Nursing Management

Contents continued from outside back cover

Received: 20 June 2021 | Revised: 16 September 2021 | Accepted: 24 September 2021

DOI: 10.1111/jonm.13481

ORIGINAL ARTICLE

WILEY

Negative and positive psychological experience of frontline nurses in combatting COVID-19: A qualitative study

Xin Peng MD, Deputy Chief Nurse[1] | Yi Yang Undergraduate, Registered Nurse[1] | Ping Gao Undergraduate, Registered Nurse[1] | Yi Ren Undergraduate, Chinese Registered Nurse[2] | Deying Hu PhD, Chief Nurse[3] | Qin He Undergraduate, Registered Nurse[4]

[1]Cancer Center, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China

[2]Department of the Wise Group, Pathways Health, Hamilton, New Zealand

[3]Department of Nursing, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China

[4]Public Health Department, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China

Correspondence
Hu Deying, MD, Department of Nursing, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, Jiefang Avenue 1277, Wuhan 430022, China.
Email: hudeying2006@126.com

He Qin, Undergraduate, Public Health Department, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, Jiefang Avenue 1277, Wuhan 430022, China.
Email: heqinzz@163.com

Funding information
Huazhong University of Science and Technology, Grant/Award Number: 2020kfyXGYJ001

Abstract

Aims: To qualitatively explore potential experience among frontline nurses who had been fighting against the COVID-19 infection since the outbreak.

Background: Disasters are often sudden and uncertain. Since the COVID-19 outbreak in Wuhan city, local frontline nurses had been responsible for treatment of COVID-19 for several months. Qualitative study was required to assess complex multi-component psychological experiences among frontline nurses.

Methods: Twenty local frontline nurses were recruited from a designated hospital of COVID-19 treatment. We conducted semi-structured interview using phenomenological method. Descriptive phenomenological method was applied for thematic analysis.

Results: Twenty female frontline nurses (aged 24 to 43 years old) were interviewed. Two broader themes, negative and positive, were identified. Negative experience included refusal and helpless (refusal to work at frontline, shortage of confidence in working and helpless), fear and anxiety, excessive miss, and other health issues. Positive experience included improved interpersonal relationship, sublimation of personal faith and strength, changes in understanding meaning of life and new possibility.

Conclusion: Both positive and negative psychological response were observed, which can provide evidence based clues for making essential strategies and policy.

Implications for Nursing Management: Understand subjective experience of frontline nurses can establish evidence for development of effective psychological intervention. Nursing administrator should consider the nurses' psychological experience comprehensively to promote psychological growth and lower post-traumatic psychological burden.

Xin Peng and Yi Yang contribute equally and share first authorship.

KEYWORDS
frontline nurses, novel corona virus pneumonia, psychological experience, qualitative research

1 | BACKGROUND

Since early December, 2019, the first coronavirus disease 2019 (COVID-19) case was detected in Wuhan, China. The COVID-19 had a basic reproduction number (R0) of 5.7 and required timely diagnosis and effective treatment to prevent progression and lower mortality (Jin et al., 2020; Sanche et al., 2020). Person-to-person transmission of the disease made the first-wave outbreak spread quickly, and it had evolved into a global pandemic. Although countries have tried their best to implement effective restrictions and promote vaccination, the global epidemic was not still contained (Han et al., 2020). Some countries had experienced a second wave or even the third wave of COVID-19 (Asrani et al., 2021). As of August, 2021, the COVID-19 had infected more than 200,000,000 cases worldwide. The global pandemic might be a long lasting problem; it is worthwhile and beneficial to study COVID-19 related topics, including topics triggered at the beginning of the outbreak.

Since the outbreak, the healthcare workers (HCWs) have been responsible for the frontline fight against the COVID-19 for several months. Necessity and importance of psychological status among frontline nurses have been emphasized (Chen et al., 2020). Negative psychological status might prevent nurses from caring for patients with COVID-19 (Joo & Liu, 2021). A systematic review including 16 quantitative articles found that the frontline HCWs suffered from high prevalence of post-traumatic stress symptoms (D'Ettorre et al., 2021). Qualitative studies reported psychological disturbances, powerless, depression and anxiety among frontline HCWs (Al Ghafri et al., 2020; Fang et al., 2021; Liu et al., 2020a). Higher anxiety and stress were observed among frontline HCWs who were female, married and had children (Celmece & Menekay, 2020; Huang et al., 2021). The conflict between family and work, increase in family care responsibilities, and constant worry that oneself and family members would be infected might explain this phenomenon.

While, coping with trauma events also might develop positive psychological experience (Meichenbaum, 2017). During the COVID-19 pandemic, psychological resilience and effective coping strategies promoted positive psychological health outcomes among HCWs (Labrague, 2021). A quantitative study suggested frontline nurses experienced a moderate and high-level post-traumatic growth (PTG) (Peng et al., 2021). Both positive and negative elements in psychological responses were urgent and noteworthy that required comprehensive research. However, previous studies investigated either negative or positive experience separately; a comprehensive study on HCWs' mental health was inadequately understood. Qualitative study can give a comprehensive and in-depth understanding of phenomenon and experience by exploring natures of research subjects and establishing relationship between them (Busetto et al., 2020). So qualitative method can equip us with a better tool to assess complex multi-component psychological experiences among frontline nurses.

Disasters and crises on earth are often sudden and uncertain, including lessons Learned from COVID-19 pandemic (Miller, 2020). At beginning of the outbreak as the first wave in Wuhan city, many hospitals were designated as the first-line hospital for treatment of critical patients infected with COVID-19. However, unavoidably increased workloads, shortage of personal protection equipment (PPE), uncertainty of curative treatment, risk of infection and death and impact of patients' pessimism had posed a great and significant threat on these frontline nurses (Huang et al., 2021). Some nurses in Wuhan city had been working at frontline since the city lockdown, and they might need to play the role of both a clinical nurse and a family caregiver. With the increase in support, they were required to quarantine in designated hotel after work, direct contact with families decreased. Compared with general population and nurses in the subsequent waves, more profound and comprehensive psychological experience might be observed among these frontline nurses. HCWs were limited and scarce resources to fight against current and future crisis; their initial response to the sudden disaster was worth studying to provide evidence for developing customized intervention and protect them from the next crisis.

In this study, a tertiary Grade A hospital of Wuhan city was selected, in which more than 5200 COVID-19 patients and 30,000 fever patients were treated since the outbreak. We recruited 20 female frontline nurses from fever outpatient and isolation ward. The subjects were interviewed through semi-structured interview. The objective of this qualitative study was to provide in-depth insights into comprehensive experiences of frontline nurses from epidemic center. It would not only generate new knowledge regarding psychological development to sudden disaster but also establish evidence for development of effective psychological intervention.

2 | METHODS

The consolidated criteria for reporting qualitative research (COREQ) guideline was implemented in this study for reporting methods and results structurally and clearly (Tong et al., 2007).

2.1 | Study design and setting

To capture and describe the frontline nurses psychological experience compressively and veritably, we chose a qualitative method by in-depth semi-structured face-to-face interview. A descriptive phenomenological method was applied to understand aspects of experiences and generalizing the individual's reports in qualitative study of psychology (Englander, 2016; Matua & Van Der Wal, 2015).

Since January 23, 2020, the COVID-19 outbreak was declared as a public health emergency and caused lockdown of the Wuhan city because of its high contagion and great uncertainty. Many local hospitals were reconstructed into designated hospitals for treating the COVID-19. Many local nurses were arranged to support the treatment with limited source since the lockdown. A tertiary Grade A and designated hospital in Wuhan city was selected to recruit participants.

2.2 | Ethical approval

This study was reviewed and approved by the Ethics Committee of the Union Hospital of Tongji Medical College, Huazhong University of Science and Technology (2020) Lunshenzi (0025), moreover, special approval was obtained from the new coronavirus pneumonia emergency in 2020 project (number 2020kfyXGYJ001). Written informed consensus was documented for each included participant and information confidentiality was guaranteed.

2.3 | Study participants and data collection

Female frontline nurses who had been fighting against the COVID-19 from the beginning of the pandemic to 15 March 2020 were recruited for face-to-face interview. Invitation was distributed in an online nursing resource group, and a convenience sampling method was adopted based on ease of availability. Inclusion criteria included the following: (1) registered nurse who had worked in this hospital at least 1 year; (2) the duration of frontline work was above 14 days; (3) nurses who had signed the consent form and volunteered to participate in this study. Nurses who was on sick leave and personal leave, was excluded from interview. Average of 16–24 interviews could reach the saturation in a qualitative study (Hennink et al., 2017). Interviews were conducted until thematic saturation was reached. Finally, 23 frontline nurses were connected, 3 participants declined the interview because of additional work. Twenty nurses, ageing from 24 to 43 years old, agreed to participate in the interviewed during March 17 to March 20.

P. X. was a female nurse in chief with experience in psychology and qualitative study and worked as the interviewer. Y. Y. was a female clinical nurse and worked as the facilitator. Y. Y. contacted the participants and re-introduced the study purpose and arrangement before official interview. After treatment work, the interview was held in the hotel where frontline nurses were quarantined. To guarantee data saturation, each interview was conducted without time limit until no new topic was represented.

2.4 | Contents of the interview

A semi-structured guide with open-ended questions was developed based on both existing literatures on nurses' psychological experience and nursing experts in this designated hospital (Bastos et al., 2018; Yuwanich et al., 2015). The guide included five questions: (1) What is your first reaction when you knew that you would be transferred to the frontline COVID-19 ward? (2) What impressed you the most during the COVID-19 epidemic? (3) What were your concerns when you were working on the frontline? (4) How did your family think about that you were going to the frontline? (5) How did you think about your future life after working on frontline? The Preliminary guide was piloted with one targeted frontline nurse and no change was made for the interview guide, the pilot interview was included in the final analysis.

2.5 | Data analysis

All interviews were audio-recorded and transcribed verbatim, and relevant memo notes were made during and after the interviews for further analysis. A seven-step phenomenological analysis method developed by Colaizzi was carried out for content analysis (Abalos et al., 2016). After being familiar with the data, two researchers (P. X. and R. Y.) independently coded the transcript. Discrepancies between the two independent coders were discussed and refined with the third research (H. D. Y.) for consistency. Identified topics were discussed among all authors and then categorized through several iterations.

3 | RESULTS

Basic characteristics about the 20 nurses were presented in Table 1. Negative and positive experiences were determined preliminary based on previous studies and coders' self-experience.

3.1 | Theme 1: Negative experience

3.1.1 | Refusal and helpless

Refusal to work at frontline and helpless

COVID-19 was a highly contagious disease. During the start of the COVID-19 outbreak, no effective treatment was found, and the personal protective equipment was limited. However, these nurses had to work with great vulnerability and workload. Most nurses stated that they did not want to work in the fever clinic.

> This disease was too terrible, I did not want to go to the fever clinic, I would resign if I has been assigned to the fever clinic. (Nurse C)

Another participant further added

> I heard that there was a shortage of personal protective equipment (PPE) from the nurses who have worked in the fever clinic; I did not know how to

TABLE 1 Demographic characteristics of the participants ($n = 20$)

ID	Education level	Nursing experience (year)	Working against COVID-19(day)	Title	Married	Having child/children
A	Diploma	6	21	Nurse practitioner	Yes	Yes
B	Bachelor	6	21	Nurse practitioner	No	No
C	Bachelor	7	14	Nurse practitioner	Yes	Yes
D	Bachelor	13	14	Supervisor nurse	Yes	Yes
E	Bachelor	10	21	Supervisor nurse	Yes	Yes
F	Bachelor	17	21	Nurse practitioner	Yes	Yes
G	Bachelor	18	21	Supervisor nurse	Yes	Yes
H	Diploma	6	21	Nurse	No	No
I	Bachelor	6	21	Nurse	Yes	No
J	Bachelor	6	20	Nurse practitioner	Yes	No
K	Diploma	6	14	Nurse	No	No
L	Bachelor	10	14	Nurse practitioner	Yes	Yes
M	Bachelor	7	21	Nurse practitioner	Yes	Yes
N	Bachelor	7	21	Nurse practitioner	Yes	Yes
O	Bachelor	13	14	Supervisor nurse	Yes	Yes
P	Bachelor	25	21	Supervisor nurse	Yes	Yes
Q	Postgraduate	5	21	Nurse practitioner	Yes	No
R	Bachelor	8	14	Nurse practitioner	Yes	Yes
S	Bachelor	4	21	Nurse	No	No
T	Bachelor	3	21	Nurse	No	No

> protect herself from COVID-19, thus she did not want to work there. (Nurse Z)

The COVID-19 required timely diagnosis and effective treatment to prevent progression and lower mortality. However, in addition to supporting treatment, there was no effective curative treatment and nursing management at that time. These nurses felt helpless.

> There was no specific medicine to treat COVID-19, all I could do was watching the patients suffering. (Nurse M)

Nurse N further added a self-example:

> an elderly patient talked jokes with the nurses when I just came in to the clinic, however, after two days, I lost my ability of speech and motor. (Nurse N)

Shortage of confidence in working

The COVID-19 outbreak was a public health emergency during the Chinese Spring Festival. There was a sudden and rapid rise in the number of suspected, confirmed and death cases. However, the number of respiratory nurse specialist was seriously insufficient, and other nurses are temporarily trained and arranged to participate in treatment.

> it was the first time that she acknowledges this kind of disease, I was doubting about her nursing ability in terms of COVID-19, and I concerned if I could keep up with the work pace of other colleagues. (Nurse Y)

> when rescuing critically patients, I was not confident with my ability to manipulate the ventilator and high-flow oxygen equipment, I was afraid of dragging down her colleagues. (Nurse B)

3.1.2 | Fear and anxiety

Almost all participants had experiencing fear and anxiety because they were working with real risk of being infected and in the special working environment with heavy equipment.

> It was hard to sleep when she saw the news about the death of the doctors and nurses from infection. I had older people and children in her family, I was afraid of infecting her family members. (Nurse L)

Meanwhile, the continuous increase in infected cases suggested that the pandemic did not seem to end, which further deteriorated the condition.

> Recently, the increase of patients in my clinic made me always think about these patients, even after getting off work. (Nurse A)

3.1.3 | Excessive miss

The majority of respondents had families and children. They were separated from their family at least 3 weeks. Participants expressed their miss and guilty to their families.

