECOMMENDATION

The study findings demonstrate that the I-JDS has satisfactory structural validity, content validity, concurrent validity and internal consistency. This instrument can be used separately to assess job characteristics, experienced psychological states, affective responses to the job, and individual growth needs. The user can utilize the it the measuring tools in Indonesian hospitals. The I-JDS can be applied by the hospital, chief nursing officer, or nurse first-line management to evaluate the work environment.

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