> I had not seen my daughter for 2 months, my daughter called my auntie instead of mother when video chatting. My daughter could not recognize her now. (Nurse H)

Another nurse N further added

> when I came to the frontline, my son was too young to walk. A few days before the interview, my mother sent me a video that my son could walk now, I felt so guilty for passing my son's growth. (Nurse N)

3.1.4 | Other health issues

Heavy protective equipment, high-intensity workload and closed working environment, fear and anxiety caused them to suffer from various physical symptoms. Participants mentioned discomforts during their work and rest.

> When I was working in the isolation ward, I always felt difficulty in breathing, weakness and dizziness. (Nurse Y)

Another participant suffered from circadian rhythm disturbance because of continuous work.

> When I took rest at the hotel, I felt that the day and night were reversed, and suffered from appetite and sleeping problems. (Nurse B)

Another nurse reported lack of appetite caused by stress and anxiety, which led to abnormal weight loss.

> Sometimes, I felt very hungry but had no appetite, and I had lost 5 kg in the last month. (Nurse Z)

3.2 | Theme 2: positive experience

After experiencing the COVID-19 epidemic, these frontline nurses expressed growth in this adversity.

3.2.1 | Improved interpersonal relationship

The collaborative practice within health-care team was critical for treating the emergent COVID-19. The participants would keep an open mind and establish mutual trust with colleagues and patients.

> I was too competitive before, but now I knew I could ask for help when I got in trouble. My colleagues and nurse in chief always brought food for me. I felt that relationship between myself and colleges became closer since I worked in frontline. (Nurse Z)

Meanwhile, social support assisted HCWs to cope with the COVID-19 by warm interpersonal relationship and the honour of being a nurse.

> When I went to work, my neighbors gave smile to me every morning after knowing she was a nurse, the sense of approval and respect warmed me. (Nurse P)

Another nurse further added

> 'thank you' was a simple but beautiful word where the canteen lady delivered food for me, the security tested my body temperature every day and the volunteer drove me to work for free. (Nurse C)

3.2.2 | Sublimation of personal faith and strength

National medical aid mission was implemented by the government, and the whole country tried its best to fight against the pandemic. Powerful support from the country encouraged the participants greatly. They found that they were much stronger mentally and physically than they thought.

> I felt scared and stressed about the frontline job at the beginning. However, I was no longer afraid after so many medical teams and colleagues from all over the country joined frontline work. I was proud of my contribution when my motherland encountered the disaster. (Nurse C)

3.2.3 | Change in understanding meaning of life

These frontline participants were at risk of infection and death every day, and they experienced both success and failure, both life and death during treatment of the COVID-19.

> I felt that nothing was more important than being alive after seeing life and death. Maintaining a positive attitude and being happy every day were the most important thing for me. (Nurse Z)

Participants expressed their emphasis on life.

> Good health was the foundation of everything. I would cherish life more and pay more attention to my health than before. (Nurse Y)

> My husband should slow down work pace and spend more time with me and our children. (Nurse R)

3.2.4 | New possibility

The epidemic was a new and unexpected life event, which prompted participants to re-plan their future lives after reflecting on their past experiences.

> After the epidemic, I wanted to try new things which I did not dare to do before, such as skydiving and bungee jumping. (Nurse E)

4 | DISCUSSION

The COVID-19 pandemic was an emergent public health event. In this qualitative study, the recruited nurses were local in the epicentre and had worked at frontline since the COVID-19 outbreak in Wuhan city. Most of previous studies focused on HCWs' negative experiences, whereas their positive experiences were largely neglected. We documented lived experiences of these nurses and observed both positive and negative experiences among these frontline nurses.

The epidemic broke out suddenly, and the local health organisation might have insufficient professional experience with this new virus. In the early stages of the outbreak, frontline nurses were temporarily recruited and trained. High contagion of the COVID-19 and uncertainty in treatment and prevention made them under considerable psychological stress. Meanwhile, the personal protective equipment was limited seriously, including N95/FFP2 respirators, face shields or goggles. These frontline nurses had to work under high risk of occupational exposure to the infection (Zhan, Anders, et al., 2020). The unprecedented challenge would make them hesitant to work and feel helpless in the high-risk environment. Previous study in India reported that more than 70% HCWs hesitate to work during the COVID-19 pandemic (Khasne et al., 2020). The majority of them were not specialist in communicable disease, and shortage of confidence in caring for patients was observed. In a previous qualitative study, nine frontline nurses who were recruited and had no infectious disease expertise also stated lacked confidence and felt powerless when caring for patients (Liu et al., 2020b).

Fear and anxiety were observed as negative experience, which had been described in many previous studies (Hu et al., 2020; Shen et al., 2021). Dr Wenliang Li, a key figure in the COVID-19 epidemic in China and a hero for the HCWs, died on 7 February 2020, aged 33 years (Petersen et al., 2020). Other countries documented medical workers' infection and death on duty, even suicide (Montemurro, 2020; Sohrabi et al., 2020). Colleague's infection and death presented a direct and specific challenge to uninfected HCWs and may further worsen their mental situation. Excessive miss was a special but reasonable experience among these participants. With the management of COVID-19 epidemic increased, the frontline staffs were arranged to live alone in the designated hotels. They worked with high-density and long-duration nursing workload, they also worried about family members who were quarantined at home, but they only could contact family members occasionally through online tools. Another study on HCWs also reported missing of direct contact with intimate people (Al Ghafri et al., 2020).

Negative physical issues were also discussed. Frontline nurses worked with heavy equipment and long shift-time work during the COVID-19 outbreak; they tended to presented burnout and emotional exhaustion (Wang et al., 2021; Zhang et al., 2020). A large sample and multicentre study reported that more than 50% frontier nurses suffered from insomnia during their frontline works (Zhan, Liu, et al., 2020). In this study, loss of appetite was observed. Previous study showed that nurses in Wuhan city had higher score in poor appetite or overeating than nurses in other cities (Ren et al., 2021). These health issues were associated with the negative psychological experiences and might further the conditions.

Although trauma caused negative experience, negative experiences also catalysed the development of positive change, while positive changes acted as a buffer against the negative experiences (Tedeschi et al., 2018). Coping with and adaption to trauma brought about the post-traumatic growth (Wu et al., 2019). In a previous study, nurses demonstrated high positive growth when worked with war victims (Lev-Wiesel et al., 2009). During treatment of COVID-19 infected patients, nurses should trust and collaborate effectively with team members. After work, a social distance was also required, but video communication allowed them to be connected to their loved ones. Supports from colleagues, supervisors and families were the fundamental, which could encourage HCWs to fight with confidence, help HCWs control negative thoughts and relieve their psychological burden and miss (Blanco-Donoso et al., 2020). Support from society gave a great and warm respect to HCWs' contribution and encouraged HCWs to seek mental help, which might increase HCWs' self-efficacy and turn the trauma into positive growth (She et al., 2021).

After the outbreak, the Chinese government carried out 'one province to aid one city' medical aid by recruiting HCWs outside Hubei province who possessed advance clinical experience to assist the fight. By March 2020, there were 42,000 HCWs from 31 provinces participating in the national mission. Meanwhile, many companies donated sufficient materials to support frontline HCWs. The national solidarity promoted the development of strong sense of national pride and psychological affiliation with the country (David & Bar-Tal, 2009). Collaboration with supportive human resources strengthened local HCWs' power. Many special welfares were given to these frontline HCWs, including anti-epidemic memento and commendation conference organised by government, which affirmed their contrition to the combat against the COVID-19 pandemic.

The COVID-19 trauma was an unexpected event; HCWs faced the risk of infection and death during their work. The normal life had been drastically changed. After a trauma, finding meaning in a traumatic event made sense of what had happened. Previous study showed that finding the meaning of life could help recovery from a grief and improve post-traumatic growth instead of post-traumatic stress (de Jong et al., 2020). In our study, the experience made participants feel a sense of life's inherent value and hope to have a life worth living. Meanwhile, they embraced new possibility and make changes, which will enrich their future life. Similar findings were found in cares of children during the COVID-19 pandemic (Stallard et al., 2021).

4.1 | Implementation in nursing management and future crisis

Our study showed that both negative and positive experiences were present among HCWs. Because the COVID-19 pandemic was still continuing, future crisis was possible. Essential strategies and policy were needed to support frontline HCWs: (1) accessibility to formal psychological support and intervention, which maintain frontline nurses' mental health, especially male HCWs (Huang et al., 2021); (2) establishment of comfortable communication and effective collaboration environment to reduce burnout; (3) assurance of support from family, colleague and society to improve professional identity; (4) reasonable shift arrangement and attractive nutrition to maintain frontline HCWs' physical power.

Our study had several limitations. Firstly, even though participants were given the opportunity to share their personal experiences of risk and resilience, only 20 frontline nurses were interviewed; possible selection bias might exist in the qualitative study. Secondly, only female nurses were included; gender asymmetry limited the generalizability of the study. Finally, only a single time point was applied; the change in psychological experience could not be observed.

5 | CONCLUSION

Prevention and control of COVID-19 was a special and heuristic mission related to human life and health. This study showed that these frontline nurses experienced both negative and positive experiences as response to the COVID-19 outbreak. Nursing professionals were recommended to provide reasonable manpower arrangement and humanistic care to support development of psychological growth and to lower post-traumatic psychological burden.

FUNDING INFORMATION

The role of the 2020 COVID-19 emergency special approval project of Huazhong University of Science and Technology in the design of the study and collection, analysis and interpretation of data and in writing the manuscript gave much support. The reference number is 2020kfyXGYJ001.

CONFLICT OF INTEREST

The authors declare that they have no competing interests.

AUTHOR CONTRIBUTIONS

P. X. initiated and conceived this research article, collected data and supported with the first-line nurses' interviews, and participated in writing the original article. Y. Y., G. P. and R. Y. wrote the original article. D. Y. H. and Q. H. supervised the study and reviewed final manuscript.

ETHICS STATEMENT

This study has been approved by the Ethics Committee of Drug Clinical Trials of Huazhong University of Science and Technology. It has been carried out in the city of Wuhan, located in the middle south of China, with the registration number 1900022422. The participants who have been involved in this study have signed the informed consent form before being included in the study.

CONSENT FOR PUBLICATION

Not applicable.

DATA AVAILABILITY STATEMENT

The data being used and analysed during the current study are available from the corresponding authors upon reasonable request.

ORCID

Xin Peng https://orcid.org/0000-0002-8061-2335

REFERENCES

Abalos, E. E., Rivera, R. Y., Locsin, R. C., & Schoenhofer, S. O. (2016). Husserlian phenomenology and Colaizzi's method of data analysis: Exemplar in qualitative nursing inquiry using nursing as caring theory. *International Journal of Human Caring*, *1*(20), 19–23.

Al Ghafri, T., Al Ajmi, F., Anwar, H., Al Balushi, L., Al Balushi, Z., Al Fahdi, F., Al Lawati, A., Al Hashmi, S., Al Ghamari, A., Al Harthi, M., Kurup, P., Al Lamki, M., Al Manji, A., Al Sharji, A., Al Harthi, S., & Gibson, E. (2020). The experiences and perceptions of health-care workers during the COVID-19 pandemic in Muscat, Oman: A qualitative study. *Journal of Primary Care & Community Health*, *11*, 921854118. https://doi.org/10.1177/215013272096751

Asrani, P., Eapen, M. S., Hassan, M. I., & Sohal, S. S. (2021). Implications of the second wave of COVID-19 in India. *The Lancet Respiratory Medicine*, *9*, e93–e94. https://doi.org/10.1016/S2213-2600(21)00312-X

Bastos, R. A., Quintana, A. M., & Carnevale, F. (2018). Psychological distress experienced by nurses who work with patients in death process: A clinical-qualitative study. *Temas Em Psicologia*, *2*(26), 795–805. https://doi.org/10.9788/TP2018.2-10Pt

Blanco-Donoso, L. M., Garrosa, E., Moreno-Jiménez, J., Gálvez-Herrer, M., & Moreno-Jiménez, B. (2020). Occupational psychosocial risks of health professionals in the face of the crisis produced by the COVID-19: From the identification of these risks to immediate action. *International Journal of Nursing Studies Advances*, *2*, 100003. https://doi.org/10.1016/j.ijnsa.2020.100003

Busetto, L., Wick, W., & Gumbinger, C. (2020). How to use and assess qualitative research methods. *Neurological Research and Practice*, *2*, 14. https://doi.org/10.1186/s42466-020-00059-z

Celmece, N., & Menekay, M. (2020). The effect of stress, anxiety and burnout levels of healthcare professionals caring for COVID-19 patients on their quality of life. *Frontiers in Psychology*, *11*, 597624. https://doi.org/10.3389/fpsyg.2020.597624

Chen, Q., Liang, M., Li, Y., Guo, J., Fei, D., Wang, L., He, L., Sheng, C., Cai, Y., Li, X., Wang, J., & Zhang, Z. (2020). Mental health care for medical staff in China during the COVID-19 outbreak. *The Lancet. Psychiatry*, *7*(4), e15–e16. https://doi.org/10.1016/S2215-0366(20)30078-X

David, O., & Bar-Tal, D. (2009). A sociopsychological conception of collective identity: The case of national identity as an example. *Personality and Social Psychology Review*, *13*(4), 354–379. https://doi.org/10.1177/1088868309344412

de Jong, E. M., Ziegler, N., & Schippers, M. C. (2020). From shattered goals to meaning in life: Life crafting in times of the COVID-19 pandemic. *Frontiers in Psychology*, *11*, 577708. https://doi.org/10.3389/fpsyg.2020.577708

D'Ettorre, G., Ceccarelli, G., Santinelli, L., Vassalini, P., Innocenti, G. P., Alessandri, F., Koukopoulos, A. E., Russo, A., D'Ettorre, G., & Tarsitani, L. (2021). Post-traumatic stress symptoms in healthcare workers dealing with the COVID-19 pandemic: A systematic review. *International Journal of Environmental Research and Public Health*, *18*(2). https://doi.org/10.3390/ijerph18020601

Englander, M. (2016). The phenomenological method in qualitative psychology and psychiatry. *International Journal of Qualitative Studies on Health and Well-Being*, *11*, 30682. https://doi.org/10.3402/qhw.v11.30682

Fang, M., Xia, B., Tian, T., Hao, Y., & Wu, Z. (2021). Drivers and mediators of healthcare workers' anxiety in one of the most affected hospitals by COVID-19: A qualitative analysis. *BMJ Open*, *11*(3), e45048.

Han, E., Tan, M., Turk, E., Sridhar, D., Leung, G. M., Shibuya, K., Asgari, N., Oh, J., Garcia-Basteiro, A. L., Hanefeld, J., Cook, A. R., Hsu, L. Y., Teo, Y. Y., Heymann, D., Clark, H., McKee, M., & Legido-Quigley, H. (2020). Lessons learnt from easing COVID-19 restrictions: An analysis of countries and regions in Asia Pacific and Europe. *Lancet*, *396*(10261), 1525–1534. https://doi.org/10.1016/S0140-6736(20)32007-9

Hennink, M. M., Kaiser, B. N., & Marconi, V. C. (2017). Code saturation versus meaning saturation: How many interviews are enough? *Qualitative Health Research*, *27*(4), 591–608. https://doi.org/10.1177/1049732316665344

Hu, D., Kong, Y., Li, W., Han, Q., Zhang, X., Zhu, L. X., Wan, S. W., Liu, Z., Shen, Q., Yang, J., He, H. G., & Zhu, J. (2020). Frontline nurses' burnout, anxiety, depression, and fear statuses and their associated factors during the COVID-19 outbreak in Wuhan, China: A large-scale cross-sectional study. *EClinicalMedicine*, *24*, 100424. https://doi.org/10.1016/j.eclinm.2020.100424

Huang, Q., Luo, L., Wang, Y., Jin, Y., & Zeng, X. (2021). Gender differences in psychological and behavioral responses of infected and uninfected health-care workers during the early COVID-19 outbreak. *Frontiers in Public Health*, *9*, 638975. https://doi.org/10.3389/fpubh.2021.638975

Jin, Y., Cai, L., Cheng, Z., Cheng, H., Deng, T., Fan, Y., Fang, C., Huang, D., Huang, L., Huang, Q., Han, Y., Hu, B., Hu, F., Li, B., Li, Y., Liang, K., Lin, L., Luo, L., Ma, J., … For, T. Z. H. O. (2020). A rapid advice guideline for the diagnosis and treatment of 2019 novel coronavirus (2019-nCoV) infected pneumonia (standard version). *Military Medical Research*, *7*(1), 4. https://doi.org/10.1186/s40779-020-0233-6

Joo, J. Y., & Liu, M. F. (2021). Nurses' barriers to caring for patients with COVID-19: A qualitative systematic review. *International Nursing Review*, *8*(2), 202–213. https://doi.org/10.1111/inr.12648

Khasne, R. W., Dhakulkar, B. S., Mahajan, H. C., & Kulkarni, A. P. (2020). Burnout among healthcare workers during COVID-19 pandemic in India: Results of a questionnaire-based survey. *Indian Journal of Critical Care Medicine: Peer-reviewed, Official Publication of Indian Society of Critical Care Medicine*, *24*(8), 664–671. https://doi.org/10.5005/jp-journals-10071-23518

Labrague, L. J. (2021). Psychological resilience, coping behaviours and social support among health care workers during the COVID-19 pandemic: A systematic review of quantitative studies. *Journal of Nursing Management*. https://doi.org/10.1111/jonm.13336

Lev-Wiesel, R., Goldblatt, H., Eisikovits, Z., & Admi, H. (2009). *Growth in the shadow of war: The case of social workers and nurses working in a shared war reality* (pp. 1154–1174). Oxford University Press.

Liu, Q., Luo, D., Haase, J. E., Guo, Q., Wang, X. Q., Liu, S., Xia, L., Liu, Z., Yang, J., & Yang, B. X. (2020a). The experiences of health-care providers during the COVID-19 crisis in China: A qualitative study. *The Lancet Global Health*, *8*(6), e790–e798. https://doi.org/10.1016/S2214-109X(20)30204-7

Matua, G. A., & Van Der Wal, D. M. (2015). Differentiating between descriptive and interpretive phenomenological research approaches. *Nurse Researcher*, *22*(6), 22–27. https://doi.org/10.7748/nr.22.6.22.e1344

Meichenbaum, D. (2017). *The evolution of cognitive behavior therapy: Resilience and posttraumatic growth*. Taylor & Francis Group. https://doi.org/10.4324/9781315748931

Miller, E. L. (2020). Dealing with uncertainty: Lessons learned from COVID-19. *Pain Management Nursing*, *21*(4), 305–306. https://doi.org/10.1016/j.pmn.2020.06.001

Montemurro, N. (2020). The emotional impact of COVID-19: From medical staff to common people. *Brain, Behavior, and Immunity*, *87*, 23–24. https://doi.org/10.1016/j.bbi.2020.03.032

Peng, X., Zhao, H., Yang, Y., Rao, Z., Hu, D., & He, Q. (2021). Post-traumatic growth level and influencing factors of first-line nurses for COVID-19. *Frontiers in Psychiatry*, *12*, 632360. https://doi.org/10.3389/fpsyt.2021.632360

Petersen, E., Hui, D., Hamer, D. H., Blumberg, L., Madoff, L. C., Pollack, M., Lee, S. S., McLellan, S., Memish, Z., Praharaj, I., Wasserman, S., Ntoumi, F., Azhar, E. I., Mchugh, T. D., Kock, R., Ippolito, G., Zumla, A., & Koopmans, M. (2020). Li Wenliang, a face to the frontline healthcare worker. The first doctor to notify the emergence of the SARS-CoV-2, (COVID-19), outbreak. *International Journal of Infectious Diseases*, *93*, 205–207. https://doi.org/10.1016/j.ijid.2020.02.052

Ren, H., Luo, X., Wang, Y., Guo, X., Hou, H., Zhang, Y., Yang, P., Zhu, F., Hu, C., Wang, R., Sun, Y., Du, Y., Yin, Q., Xu, G., Zuo, H., Hu, Q., & Wang, Y. (2021). Psychological responses among nurses caring for patients with COVID-19: A comparative study in China. *Translational Psychiatry*, *11*(1), 273. https://doi.org/10.1038/s41398-020-00993-1

Sanche, S., Lin, Y. T., Xu, C., Romero-Severson, E., Hengartner, N., & Ke, R. (2020). High contagiousness and rapid spread of severe acute respiratory syndrome coronavirus 2. *Emerging Infectious Diseases*, *7*(26), 1470–1477. https://doi.org/10.3201/eid2607.200282

She, R., Wang, X., Zhang, Z., Li, J., Xu, J., You, H., Li, Y., Liang, Y., Li, S., Ma, L., Wang, X., Chen, X., Zhou, P., Lau, J., Hao, Y., Zhou, H., & Gu, J. (2021). Mental health help-seeking and associated factors among public health workers during the COVID-19 outbreak in China. *Frontiers in Public Health*, *9*, 622677. https://doi.org/10.3389/fpubh.2021.622677

Shen, Y., Zhan, Y., Zheng, H., Liu, H., Wan, Y., & Zhou, W. (2021). Anxiety and its association with perceived stress and insomnia among nurses fighting against COVID-19 in Wuhan: A cross-sectional survey. *Journal of Clinical Nursing*, *30*(17–18), 2654–2664. https://doi.org/10.1111/jocn.15678

Sohrabi, C., Alsafi, Z., O'Neill, N., Khan, M., Kerwan, A., Al-Jabir, A., Iosifidis, C., & Agha, R. (2020). World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19). *International Journal of Surgery*, *76*, 71–76. https://doi.org/10.1016/j.ijsu.2020.02.034

Stallard, P., Pereira, A. I., & Barros, L. (2021). Post-traumatic growth during the COVID-19 pandemic in carers of children in Portugal and the UK: Cross-sectional online survey. *BJPsych Open*, *7*(1), e37. https://doi.org/10.1192/bjo.2021.1

Tedeschi, R. G., Shakespeare-Finch, J., Taku, K., & Calhoun, L. G. (2018). *Posttraumatic growth: Theory, research, and applications*. Routledge. https://doi.org/10.4324/9781315527451

Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*, *19*(6), 349–357. https://doi.org/10.1093/intqhc/mzm042

Wang, H., Zhou, X., Jia, X., Song, C., Luo, X., Zhang, H., Wu, H., & Ye, J. (2021). Emotional exhaustion in front-line healthcare workers during the COVID-19 pandemic in Wuhan, China: The effects of time pressure, social sharing and cognitive appraisal. *BMC Public Health*, *21*(1), 829. https://doi.org/10.1186/s12889-021-10891-w

Wu, X., Kaminga, A. C., Dai, W., Deng, J., Wang, Z., Pan, X., & Liu, A. (2019). The prevalence of moderate-to-high posttraumatic growth: A systematic review and meta-analysis. *Journal of Affective Disorders*, *243*, 408–415. https://doi.org/10.1016/j.jad.2018.09.023

Yuwanich, N., Sandmark, H., & Akhavan, S. (2015). Emergency department nurses' experiences of occupational stress: A qualitative study from a public hospital in Bangkok, Thailand. *WORK—A Journal of Prevention Assessment & Rehabilitation*, *53*(4), 885–897.

Zhan, M., Anders, R. L., Lin, B., Zhang, M., & Chen, X. (2020). Lesson learned from China regarding use of personal protective equipment. *American Journal of Infection Control*, *48*(12), 1462–1465. https://doi.org/10.1016/j.ajic.2020.08.007

Zhan, Y., Liu, Y., Liu, H., Li, M., Shen, Y., Gui, L., Zhang, J., Luo, Z., Tao, X., & Yu, J. (2020). Factors associated with insomnia among Chinese front-line nurses fighting against COVID-19 in Wuhan: A cross-sectional survey. *Journal of Nursing Management*, *28*(7), 1525–1535. https://doi.org/10.1111/jonm.13094

Zhang, Y., Wang, C., Pan, W., Zheng, J., Gao, J., Huang, X., Cai, S., Zhai, Y., Latour, J. M., & Zhu, C. (2020). Stress, burnout, and coping strategies of frontline nurses during the COVID-19 epidemic in Wuhan and Shanghai, China. *Frontiers in Psychiatry*, *11*, 565520. https://doi.org/10.3389/fpsyt.2020.565520

How to cite this article: Peng, X., Yang, Y., Gao, P., Ren, Y., Hu, D., & He, Q. (2022). Negative and positive psychological experience of frontline nurses in combatting COVID-19: A qualitative study. *Journal of Nursing Management*, *30*(7), 2185–2193. https://doi.org/10.1111/jonm.13481

Received: 5 February 2021 | Revised: 9 May 2021 | Accepted: 16 May 2021

DOI: 10.1111/jonm.13379

ORIGINAL ARTICLE

WILEY

Nurses' turnover intention in secondary hospitals in China: A structural equation modelling approach

Yong-ai Zhang PhD[1] | Xiao-na Zhang PhD[1] | Na Xu MD[1] | EunKyoung Yun PhD[2]

[1]The Faculty of Nursing, Xi'an Medical University, Xi'an, China

[2]College of Nursing Science, Kyung Hee University, Seoul, Korea

Correspondence
Yong-ai Zhang, The Faculty of Nursing, Xi'an Medical University, Xi'an, China. Address: No. 1 Xinwang Road, Weiyang District, Xi'an, Shaanxi 710021, China.
Email: zhangyongai@xiyi.edu.cn

Funding information
Shaanxi Province "Sanqin Scholars" Innovation Team Support Program; Doctoral Research Fund of Xi 'an Medical University, Grant/Award Number: 2017DOC09 and 2020DOC11

Abstract

Aim: To identify the factors affecting nurses' turnover intention.

Background: The shortage of nurses has been a great challenge worldwide, and nurses' turnover may exacerbate the situation.

Methods: A cross-sectional study was conducted among nurses in six secondary hospitals in China. A model was constructed, and structured questionnaires were adopted to measure model variables. Structural equation modelling was used to verify the model.

Results: Totally, 594 valid questionnaires were collected. The final model showed an acceptable fit, and 35.0% of the total variation was explained. Nine of the ten pathways were statistically significant. The model verified the contribution of professional value, nursing practice, job stress and social support to turnover intention and their effects were mediated by job satisfaction and organisational commitment. As hypothesized, there existed a significant effect between job satisfaction and organisational commitment. Unexpectedly, job stress had a greater direct effect on turnover intention than job satisfaction and organisational commitment.

Conclusions: The structural model provided a feasible model that could explain nurses' turnover intention in China.

Implications for Nursing Management: To prevent the turnover of nurses, administrators and managers should advisably prioritize the effect of job stress, especially in hospitals with similar medical context.

KEYWORDS

latent class analysis, nurse, occupational stress, personnel turnover, secondary care centres

1 | BACKGROUND

Lack of nursing staff is a common problem faced by health care organisations worldwide (Drennan & Ross, 2019). Given the ageing of the population and the increasing demand for nursing services, the nurse staffing shortage is expected to worsen. It has been projected that the worldwide shortage of nurses will reach 7.6 million by 2030 (World Health Organization, 2016). The nursing workforce shortage is even more pressing in China. The number of registered nurses in China was 3.8 million in 2017; that is, 2.7 nurses per 1,000 people

Yong-ai Zhang and Xiao-na Zhang they contributed equally to this work.

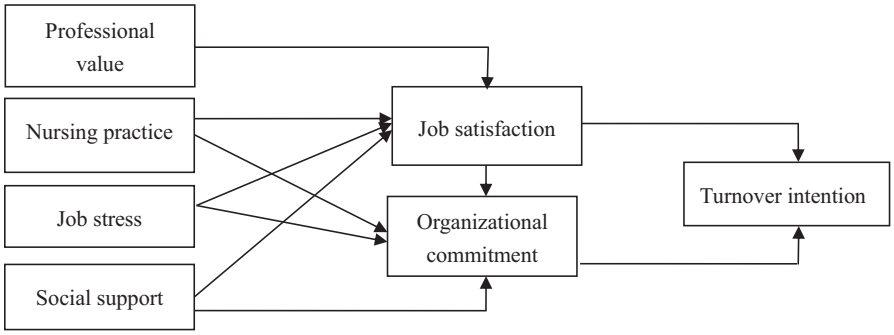

FIGURE 1 Theoretical Framework

nationwide, less than half the average level worldwide and far below the ratio in developed countries such as the United States (8.2) and Switzerland (17.5), although the total number increases annually (World Health Organization, 2018).

In addition, the high turnover rate is likely to exacerbate the nursing shortage situation and cause many problems. First, the quality of nursing services that require practical experience might drop due to the turnover of more skilled nurses. Second, the loss of nursing staff requires the remaining nurses to work more shifts, which puts more psychological pressure on them and consequently leads to more nurses leaving their jobs (Huang, 2018). Third, hospitals must invest more resources to recruit and train nurses; however, this process is usually lengthy, which might affect normal hospital operational procedures and increase patient dissatisfaction.

1.1 | Literature review

Turnover in nursing staff involves various aspects of the health care system, including the individuals, organisation and environment. It can be best predicted by the turnover intention, which refers to the likelihood of an employee leaving the current job (Michaels & Spector, 1982). Previous studies have found that nurses' turnover intention was influenced by many factors. A joint study by 10 European countries with 23,159 nurses found that burnout and elements of work environment were the factors that had the greatest influence on turnover intention (Heinen et al., 2013). Several studies have confirmed the relevance of nurses' turnover intention to their job satisfaction (Falatah & Conway, 2019; Zhang, You, et al., 2014), organisational commitment (Tang et al., 2016), social support (Zheng et al., 2015) and stress (Kim & Choi, 2015). Zhang et al. (2018) analysed studies about nurses in China mainland hospitals from 2013 to 2015 and reported that there was a moderate negative correlation between work environment and turnover intention. However, up to now, mainstream research on nursing turnover in China has examined the relationship between individual factors and turnover intention; there is a lack of systematic research exploring the interrelationship between factors by integrating various aspects into a turnover process model. Therefore, it is essential to carry out a study to systematically investigate nurses' turnover intention in China based on a scientific turnover theory.

1.2 | Structural equation model

The multidimensional staff turnover model (Price, 2001), known as Price's model, has been used and adapted in various fields for more than 20 years with proven scientific value. To explain influences on nurses' turnover intention, we constructed a model by combining Price's model with our hypothesis that nursing turnover is a response to nurses' job appraisal.

In Price's turnover model, the factors influencing job satisfaction and organisational commitment were categorized as individual (general training, job involvement, positive affectivity and negative affectivity), structural (autonomy, justice, job stress, pay, promotional chances, routinization and social support) and environmental (opportunity and kinship responsibility) factors. Therefore, this study adopted the analysis pattern and classified factors influencing turnover intention into individual and structural, that is professional value, nursing practice, job stress and social support, all serving as exogenous variables. Virtually, job satisfaction and organisational commitment served as media variables, while turnover intention (In Price's model, it was an internal variable that directly affects turnover), the best predictor of turnover behaviour, served as result variable (Figure 1).

The factors included in Price's model were adapted to the specific measures in this study. First, this study excluded external employment opportunity, family kinship responsibility and general training, factors directly affecting turnover. External employment opportunities and general training were reincluded as observed variables of job satisfaction and organisational commitment. Thus, except for kinship responsibility, other factors in Price's model were included in our model. Job involvement and positive/negative affectivity were included as the observed variables of nursing professional value, and autonomy and routinization were integrated into nursing practice. External employment opportunities, general training, fairness of distribution, promotion opportunities and pay were included as observed variables of job satisfaction and organisational commitment.

The pathways among factors were established based on evidence from existing research. Professional value may reflect an employee's fundamental understanding and views on occupation (Yarbrough et al., 2017); therefore, professional value and job satisfaction were hypothesized to be positively correlated. Previous researches have found that nursing practice had a significant positive effect on both job satisfaction (Kim & Lee, 2014) and

organisational commitment (Sun et al., 2017), while job stress had a negative effect on both (Jang et al., 2015; Lupiana & Rijanti, 2015). Social support has also been identified as a factor that directly influences nurses' job satisfaction and organisational commitment (Polat & Terzi, 2020). Job satisfaction, which represents an individual's views and attitudes towards the job, affects the development of the individual and the organisation (Salem et al., 2016). Organisational commitment, referred to as an employee's level of loyalty to the organisation, is an important variable in the development of an organisation (Salem et al., 2016). Their negative effects on turnover intention have been reported repeatedly (Moon & Han, 2011; Salem et al., 2016; Zhang, You, et al., 2014). Although Price's model did not suggest a pathway between job satisfaction and organisational commitment, studies have identified significant positive correlation between these two variables (Khan & Jan, 2015; Salem et al., 2016), and thus, this pathway was included in the model.

1.3 | Purpose

In this study, we aimed to build and test a structural equation model for clarifying the factors that influence nurses' turnover intention in secondary hospitals in China, in order to provide information to hospitals and policymakers to establish a better nursing human resources and job performance management system.

2 | METHODS

2.1 | Overview

This study used a cross-sectional design. A survey was conducted to collect data from secondary hospitals in Shaanxi province, China. Structural equation modelling was used to examine the pathways between various factors and turnover intention.

2.2 | Participants and data collection

A cross-sectional survey adopting a proportionate random sampling strategy to ensure sample representativeness was conducted to recruit nurses working in six secondary hospitals located in three cities (Xi'an, Yan'an and Baoji; two facilities in each city) in the Shaanxi Province of north-west China, from December 2015 to February 2016. We chose secondary hospitals considering that nursing turnover might be the highest in these hospitals. In China, patients are free to choose a hospital of any level for their diseases or conditions, which results in many people rushing to the tertiary hospitals. Consequently, nurses preferred to work at tertiary hospitals for better salary and career development; those who choose to work for primary health care providers may enjoy the relatively less workload and lower job stress. However, nurses who work in secondary hospitals must manage a heavy workload and meet high standards of service that are similar to the professional expectations for tertiary hospitals, but the salary is not very high, which may lead to high turnover.

In view of the recommendation of 20 participants per variable (Hoyle & Gottfredson, 2015) and invalid questionnaires, the target sample size was set at 600, as the study included 26 measurement variables. Eligible participants were those having a registered nursing licence and working as full-time staff in direct patient care settings. After obtaining approval, the trained interviewers distributed the self-completed questionnaires to the nurses and then collected them. We also collected demographic information, including age, gender, marital status, educational background and number of working years. This study was approved by relevant institutional review board.

2.3 | Measures

Professional value was measured using Yuen's professional value tool (Yeun et al., 2005), which was translated from Korean into Chinese. It includes four subscales (professional self-concept, social cognition, nursing expertise and nursing accountability) with 28 items on a 5-point Likert scale. Cronbach's α values for the original scale and for the version used in this study were 0.92 and 0.87, respectively. Nursing practice was measured by the Chinese version of Yuen's nursing practice tool (Yeun, 1995). It includes three subscales (nursing education, clinical nursing practice and communication) with 18 items on a 5-point response scale. Cronbach's α was 0.94 for both the original scale and for the version used in our study. Job stress was measured using the tool developed by Li and Liu (2000), including 35 items with a 4-point response scale. The items cover five main aspects of nursing work, that is workload burden, environment and resources, professional burden, patient care problems, and management and communication. Cronbach's α values for Li and Liu's tool and for the version used in our study were 0.86 and 0.95, respectively. Social support was measured using the tool developed by Xiao (1987) consisting of 14 items in three subscales (subject support, objective support and use of support level). Cronbach's α values for the original scale and for the version used in our study were 0.93 and 0.76, respectively.

Job satisfaction was measured using the Chinese version of Slavitt's index of work satisfaction (Slavitt et al., 1978). It consists of 32 items on a 5-point Likert scale in six subscales, that is autonomy, salary, interactions, administrative requirements, business requirements and level of professional job. Cronbach's α was 0.92 for both the original scale and for the version used in this study. Organisational commitment was measured by the Chinese translation of Meyer and Allen's organisational commitment scale (Meyer & Allen, 1991). It consists of 18 items on a 5-point Likert scale in three subscales (affective commitment, normative commitment and continuance commitment). Cronbach's α values for the original scale and for the version used in this study were 0.91 and 0.90, respectively.

Turnover intention was measured using the Michaels and Spector tool (Michaels & Spector, 1982). It consists of six items with a 4-point response scale, and the items are grouped into two subscales: intention to leave the current workplace and intention to find a new workplace. The higher the score, the stronger the turnover intention. Cronbach's α values for the original scale and for the version used in this study were 0.90 and 0.79, respectively. All the Cronbach's α values were satisfactory, supporting the validity of the scales used here.

2.4 | Data analysis

Data were analysed using SPSS statistics 22.0 and AMOS 22.0. The characteristics of the nurse participants and the measurement variables were analysed using descriptive statistics. The goodness of fit was analysed using comparative fit index (CFI), normed fit index (NFI), Tucker-Lewis index (TLI) and root mean square error of approximation (RMSEA). A model that meets the following criteria is considered to have a good fit: RMSEA <0.08, CFI >0.90, NFI >0.90 and TLI >0.90 (Kline, 2011). Bootstrapping was used to test the statistical significance of the indirect and total effects of the model.

3 | RESULTS

3.1 | Characteristics

A total of 630 questionnaires were distributed and 613 were collected, representing a 97.3% response rate. Of these, 594 questionnaires (96.9%) with complete information were used in the analysis. The demographic characteristics of participants are summarized in Table 1. The average age of the nurses was 30.0 years (Standard deviation, *SD* = 7.6). Female nurses accounted for 98.8% of the study sample, indicating that nursing is an occupation predominantly undertaken by women in China. A total of 348 nurses (58.6%) were married.

Regarding educational background, 345 nurses (58.1%) were 3 year junior college graduates, 136 (22.9%) were graduates upgraded from junior vocational college to university, and only 54 (9.0%) nurses were graduates with a full-time bachelor's degree. No participants had a master's degree or higher.

Our data suggest that the average educational background of Chinese nurses in secondary hospitals is relatively low. Among the participants, 242 (40.7%) had worked for 3 years or less, 187 (31.5%) had worked for 4–10 years, and 165 (27.8%) had worked for more than 10 years. Considering the average age and number of working years, nurses in secondary hospitals in China were relatively young. When asked about the long-term career plan (participants could choose between the following: do nursing work for long, do nursing work until necessary, try to quit or not sure), only 57.2% of nurses working in secondary hospitals intended to do nursing work for a long time.

TABLE 1 Demographic characteristics of the participants (*SD*, standard deviation)

All nurse participants (*n* = 594)	
Age (years), mean (*SD*)	**30.0 (7.6)**
Female, *n* (%)	587 (98.8)
Marital status, *n* (%)	
Married	348 (58.6)
Not married	246 (41.4)
Education, *n* (%)	
Bachelor	54 (9.0)
Junior college to university	136 (22.9)
3-year junior college	345 (58.1)
Technical secondary school or lower	59 (10.0)
Working years, *n* (%)	
3 years or less	242 (40.7)
4–10 years	187 (31.5)
More than 10 years	165 (27.8)

3.2 | Measures

Table 2 reports the descriptive statistics of the variables in the hypothesized model. During the four exogenous variables, only job stress showed stronger direct correlation with turnover intention than with the two intermediate variables. Actually, it indicated the legitimacy of establishing a pathway from job stress to turnover intention. In addition, there is a relatively strong correlation between the two intermediate variables, namely job satisfaction and organisational commitment, which supports the model hypothesis of establishing the pathway between the two.

3.3 | Structural equation model

The test results for the hypothesized model as described previously were RMSEA = 0.098, CFI = 0.798, NFI = 0.772 and TLI = 0.768; the values were slightly below the recommended standard. Based on the results of modified indexes and correlations among variables, we further modified the model; that is we added the pathway from job stress to turnover intention and removed the pathway between social support and organisational commitment. The final model is shown in Figure 2. The goodness-of-fit indices of this modified model were RMSEA = 0.075, CFI = 0.903, NFI = 0.879 and TLI = 0.881. These statistics were better than those for the hypothetical model; thus, the modified model was regarded as acceptable.

The parameter estimates of the modified model of turnover intention among nurses in secondary hospitals in China are shown in Table 3. Nine of the ten pathways were found to be statistically significant. Job satisfaction, organisational commitment and job stress explained 35.0% of turnover intention; professional value, nursing practice, job stress and social support explained 38.4% of

TABLE 2 Mean item scores and Pearson correlation coefficients of the variables in the hypothesized model ($n = 594$, *SD*, standard deviation)

	Mean [*SD*]	Range	X1	X2	X3	X4	Y1	Y2
Professional value (X1)	3.93[0.46]	2.17–5.00						
Nursing practice (X2)	4.15[0.54]	2.17–5.00	0.409[a]					
Job stress (X3)	2.17[0.49]	1.03–4.00	−0.166[a]	−0.132[a]				
Social support (X4)	2.93[0.56]	1.00–4.63	0.213[a]	0.167[a]	−0.206[a]			
Job satisfaction (Y1)	3.41[0.53]	1.00–5.00	0.470[a]	0.327[a]	−0.185[a]	0.207[a]		
Organisational commitment (Y2)	3.35[0.60]	1.56–5.00	0.454[a]	0.399[a]	−0.160[a]	0.167[a]	0.561[a]	
Turnover intention (Y3)	2.54[0.59]	1.00–4.00	−0.137[a]	−0.109[a]	0.439[a]	−0.209[a]	−0.318[a]	−0.293[a]

[a]All coefficients of Pearson correlation between the variables were significant at 0.001 level.

job satisfaction; and nursing practice, job stress and job satisfaction explained 54.6% of organisational commitment.

3.4 | Effects

The direct and indirect effects of the predictive variables in the model are shown in Table 4. For the impact on turnover intention, job stress had the greatest effect (standardized coefficient of direct effect = 0.387), followed by job satisfaction (−0.220) and organisational commitment (−0.123). The direct, indirect and total effects of job satisfaction and job stress on turnover intention were statistically significant. The direct and total effects of organisational commitment on turnover intention were also significant.

For the impact on job satisfaction, professional value had the greatest effect (standardized coefficient of direct effect = 0.372), followed by social support (0.306) and job stress (−0.242). The impact of nursing practice on job satisfaction was not significant.

For the impact on organisational commitment, job satisfaction had the greatest effect (direct effect = 0.552), followed by nursing practice (0.321) and job stress (−0.085). The effect of job satisfaction on organisational commitment was significant, as were the direct and total effects of nursing practice on organisational commitment. The direct, indirect and total effects of job stress on organisational commitment were also significant.

4 | DISCUSSION

The nursing shortage is an ongoing and pressing problem worldwide that is exacerbated by turnover in nurses. In the present study, we aimed to identify the factors that influence nurses' turnover intention in China. The results showed that only 57.2% of nurses working in secondary hospitals intended to do nursing work for long, indicating a high turnover intention, consistent with other studies in the United States (Unruh et al., 2016) and China (Cao et al., 2020). The mean total score of turnover intention (mean: 15.26, *SD*: 3.53) observed in this study was comparable to findings reported in other studies focusing on turnover intention of nurses in China. For example, Li et al. (2019) reported a mean turnover intention score of 14.78 (*SD*: 2.30) in 324 clinical nurses from traditional Chinese medicine hospitals in the Jiangsu Province of eastern China and Yang et al. (2014) found the turnover intention score was 15.33 (*SD*: 3.29) in 721 registered nurses from several hospitals in Shaanxi, the same province as we studied.

We developed a structural equation model based on Price's model to investigate the factors affecting nurses' turnover intention in secondary hospitals in China. After making some modifications, the final model showed an acceptable fit. Compared with Price's turnover model that explained 12% of the variation, the final model of nurses' turnover intention developed in this study demonstrated higher explanatory power (which explained 35.0% of the variation). Also, the pathway from job satisfaction to organisational commitment, which was not included in Price's model, was found to be statistically significant, consistent with previous studies showing that satisfied nurses tend to be more loyal to their organisation (Khan & Jan, 2015; Salem et al., 2016). It should be noted that job stress was found to have a direct impact on turnover intention. The effect was even greater than job satisfaction and organisational commitment. Comparatively, previous studies reported an indirect effect of job stress on turnover intention through job satisfaction and organisational commitment (Khan & Jan, 2015; Lupiana & Rijanti, 2015; Zhang et al., 2018). Although existing studies have suggested that the most significant factor affecting turnover is job satisfaction (Li et al., 2019; Moon & Han, 2011), we found that job stress had the greatest impact on the turnover intention of Chinese nurses, indicating the existence of high job stress for nurses in China and highlighting the urgent need to alleviate it.

Professional value was found to have the greatest direct effect on job satisfaction, as well as an indirect effect on turnover intention through job satisfaction. Nurses' professional values are a prerequisite for their ability to take care of patients because they reflect the value of their work. The correlation of professional value with job satisfaction has been acknowledged in a

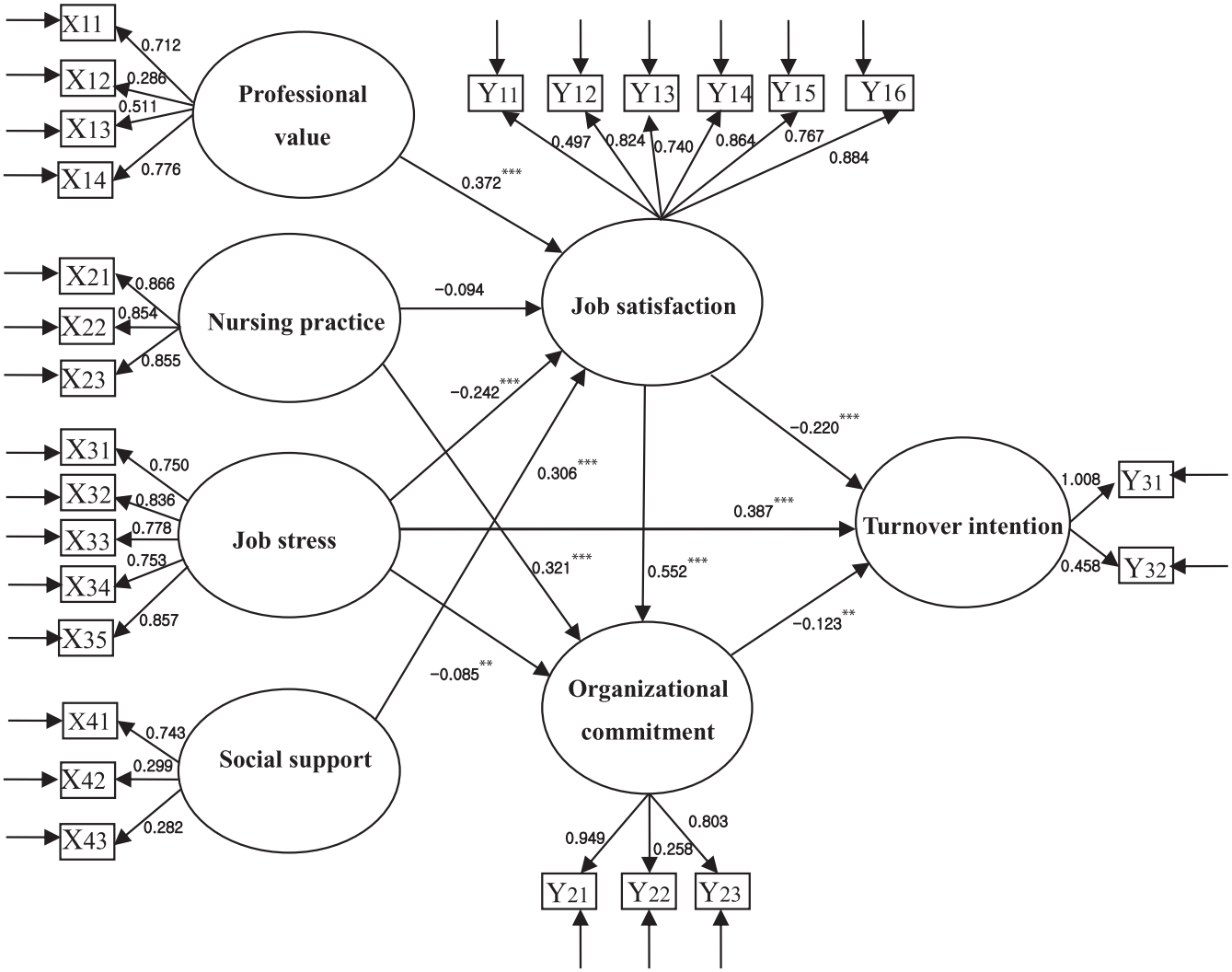

FIGURE 2 Standardized Regression Weights for the Modified Structural Equation Model. X11: Professional self-concept; X12: Social cognition; X13: Nursing expertise; X14: Nursing accountability; X21: Nursing education; X22: Nursing practice; X23: Communication; X31: Workload burden; X32: Environment and resources; X33: Professional burden; X34: Patient care problems; X35: Management and communication; X41: Subject support; X42: Objective support; X43: Use of support level; Y11: Autonomy; Y12: Salary; Y13: Interactions; Y14: Administrative requirements; Y15: Business requirements; Y16: Level of professional job; Y21: Affective commitment; Y22: Normative commitment; Y23: Continuance commitment; Y31: Intention to leave; Y32: Intention to find. $^{*}p < .1$, $^{**}p < .05$, $^{***}p < .01$

previous study, suggesting that professional value was positively correlated with job satisfaction (Yarbrough et al., 2017). Second, nursing practice had a significant positive effect on organisational commitment, but a negative effect on job satisfaction. This may be explained by the unsatisfactory nursing management strategies employed in Chinese public hospitals, such as assignment of inappropriate job roles, poor salary regulation, lack of incentives and lack of promotion opportunities. These factors may remarkably decrease nurses' satisfaction and passion for their job. According to Zhang et al. (2014), many experienced Chinese nurses with a high educational background were very dissatisfied with their job, as they reported that their value was not fully reflected and their performance was not properly evaluated, which then led to turnover. Third, nurses' job stress was found to have a direct effect on job satisfaction and organisational commitment, and an indirect effect on turnover intention through job satisfaction and organisational commitment. Similar results have been reported in a previous study, showing that nurses were dissatisfied with aspects of their job including excessive workload, conflicts with patients and inappropriate nursing environment (Yang et al., 2014). The pathway from job stress to organisational commitment had a control effect on job satisfaction. Increasing nurses' organisational commitment through active encouragement and compensation may mitigate a certain amount of job stress and turnover risk, while increasing job satisfaction could reduce the negative effect of job stress on organisational commitment, and thus may be an effective measure for lowering turnover intention. Fourth, social support had a positive effect on nurses' job satisfaction and an indirect effect on turnover intention through job satisfaction, consistent with one previous study suggesting an increase

TABLE 3 Parameter estimates of the modified model of turnover intention among nurses in secondary hospitals in China (*SE*, Standard error)

Dependent variable	Independent variable	Parameter estimate (*SE*)	t-value	Standardized estimate	Squared multiple correlation
Turnover intention	Job satisfaction	−0.834(0.198)[c]	−4.208	−0.220	0.350
	Organisational commitment	−0.234(0.094)[b]	−0.481	−0.123	
	Job stress	0.678(0.071)[c]	9.599	0.387	
Job satisfaction	Professional value	0.329(0.069)[c]	4.746	0.372	0.384
	Nursing practice	−0.070 (0.044)	−1.585	−0.094	
	Job stress	−0.112(0.023)[c]	−4.750	−0.242	
	Social support	0.210(0.057)[c]	3.686	0.306	
Organisational commitment	Nursing practice	0.476(0.055)[c]	8.581	0.321	0.546
	Job stress	−0.078(0.034)[b]	−2.307	−0.085	
	Job satisfaction	1.096(0.121)[c]	9.070	0.552	

[a]$p < .1$.
[b]$p < .05$.
[c]$p < .01$.

TABLE 4 Standardized direct, indirect and total effects of the modified model

Dependent variable	Independent variable	Direct effect	Indirect effect	Total effect
Turnover intention	Job satisfaction	−0.220[c]	−0.068[b]	−0.288[c]
	Organisational commitment	−0.123[b]		−0.123[b]
	Job stress	0.387[c]	0.080[c]	0.467[c]
Job satisfaction	Professional value	0.372[c]		0.372[b]
	Job stress	−0.242[c]		−0.242[c]
	Nursing practice	−0.094		−0.094
	Social support	0.306[c]		0.306[c]
Organisational commitment	Nursing practice	0.321[c]	−0.052	0.270[c]
	Job stress	−0.085[**]	−0.133[c]	−0.218[b]
	Job satisfaction	0.552[c]		0.552[c]

[a]$p < .1$.
[b]$p < .05$.
[c]$p < .01$.

of job satisfaction occurs with higher social support (Polat & Terzi, 2020). However, we did not observe a significant pathway from nurses' social support to organisational commitment, although the positive effect of social support on organisational commitment has been reported (Zheng et al., 2015). Among all the structural factors, job stress was found to have the strongest influence on nurses' turnover intention in China. Therefore, we recommend that hospital management teams in China pay more attention to nurses' job stress, as well as job satisfaction, and organisational commitment.

There are some limitations to this study. Data were collected from a cross-sectional survey, which made it impossible to test causal relationships. Additionally, due to time and resource constraints, we were able to recruit nurses from only six secondary hospitals, while China has about 8,000 secondary hospitals (National Bureau of Statistics of China, 2019) where the nursing environment and nurses' turnover intention may differ greatly from that of nurses in the hospitals included here. Thus, further research using more diverse and representative samples is highly recommended.

5 | CONCLUSIONS

Based on Price's model of staff turnover, this study provides a structural model to clarify the factors affecting nurses' turnover intention in secondary hospitals in China. The model verified the contribution of professional value, nursing practice, job stress and social support to turnover intention and also verified the mediating effects of job satisfaction and organisational commitment, as well as the effect

within the two. Unexpectedly, we found that job stress had a direct impact on turnover intention to an even greater extent than job satisfaction and organisational commitment. This finding was not reported in previous studies.

6 | IMPLICATIONS FOR NURSING MANAGEMENT

In secondary hospitals in China or in other similar hospitals or countries where nurses' work is heavy and stressful, administrators and managers should pay attention to nurses' job stress. Measures and regulations for reducing nurses' job stress should be planed, for example allocate nursing human resources reasonably to reduce the workload of nurses appropriately, strengthen the protection of nurses during the work and create a harmonious working atmosphere. Activities (e.g. humanized management, higher salary, higher degree of work autonomy, ample opportunities for promotion) that increase nurses' job satisfaction and organisational commitment could also decrease the turnover intention of nurses.

ACKNOWLEDGEMENTS

The authors would like to acknowledge Xi'an Medical University for their support and contributions. We thank Professor Ying-Li Xue very much for her linguistic assistance during the preparation of this manuscript. This research was financially supported by Shaanxi Province 'Sanqin Scholars' Innovation Team Support Program, Doctoral Research Fund of Xi 'an Medical University (2017DOC09) and Doctoral Research Fund of Xi 'an Medical University (2020DOC11).

CONFLICT OF INTEREST

All authors declare that they have no conflict of interest. The research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

ETHICAL APPROVAL

This study was approved by the institutional review board of the Xi'an Medical University Ethics Committee (Approval No: HL2015910).

ORCID

Yong-ai Zhang https://orcid.org/0000-0003-2025-6049

REFERENCES

Cao, T., Huang, X., Wang, L., Li, B., Dong, X., Lu, H., & Shang, S. (2020). Effects of organizational justice, work engagement and nurses' perception of care quality on turnover intention among newly licensed registered nurses: A structural equation modelling approach. *Journal of Clinical Nursing*, *29*(13–14), 2626–2637. https://doi.org/10.1111/jocn.15285

Drennan, V. M., & Ross, F. (2019). Global nurse shortages-the facts, the impact and action for change. *British Council Medical Department*, *130*(1), 25–37. https://doi.org/10.1093/bmb/ldz014

Falatah, R., & Conway, E. (2019). Linking relational coordination to nurses' job satisfaction, affective commitment and turnover intention in Saudi Arabia. *Journal of Nursing Management*, *27*(4), 715–721. https://doi.org/10.1111/jonm.12735

Heinen, M. M., van Achterberg, T., Schwendimann, R., Zander, B., Matthews, A., Kózka, M., Ensio, A., Sjetne, I. S., Casbas, T. M., Ball, J., & Schoonhoven, L. (2013). Nurses' intention to leave their profession: A cross sectional observational study in 10 European countries. *International Journal of Nursing Studies*, *50*(2), 174–184. https://doi.org/10.1016/j.ijnurstu.2012.09.019

Hoyle, R. H., & Gottfredson, N. C. (2015). Sample size considerations in prevention research applications of multilevel modeling and structural equation modeling. *Prevention Science*, *16*(7), 987–996. https://doi.org/10.1007/s11121-014-0489-8

Huang, Y. (2018). *A Study of Turnover Situation in Hospital Nursing Staff and Its Impact Factors*. Fujian Medical University.

Jang, M. J., Lee, E. N., & Lee, Y. H. (2015). Effect of nurses' job stress on job satisfaction: Mediating effect of head nurses' emotional leadership perceived by nurses. *Journal of Korean Academy of Nursing Administration*, *21*(1), 133–141. https://doi.org/10.11111/jkana.2015.21.1.133

Khan, A. S., & Jan, F. (2015). The study of organization commitment and job satisfaction among hospital nurses. A survey of district hospitals of dera Ismail khan. *Global Journal of Management and Business Research: A Administration and Management*, *15*(1), 17–28. https://doi.org/10.1111/j.1468-0149.2004.0334c.x

Kim, E. H., & Lee, E. (2014). Mediation and moderation effects of job embeddedness between nursing performance and turnover intention of nurses. *Journal of the Korea Academia-Industrial Cooperation Society*, *15*(8), 5042–5052. https://doi.org/10.5762/KAIS.2014.15.8.5042

Kim, M. J., & Choi, J. S. (2015). Effects of perception of the healthcare accreditation, and job stress on turnover intention in nurses. *Journal of Muscle and Joint Health*, *22*(2), 87–95. https://doi.org/10.5953/jmjh.2015.22.2.87

Kline, R. B. (2011). *Principles and Practice of Structural Equation Modeling*. The Guilford Press.

Li, X., & Liu, Y. (2000). Job stressors and burnout among staff nurses. *Chinese Journal of Nursing*, *35*(11), 645–649.

Li, Y., Wang, W., & Yu, M. (2019). Investigation on occupational stress and turnover intention of clinical nurses in Jiangsu Hospital of Traditional Chinese Medicine. *Industrial Hygiene and Occupational Diseases*, *45*(4), 248–250, 254.

Lupiana, F., & Rijanti, T. (2015). The influence of job stress and person-organization fit on turnover intention by using job satisfaction as mediating role. *Journal of Chemical Information and Modeling*, *53*(9), 1689–1699. https://doi.org/10.1017/CBO9781107415324.004

Meyer, J. P., & Allen, N. J. (1991). A three-component conceptualization of organizational commitment. *Human Resource Management Review*, *1*(1), 61–89. https://doi.org/10.1016/1053-4822(91)90011-Z

Michaels, C. E., & Spector, P. E. (1982). Causes of employee turnover: A test of the Mobley, Griffeth, Hand, and Meglino model. *Journal of Applied Psychology*, *67*(1), 53. https://doi.org/10.1037/0021-9010.67.1.53

Moon, S. J., & Han, S. S. (2011). A predictive model on turnover intention of nurses in Korea. *Journal of Korean Academy of Nursing*, *41*(5), 633. https://doi.org/10.4040/jkan.2011.41.5.633

National Bureau of Statistics of China (2019). *National data [Online]*. Retrieved from https://data.stats.gov.cn/easyquery.htm?cn=C01

Polat, Ş., & Terzi, B. (2020). Relationships between perceived support types and the job satisfaction levels of nurses. *Perspectives in Psychiatric Care*, 1–10. https://doi.org/10.1111/ppc.12675

Price, J. L. (2001). Reflections on the determinants of voluntary turnover. *International Journal of Manpower*, *22*(7), 600–624. https://doi.org/10.1108/EUM0000000006233

Salem, O. A., Baddar, F., & Mugatti, H. M. (2016). Relationship between nurses job satisfaction and organizational commitment. *Journal of Nursing and Health Science*, *5*(1), 49–55. https://doi.org/10.9790/1959-05114955

Slavitt, D. B., Stamps, P. L., Piedmont, E. B., & Haase, A. M. (1978). Nurses' satisfaction with their work situation. *Nursing Research*, *27*(2), 114–120. https://doi.org/10.1097/00006199-197803000-00018

Sun, H., Xiu, H., Guo, L., Xue, C., & Zhao, Y. (2017). Probe into relationship between job involvement, organizational commitment and job performance of nurses based on structural equation model. *Chinese Evidence-Based Nursing*, *3*(3), 208–212.

Tang, X.-Z., Yu, H., & Liu, C.-Q. (2016). Meta - analysis on correlation of the departure intention and organizational commitment of Chinese mainland nurses. *Chinese Nursing Practice and Research*, *13*(3), 1–5. https://doi.org/10.3969/j.issn.1672-9676.2016.03.001

Unruh, L., Zhang, N. J., & Chisolm, L. (2016). Job and professional leaving among newly licensed RNs: A structural equation model. *Western Journal of Nursing Research*, *38*(1), 5–26. https://doi.org/10.1177/0193945914559290

World Health Organization (2016). *Global strategy on human resources for health: Workforce 2030 [Online]*. Retrieved from https://apps.who.int/iris/handle/10665/250368

World Health Organization (2018). *Global health workforce statistics [Online]*. Retrieved from https://apps.who.int/gho/data/node.main.HWFGRP_0040?lang=en

Xiao, S. (1987). The influence of social support on physical. *Chinese Mental Health Journal*, *1*, 183–187.

Yang, H.-Y., Yan, H., Zhou, X., Wang, Z.-Y., & Lv, Y.-W. (2014). Analysis of 721 Nursing Staff's Turnover Intention. *Chinese Hospital Management*, *34*(2), 75–77. 1001-5329(2014)02-0075-03

Yarbrough, S., Martin, P., Alfred, D., & McNeill, C. (2017). Professional values, job satisfaction, career development, and intent to stay. *Nursing Ethics*, *24*(6), 675–685. https://doi.org/10.1177/0969733015623098

Yeun, E. J. (1995). *A study on the professional nursing image of nursing unit manager: A Q-methodological approach*. Chungang University of Korea.

Yeun, E. J., Kwon, Y. M., & Ahn, O. H. (2005). Development of a nursing professional values scale. *Taehan Kanho Hakhoe Chi*, *35*(6), 1091–1100. https://doi.org/10.4040/jkan.2005.35.6.1091

Zhang, L. F., You, L. M., Liu, K., Zheng, J., Fang, J. B., Lu, M. M., & Wu, X. (2014). The association of Chinese hospital work environment with nurse burnout, job satisfaction, and intention to leave. *Nursing Outlook*, *62*(2), 128–137. https://doi.org/10.1016/j.outlook.2013.10.010

Zhang, Y., Gao, J., Zhou, Z., Liu, H., & Gou, N. (2014). Exploration of nurse position management. *Chinese Health Quality Management*, *21*(4), 76–78.

Zhang, Y., Zhou, X. B., Han, Y. F., Xu, X., & Zhu, X. Y. (2018). The correlation between turnover intention and work environment of nurses: A systematic review and meta-analysis. *Journal of General Surgery and Clinicians*, *6*(4), 28–36.

Zheng, Q. X., Han, W., Zhu, Y., Yang, F. T., Wu, S. P., & Chen, C. Y. (2015). Study on the correlation between turnover intention and social support of nurses and countermeasures. *Journal of Traditional Chinese Medicine Management*, *23*(13), 61–63. https://doi.org/10.16690/j.cnki.1007-9203.2015.13.038

How to cite this article: Zhang Y-A, Zhang X-N, Xu N, Yun E. Nurses' turnover intention in secondary hospitals in China: A structural equation modelling approach. *J Nurs Manag*. 2021;29:2216–2224. https://doi.org/10.1111/jonm.13379

Received: 19 January 2021 | Revised: 10 March 2021 | Accepted: 6 April 2021

DOI: 10.1111/jonm.13341

ORIGINAL ARTICLE

WILEY

Ward staffing guided by a patient classification system: A multi-criteria analysis of "fit" in three acute hospitals

Christina Saville PhD, Research Fellow[1,2] | Peter Griffiths PhD, RN, Professor[1,2]

[1]NIHR ARC Wessex, Southampton, UK

[2]School of Health Sciences, University of Southampton, Southampton, UK

Correspondence
Christina Saville, NIHR ARC Wessex, Southampton, Hampshire, UK.
Email: C.E.Saville@soton.ac.uk

Funding information
This report is independent research funded by the National Institute for Health Research ARC Wessex (grant number 519713103). The views expressed in this publication are those of the author(s) and not necessarily those of the National Institute for Health Research or the Department of Health and Social Care.

Abstract

Aims: To assess how well the Safer Nursing Care Tool (SNCT) predicts staffing requirements on hospital wards, and to use professional judgement to generate hypotheses about factors associated with a "poor fit".

Background: The SNCT is widely used in the UK, but there is scant evidence about factors that influence the quality of staffing decisions based upon such patient classification systems.

Methods: Secondary analysis of data from 69 wards in three acute hospitals to assess the precision of the estimated staffing requirement, variation of estimates, correspondence with professional judgement and achieved staffing levels. Nursing workforce leads suggested factors associated with poor fit, based on the wards that rated worst.

Results: 39% of wards were frequently understaffed, while frequent overstaffing was less common (12%). 24% of wards needed a sample of over 182 days to estimate the establishment precisely. Potential reasons identified for poor fit included high turnover, older patients, high levels of 1-to-1 specialing, cancer care, small ward size and high within-day variation in demand.

Conclusions: Using a staffing tool without applying professional judgement or triangulating against other methods can lead to inaccurate estimates of staffing requirements and unsafe staffing levels.

Implications for Nursing Management: Despite the availability of software to calculate staffing requirements, application of professional judgement remains essential.

KEYWORDS

health services research, patient classification system, quantitative methods, Safer Nursing Care Tool, staffing levels

1 | INTRODUCTION

How many nursing staff should we employ on hospital inpatient units? A variety of tools exist to help guide this decision, but it has been recognized that no single tool is likely to capture the full extent of nursing work (Arthur & James, 1994; Fasoli & Haddock, 2010). A safe number of nursing staff depend not only on patient factors—the severity (acuity) of their condition and their dependence on nursing care—but also on contextual factors relating to the unit, as well as factors relating to the staff, including their experience and education (Ball, 2010; Hurst, 2003; Saville et al., 2019; Twigg & Duffield, 2009). Nursing involves doing multiple things at once,

often carrying out unobservable work such as critical thinking, and responding to emerging demands and prioritizing (Hughes, 1999). Furthermore the needs and numbers of patients are frequently changing and unpredictable (Edwardson & Giovannetti, 1994; Young et al., 2015), while staff schedules are subject to work regulations and satisfaction requirements. Given this complexity, it is clear why there is no simple, generally applicable method for determining a safe number of nursing staff to employ on a ward (Arthur & James, 1994; Fasoli & Haddock, 2010). The guidance says that professional judgement (using knowledge and experience to help reach a decision) and triangulation (comparing the results from multiple staffing tools/systems) are both important (Ball, 2010; NICE, 2014; The Shelford Group, 2014). This means that numbers from a measurement tool may be revised up or down based on other information.

However, in the context of increasing reliance on data-driven algorithms and evidence-based practice depending on empirical data, there is a risk that the apparent objectivity of a measured quantity is afforded undue weight in decision-making (Chin-Yee & Upshur, 2018). This is particularly the case when the measurement itself is subject to statistical error and, potentially, systematic bias. However, evidence about how nurse staffing tools work in practice is scant (Edwardson & Giovannetti, 1994; Griffiths, Saville, Ball, Jones, et al., 2020; NICE, 2014) and generally does little to establish the accuracy of measurement beyond estimating inter-rater agreement and demonstrating correlation with criterion measures, including measures of dependency (Brennan & Daly, 2015; Larson et al., 2017; Liljamo et al., 2017).

Our recent study addressed this evidence gap by considering the Safer Nursing Care Tool (The Shelford group, 2014), the most-used tool in England (Ball et al., 2019). Our study found that the SNCT patient acuity/dependency measure was correlated with professional judgements of staffing adequacy, but for some wards, this measure appeared to be biased (Griffiths, Saville, Ball, Chable, et al., 2020; Griffiths, Saville, Ball, Culliford, et al., 2020). Factors other than patient acuity/dependency measured by the SNCT were also correlated with professional judgements of staffing adequacy, and for some wards, the measured staffing requirement varied substantially by time of day and day of the week, which calls into question whether sampling patients at fixed times or on weekdays leads to an adequate estimate of typical requirements.

When the SNCT is used to estimate the required ward establishment, the measure is also subject to considerable error, even when based on the recommended minimum sample of all patients over 20 days. While the average precision in percentage terms appeared acceptable, the average width of the 95% confidence interval of the estimate is more than one whole-time-equivalent staff member either side of the mean. Thus, on average, even if the tool validity is accepted, the estimated establishment may provide one (or more) too many or one (or more) too few staff members to adequately meet patient need. Even where a tool is able to estimate typical daily workload with more precision, a separate issue is the robustness of a staffing establishment given varying demand. We found that scheduling staff to meet average demand (the basis the SNCT uses to set establishments) was frequently associated with understaffing in the face of variable demand from patients, short notice sickness absence and limited availability of temporary staff (Saville et al., 2021).

However, while we observed these patterns at hospital level, the performance of the tool varied across wards and so an unresolved issue is how well staffing tools work on wards with different characteristics and why. Exploring these issues can help to elaborate the role of professional judgement and factors that need to be considered that are not currently incorporated in the tool.

Using data from our previous study, the present study set out to explore ward-level variation in how the SNCT works for estimating staffing requirements according to multiple measures of fit and to generate hypotheses about wards where the tool, when used without applying professional judgement and triangulation, works least well.

2 | METHODS

2.1 | Setting, data sources and study design

This was a secondary analysis of ward data from the parent study (Griffiths, Saville, Ball, Chable, et al., 2020). The setting was 69 acute adult inpatient wards from three hospital trusts across the Wessex area of England. Wards were excluded if they were out of scope of the SNCT, for example those providing maternity or palliative care, and day units. The data consisted of linked data on actual staffing levels, the staffing requirement (using the SNCT) and a report of whether or not there were enough staff for quality. We had access to valid linked data from one year (2017) on 18,927 ward-days across the three hospital trusts. Where wards underwent significant changes to the size or function during the study, they were treated as multiple wards in the analysis, with part-year data available for each. The original study included one specialist hospital, which we did not include in the present analysis.

2.2 | Assessing how well the SNCT works in practice on different wards

The Safer Nursing Care Tool is a patient classification tool that works by categorizing patients into levels (0, 1a, 1b, 2 or 3) according to their acuity and dependency on nursing care (The Shelford Group, 2014). By multiplying the number of patients in each level with a workload "multiplier", managers can obtain an estimate for the number of nursing staff (both nurses and assistants) to employ, measured in full-time equivalents. Since the number of patients and their acuity/dependency vary from day to day, the developers recommend collecting data for at least 20 days and setting staffing at the average estimate.

We considered a range of measures indicating how well the SNCT works in practice for both estimating staffing requirements and recommending baseline staffing levels. These were as follows:

1. the direction of the relationship between shortfall relative to the SNCT requirement and the nurse in charge reporting enough staff for quality (yes or no),
2. the probability of the nurse in charge reporting enough staff for quality when staffing is at the SNCT recommended level,
3. the number of days of SNCT ratings required for a precise estimate of the staffing establishment,
4. the difference between morning and evening SNCT-calculated staffing requirements,
5. the difference between weekday and weekend SNCT-calculated staffing requirements,
6. observed understaffing and overstaffing based on the nursing hours actually worked (recorded in the electronic roster) relative to the staffing requirement calculated using the SNCT,
7. understaffing and overstaffing in a simulation model of variable patient demand and flexible staffing response (see Saville et al., 2021).

Details of these measures are given in Appendix: Table S1. The association between a staffing shortfall relative to the SNCT requirement and nurses reporting that they do not have enough staff for quality is expected if the SNCT is measuring demand (criterion i) and the SNCT recommended level is able to meet demand (criterion ii). If the SNCT is to provide a reliable estimate of the staffing establishment needed, the estimates derived from it must be reasonably precise. If the number of days' data required to provide a precise estimate is high (criterion iii), variability in demand is high, which means that the recommended approach to using the tool is less likely to give an accurate estimate. Similarly, if there is high variability within or between days, it is possible that the tool does not properly estimate demand based on observations taken at fixed times and days (criteria iv and v). Finally, when understaffing or overstaffing (relative to the requirement estimated by the tool) is observed frequently, it is possible that unmeasured factors may be influencing staffing decisions (criterion vi). Alternatively, the calculated staffing requirement (the average of staffing requirements from 20 days) may not be able to meet variable demand from patients and real-world constraints caused by (for example) short notice sickness in the face of limited staff availability (criteria vi and vii).

We ranked wards according to each measure from best (rank 1) to worst fit (highest rank). Ties were given a joint rank (at the average position). We decided on cut-off values for each measure to represent unusual values or extreme poor fit, and flagged wards whose values fell outside this. The cut-off values were chosen based on practical reasons suggesting that the SNCT does not fit well or divisions/jumps in the empirical distributions, which indicated that some wards were unusual.

2.3 | Generating hypotheses about wards where the tool works least well

In order to stimulate discussion and elicit professional judgements about factors that might contribute to a lack of fit, we presented a list of the most unusual wards to nurses with oversight of workforce at each hospital trust. This list consisted of those wards that were flagged as unusual according to at least three of the nine measures, as well as those whose average rank across measures was in the top quarter of wards. In order to test the sensitivity of our process for deciding which wards to include in this list, we tested several alternatives (Table S5). In each case, the order of ranked wards was slightly different, but there was no change to the list identified. We asked the nursing workforce leads to consider potential reasons why the SNCT appeared to fit least well for these wards, without showing them the reasons why the wards had been flagged. They provided their professional opinion (in writing) of characteristics of those wards that might explain why the SNCT fits less well. We converted these ideas into the implied "hypotheses", which we consider in the context of existing evidence of factors affecting staffing requirements.

3 | RESULTS

3.1 | Ward characteristics

Of the 69 wards included in the study, five are acute admissions units (Table 1), which have higher SNCT multipliers to allow for higher patient turnover (The Shelford Group, 2014). Wards cover a wide range

TABLE 1 Ward characteristics

	n	Mean	Minimum	Maximum
Wards	69			
Medical	32			
Surgical	22			
Mixed medical/surgical	15			
Acute admission units	5			
Days with "enough staff for quality", percentage		79%	24%	100%
SNCT-estimated staffing requirement, hours per patient day		7.24	5.9	10.2
Actual staffing, hours per patient day		6.77	5.0	10.4
Beds[a]		27	8	63
Single rooms, percentage		23%	0%	75%
Patient turnover, ward average daily admissions and discharges per care hour		0.06	0.01	0.29
Skill mix, percentage of registered nurses		53%	39%	79%
Patients requiring one-to-one care ("specialing"), average daily percentage		3.2%	0%	14.6%

Note: Table S2 gives the characteristics of wards at each hospital trust.
[a]Based on beds at start of year.

TABLE 2 Number of wards where the establishment calculated from SNCT ratings is flagged as a poor fit according to different criteria

Number of wards with each combination of flagged measures	11 wards flag no measures	30 wards flag 1 measure					20 wards flag 2 measures							
	11	12	10	4	3	1	6	3	3	2	1	1	1	1
High understaffing (actual)[a]		x					x	x			x	x	x	
Large sample size needed for a precise estimate of the establishment[a]				x			x		x	x				
High understaffing (simulation)[b]			x								x			x
Low probability of reporting enough staff for quality at SNCT recommended level[a]								x	x					
High overstaffing (actual)[a]						x				x				x
Non-negative relationship between SNCT-measured shortfall and reports of enough staff for quality[a]					x							x		
Outlier for weekend–weekday differences in SNCT-calculated requirement[a]														
Large morning–evening differences in SNCT-calculated requirement[a]													x	
High overstaffing (simulation)[b]														

Notes: Crosses represent the measures flagged; for example, of the 30 wards that flag 1 measure, 12 wards flag high understaffing (actual), and of the 20 wards that flag two measures, 6 flag both high understaffing and large sample size needed for a precise estimate of the establishment.

[a]For these criteria, total possible is 74 because where there were ward changes, we considered as multiple wards.

[b]Total possible is 69 wards to avoid duplication of wards in simulation.

of specialties, including both surgical and medical, as well as mixed medical/surgical (e.g., oncology), wards. Wards have different sizes, layouts, staff skill mix and volumes of patients requiring one-to-one care. Wards' staffing requirements according to the SNCT range from 5.9 to 10.2 care hours per patient day, and on average, the actual staffing is lower than this at all trusts. Nurses in charge reported enough staff for quality most of the time, but on some wards, this was rare.

3.2 | Investigating how the SNCT works in practice on different wards

The number of wards where the establishment calculated from SNCT ratings is flagged as a poor fit according to each measure, and each combination of measures is displayed in Table 2. For eleven of the 74 wards, no criteria were flagged.

The relationship between shortfalls in staffing relative to the SNCT requirement and nurse reports of having "enough staff for quality" differed between wards (Figure 1a–c). For six wards, there was no evidence of the expected relationship of higher shortfalls associated with fewer reports of enough staff for quality. The probability of nurses reporting enough staff for quality when there is zero shortfall according to the SNCT ranged from 27% to 99% (81% on average). The probability of reporting enough staff for quality when staffing is at the SNCT recommended level is expected to be high—if the SNCT provides a "perfect" measure, it would be 100%, but for thirteen wards, this was less than 70%.

Although the current SNCT guidelines recommend collecting 20 days' of data, for most wards this was insufficient for a precise estimate (defined as a 95% confidence interval 1 whole-time-equivalent wide). The number of days required ranged from 20 to more than 365 days' data (the maximum available) with 165 days required on average. For 18 wards, more than half a year's data (182 days) was required for this level of precision. Additionally, six wards had less than half a year's data and could not provide a reliable estimate with the available data (sample sizes were 80–175 days, 112.5 on average).

Wards that had large differences between weekday and weekend requirements, or between mornings and evenings, were rare, but all of these were judged a poor fit according to other criteria too. The difference between weekdays and weekends was 3% on average, but ranged from −1% to 20% across wards. For four wards, weekday assessments were substantially (more than 10%) higher than at weekends. Only one ward had higher requirements at the weekend. Four of the wards that were outliers according to the weekday–weekend criterion flagged as poor fit on three measures in total and one ward flagged four. On average, there was no difference between morning and evening assessments of staffing requirements, but differences ranged from 19% bigger estimates based on morning observations compared with evenings, to evening assessments yielding 12% bigger estimates than mornings. Differences of more than 5% between morning and evening SNCT-calculated requirements were rare (four wards). Three of these wards flagged three measures, and the other one

		12 wards flag 3 measures											1 ward flags 4 measures	Number of wards flagging each measure	Percentage of wards flagging each measure
1	1	2	1	1	1	1	1	1	1	1	1	1	1	74	
			x	x	x	x							x	29	39%
		x	x	x			x	x	x	x			x	24	32%
			x		x		x	x	x		x			18	26%
x				x		x	x			x	x	x		13	18%
x	x							x		x		x		9	12%
	x				x									6	8%
		x				x					x		x	5	7%
		x							x					4	5%
												x	x	2	3%

flagged two measures and ranked in the top (worst) quarter of wards overall.

Actual understaffing ranged between 0% and 85% of days (34% on average), while simulated understaffing of what is likely to happen if wards follow SNCT guidance ranged from 7% to 80% of shifts (31% on average). We considered more than 40% days with understaffing as a sign of poor fit, and this was the most commonly flagged measure (29 wards). For 12 of these wards, this was the only flagged measure. Simulated understaffing was also common (18 wards). Overstaffing was much less common (although more common in reality than in the simulation). Actual overstaffing ranged from 0% to 59% (10% on average), while simulated overstaffing ranged from 0% to 35% (5% on average).

3.3 | Generating hypotheses about wards where the tool works least well

We identified the wards that flagged at least three measures (thirteen wards), as well as those that ranked in the top quarter of wards (a further nine wards), and presented a list of these wards to the respective workforce leads for each hospital. Their expert judgements of potential reasons why the SNCT may fit less well in some wards are summarized in Table 3, and verbatim comments and flagged measures for each ward are provided in Table S7. Some common themes emerged, leading us to formulate a number of implied hypotheses. Characteristics of some wards mean the SNCT multipliers, as they are applied, may underestimate the true workload. These factors include high patient turnover, an older patient population, cancer infusion/device activity and high levels of one-to-one specialing requirements. Although we did not identify which wards flagged high within-day variation, for several wards our experts suggested that large morning–evening differences in staffing requirements may result in the tool performing less well to estimate staffing requirements. For wards that are particularly small or large, it is possible that the number generated by the SNCT is less likely to be sufficient to maintain minimum registered nurse levels when rostering staff to shifts. Other factors that were suggested for a small numbers of wards are presented in the table, these included aspects of ward layout and systematic down coding of patients where ward staff felt the SNCT staffing levels were too generous.

4 | DISCUSSION

4.1 | Implications of findings

This study adds to the scant evidence about how nurse staffing tools work in practice and offers insights into how a widely used acuity/dependency tool fits in a range of wards. On the one hand, for some wards the tool appears to fit well; we found 11 wards flagged no measures and 30 flagged only one measure, which in some cases may not be due to a problem with the tool and in others could be addressed by minor adjustments to how the tool is implemented. On

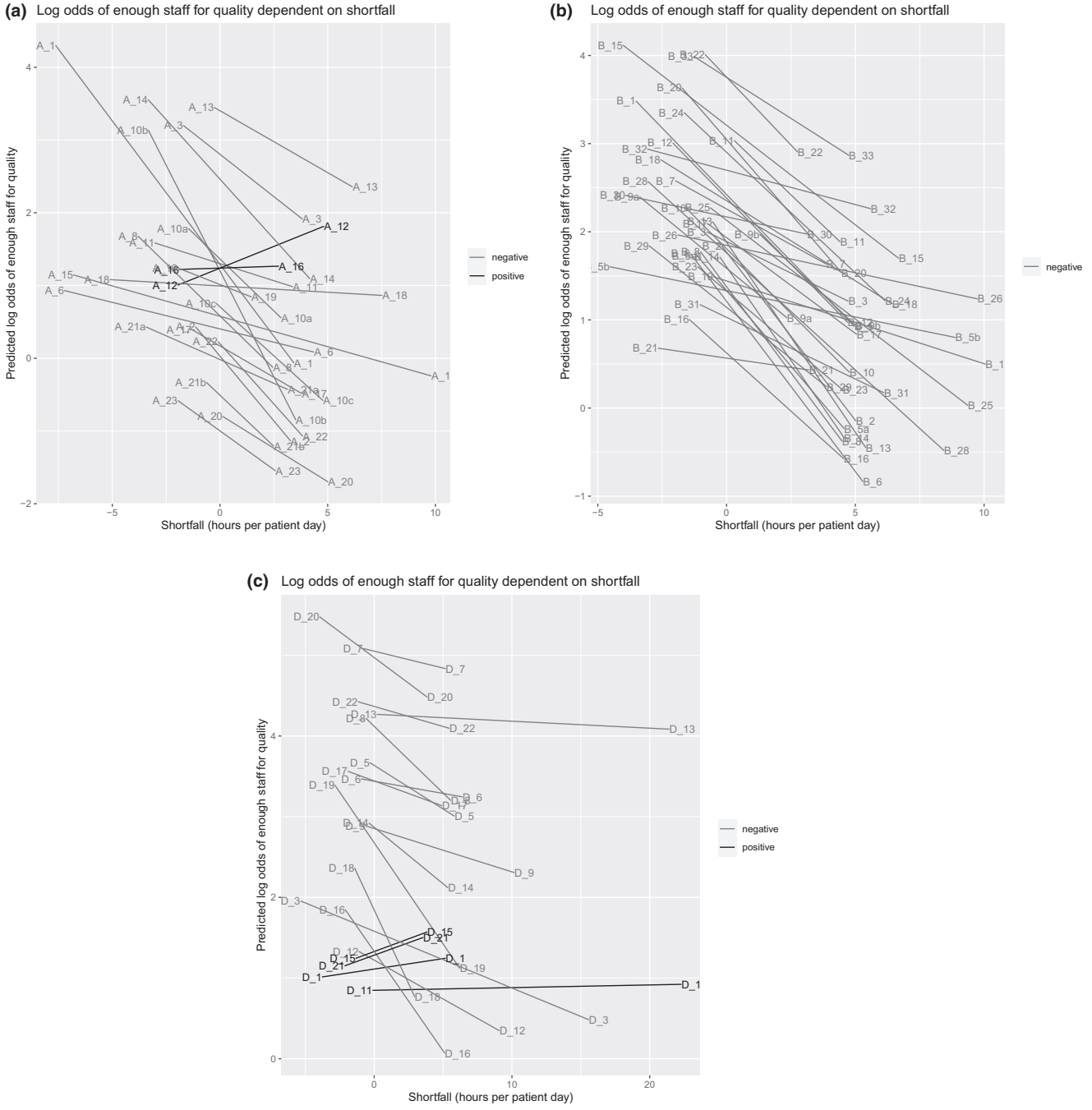

FIGURE 1 Log odds of enough staff for quality dependent on shortfall (random slopes models)

the other hand, for some wards multiple measures indicating poor fit were flagged, indicating potentially serious problems with error and/or bias. In other words, if the SNCT is used to set staffing levels without applying professional judgement or triangulating results against other methods, as is recommended in the accompanying guidance (The Shelford Group, 2014), there is a risk that resulting staffing levels will be unsafe.

These findings highlight the importance of training and expertise in setting staffing levels and give weight to repeated warnings against over-reliance on staffing tools and software (Edwardson & Giovannetti, 1994; Griffiths, Saville, Ball, Jones, et al., 2020; Twigg & Duffield, 2009). The results of this study suggest that a staffing estimate generated by a tool should be a starting point to question, rather than the indisputable correct answer.

Understaffing relative to the measured requirement was observed in many wards. Understaffing may be due to staffing shortages, but can also indicate that setting staffing at the average requirement does not provide enough staff on the day in the face of variable demand. It could also occur if local decision-makers think the tool provides too many staff to adjust the establishment downwards from the recommended level. The fact that understaffing was common in the simulation is consistent with poor fit resulting from mean

TABLE 3 Nursing workforce leads' suggestions of reasons why the SNCT may fit less well in some wards

Ward factor	Expert judgement (of why wards in "poor-fit" list)	Number of wards	Implied hypothesis
Throughput	"As an assessment area with acutely unwell patients being admitted and transferred throughout the 24 hr period the acuity and dependency of all patients is not necessarily captured using the SNCT census checks am and pm"	3	High throughput/turnover means some work is not captured by the SNCT
Older patients	"The Matron felt that the patients required the care hours allotted to a level 2 patient but could not be scored at this level due to the criteria used within the model"	5	Wards with older patients require more care than what is captured by the SNCT
Specialing requirements	"Many of the patients require two nurses to administer care for safety and dependency reasons or 1–1 care"	5	Wards with high specialing requirements have higher requirements than what is captured by the SNCT
Cancer infusion/device activity	"The area has a high level of activity associated with infusions and devices" "There may also be an issue between the SNCT definitions of what is 'normal ward care' e.g. level 0 and the actual acuity/dependency of the patients who are having normal ward care… a cancer care ward expects high interventional IV therapies as normal care"	4	Cancer infusion/device activity may not be captured by the SNCT multipliers or patients may be underscored
Morning–evening differences	"Acuity AM will be lower than PM due to post op patients returning PM and being more acute"	3	SNCT is a poor fit for wards with large morning–evening differences in staffing requirements (based on acuity dependency ratings)
Ward size	"… anything less than 16 beds starts to make rostering difficult with the number of staff generated by SNCT and to also maintain things like minimum registered nurse etc. The same seems to be for those above 26"	4	For wards that are particularly small or large, the number generated by the SNCT is less likely to be sufficient to maintain minimum registered nurse levels when rostering staff to shifts
Escalation ward	"The area was also used for escalation during times of bed pressures—this means that as well as the ED/GP/'Hot' clinic patients the area would have patients being admitted into beds for longer stays"	1	Extra patients at some times of year means that there is high variation and may not plan staffing for this
Waiting patients	"What's not captured are patients in waiting area who are not ambulatory or in patients"	1	Additional workload from waiting patients not accounted for
Ward layout	"Have to have 2 × RN's in each area whether acuity requires it or not"	1	Geography of ward—separate areas mean higher requirements
Change in types of patients	"they also moved from taking trauma to elective patients so will have had a very mixed acuity/dependency of patients over the time"	1	Large variation in SNCT-assessed need over the time period means that SNCT does not fit well
Local adjustment	"As discussed. Can't understand why they would look any different to [ward not in study, D_12 or D_13]"	1	Some nurses in charge may be down-coding patients in SNCT because they find that too many staff are provided when they follow SNCT
No reason given		4	

staffing being inadequate to meet variable demand. Overstaffing was rare, both in the observed data and in the simulation.

For many wards, a large sample size was needed to estimate the staffing establishment precisely. In some cases, this could be dealt with by collecting more data, but for wards with very variable requirements, setting the staffing establishment higher than the average is also likely to help cover more of the peaks in demand (Saville et al., 2021) and would reduce the risk of setting the establishment too low due to measurement error. Although shortfalls from the SNCT staffing requirement are associated with professional judgements of staffing adequacy overall (Griffiths, Saville, Ball, Chable, et al., 2020; Griffiths, Saville, Ball, Culliford, et al., 2020), this did not translate into the expected relationship on every ward. For thirteen wards, setting staffing levels each day at the level recommended by the tool was associated with a low chance of saying there were enough staff, suggesting it is underestimating requirements here. Again, this highlights the need for triangulation against other methods as there is no evidence to suggest that the measures are superior to professional judgement (Griffiths, Saville, Ball, Jones, et al., 2020).

The hypotheses suggested by our expert workforce leads, based on scrutinizing a list of poor-fit wards without knowing the specific flags that led them to be identified, are, on the whole, congruent with evidence. Some of these suggested reasons for poor fit can be considered as patient factors: patients requiring one-to-one care, older patients and cancer patients were all put forward as potentially needing higher levels of care than the tool recommends. In our previous study, we found that "specialing" requirements was a major source of variation in workload that is not directly accounted for by the SNCT (Griffiths, Saville, Ball, Chable, et al., 2020). However, evidence for older patients requiring adjustment to the multipliers is less convincing: a review of studies in 2014 found no clear evidence of specific differences in staffing requirements between ward types such as older people wards and others (Griffiths et al., 2014) although equally there is no evidence to support lower staffing or skill mix for older patients. More recently, Yoshida et al. (2019) found that age affected nurses' perceived burden from a patient, although it is unclear to what extent this is already captured in SNCT acuity/dependency ratings.

Some cancer wards, along with some other speciality units, provide specialist care such as managing multiple infusions requiring close observations in patients who are not acutely unwell (Colombo et al., 2005). However, it is again unclear to what extent this is captured in SNCT ratings, or whether nurses reliably apply the correct rating. There is a potential problem with nurses misinterpreting the concept of "normal ward care" when "normal" for a particular ward is more demanding than the implied definition in the tool: normal for general medical/surgical wards.

High patient turnover was also suggested as a reason for poor fit. Although the SNCT multipliers incorporate an allowance for turnover, this may be insufficient for some wards; our measure of turnover showed a near 30-fold variation between the highest and lowest turnover wards. It seems unlikely that provision for a mean level can accommodate such variation. In the parent study, the associations between patient turnover and reports of a variety of measures of staffing adequacy were not statistically significant (Griffiths, Saville, Ball, Chable, et al., 2020), but the direction of estimates was consistent with more turnover reducing perceived staffing adequacy for the same SNCT shortfall (Griffiths, Saville, Ball, Chable, et al., 2020). Higher patient turnover per registered nurse has been associated with increased risk of mortality in other studies (Griffiths et al., 2018; Needleman et al., 2011), suggesting it is a significant driver of nurse workload.

Large differences between ratings collected at different times of day or weekdays versus weekends were rare but were an indicator of poor fit overall, and our experts highlighted large morning/evening differences as an issue for some wards (they did not see which wards flagged this measure). Wards with high within-day variation in patients per acuity/dependency category may also have high variation between days, making them more likely to flag criteria such as frequent understaffing and a large sample size for a precise establishment.

Nurses highlighted that for wards that are particularly small or large, the number generated by the SNCT is less likely to be sufficient to maintain minimum registered nurse levels when rostering staff to shifts. In the parent study, we did not consider ward size in modelling the relationship with staffing adequacy, although in our simulation we adjusted to account for the need to deploy whole people. Consequently, establishments were adjusted upwards by 2% on average but such upward adjustments are likely to be of greater magnitude on smaller wards (Griffiths, Saville, Ball, Chable, et al., 2020).

The identification of these factors affecting staffing requirements leads us to question whether they could be incorporated into the SNCT. However, some of them are not patient factors so are not compatible with the core patient classification system, although they could potentially be addressed by creating "specialist" versions of the tool for particular ward types. Other factors would add to the complexity of the data collection, for example considering the age of patients. For each additional version, there is a corresponding increase in data to be collected to develop the multipliers and the judgement to be applied in selecting the tool to fit. Given that it is already the case that multipliers need to be re-evaluated every few years as patients and care procedures change, this additional burden seems unwarranted and potentially unfeasible, undermining one of the core virtues of the SNCT—its simplicity. Publishing the variation in staff time in different quality-assured wards, rather than solely the average (the multiplier), might help to give some bounds on what are reasonable adjustments for managers to make to the multipliers for their wards.

4.2 | Limitations of this study

The sample in this study was large in terms of ward-days, but came from only 69 wards at three hospitals so we cannot know whether these results generalize more widely. The simulation model was subject to assumptions about how staffing is managed on wards. The measures we considered, when taken individually, may be attributable to other causes rather than the performance of the SNCT, which is why we considered multiple measures. In particular, the "actual understaffing" measure could be flagged due to problems recruiting staff to a ward, or because of problems with the tool. We selected wards that exhibited a lack of fit based on multiple criteria to provide a stimulus for senior nurses to offer explanations. We did not directly test whether these explanations were correct, and it may be that other factors, not identified here, are also relevant.

5 | CONCLUSIONS

Using a staffing tool without applying professional judgement or triangulating against other methods can lead to unsafe staffing levels;

tools give a starting point to be questioned. Empirically, "poor-fit" criteria that were flagged most commonly included frequent understaffing and needing a large sample for a precise estimate. Workforce leads were able to identify reasons for poor fit of the tool that are on the whole consistent with research evidence, but more evidence is needed to test the hypotheses about the wards where the SNCT fits least well.

6 | IMPLICATIONS FOR NURSING MANAGEMENT

Training in applying professional judgement and triangulation remains important despite the availability of nurse staffing software and tools. In particular, nurses with responsibility for staffing decisions need to be aware of factors aside from acuity/dependency that may affect staffing requirements.

ACKNOWLEDGEMENTS

We acknowledge the input of our co-investigators, Rosemary Chable, Nicky Sinden and Tracy Moran, without whom this project would not have been possible. We also acknowledge the nurses who completed the staffing adequacy survey and recorded SNCT ratings.

CONFLICT OF INTEREST

Peter Griffiths is a member of the National Health Service Improvement safe staffing faculty steering group. The safe staffing faculty programme is intended to ensure that knowledge of the Safer Nursing Care Tool (SNCT), its development and its operational application is consistently applied across the NHS. Christina Saville declares no conflicts of interest.

ETHICAL APPROVAL

This study received ethics approval through the University of Southampton (18809.A1), and permission to undertake the study was given by the Health Research Authority (IRAS project ID: 190548).

DATA AVAILABILITY STATEMENT

The data that supports the findings of this study are available in the supplementary material of this article.

ORCID

Christina Saville https://orcid.org/0000-0001-7718-5689
Peter Griffiths https://orcid.org/0000-0003-2439-2857

REFERENCES

Arthur, T., & James, N. (1994). Determining nurse staffing levels: A critical review of the literature. *Journal of Advanced Nursing*, *19*(3), 558–565. https://doi.org/10.1111/j.1365-2648.1994.tb01121.x

Ball, J. (2010). *Guidance on safe nurse staffing levels in the UK*. Royal College of Nursing.

Ball, J., Barker, H., Griffiths, P., Jones, J., Lawless, J. A., Burton, C., Couch, R., & Rycroft-Malone, J. (2019). *Implementation, impact and costs of policies for safe staffing in acute trusts*.

Brennan, C. W., & Daly, B. J. (2015). Methodological challenges of validating a clinical decision-making tool in the practice environment. *Western Journal of Nursing Research*, *37*(4), 536–545. https://doi.org/10.1177/0193945914539738

Chin-Yee, B., & Upshur, R. (2018). Clinical judgement in the era of big data and predictive analytics. *Journal of Evaluation in Clinical Practice*, *24*(3), 638–645. https://doi.org/10.1111/jep.12852

Colombo, A., Solberg, B., Vanderhoeft, E., Ramsay, G., & Schouten, H. C. (2005). Measurement of nursing care time of specific interventions on a hematology-oncology unit related to diagnostic categories. *Cancer Nursing*, *28*(6), 476–480. https://doi.org/10.1097/00002820-200511000-00011

Edwardson, S. R., & Giovannetti, P. B. (1994). Nursing workload measurement systems. *Annual Review of Nursing Research*, *12*(1), 95–123. https://doi.org/10.1891/0739-6686.12.1.95

Fasoli, D. R., & Haddock, K. S. (2010). Results of an integrative review of patient classification systems. *Annual Review of Nursing Research*, *28*, 295–316. https://doi.org/10.1891/0739-6686.28.295

Griffiths, P., Ball, J., Drennan, J., James, L., Jones, J., Recio-Saucedo, A., & Simon, M. (2014). The association between patient safety outcomes and nurse/healthcare assistant skill mix and staffing levels and factors that may influence staffing requirements (Evidence review commissioned by NICE). University of Southampton. http://eprints.soton.ac.uk/367526/

Griffiths, P., Maruotti, A., Recio Saucedo, A., Redfern, O. C., Ball, J. E., Briggs, J., Dall'Ora, C., Schmidt, P. E., & Smith, G. B. (2018). Nurse staffing, nursing assistants and hospital mortality: retrospective longitudinal cohort study. *BMJ Quality & Safety*, *28*(8), 609–617. https://doi.org/10.1136/bmjqs-2018-008043

Griffiths, P., Saville, C., Ball, J. E., Chable, R., Dimech, A., Jones, J., Jeffrey, Y., Pattison, N., Recio Saucedo, A., Sinden, N., & Monks, T. (2020). The Safer Nursing Care Tool as a guide to nurse staffing requirements on hospital wards: Observational and modelling study. *Health Services and Delivery Research*, *8*(16), 1–161. https://doi.org/10.3310/hsdr08160

Griffiths, P., Saville, C., Ball, J., Culliford, D., Pattison, N., & Monks, T. (2020). Performance of the Safer Nursing Care Tool to measure nurse staffing requirements in acute hospitals: a multicentre observational study. *British Medical Journal Open*, *10*(5), e035828. https://doi.org/10.1136/bmjopen-2019-035828

Griffiths, P., Saville, C., Ball, J., Jones, J., Pattison, N., Monks, T. & Safer Nursing Care Study Group (2020). Nursing workload, nurse staffing methodologies & tools: a systematic scoping review & discussion. *International Journal of Nursing Studies*, *103*, 103487. https://doi.org/10.1016/j.ijnurstu.2019.103487

Hughes, M. (1999). Nursing workload: An unquantifiable entity. *Journal of Nursing Management*, *7*, 317–322. https://doi.org/10.1046/j.1365-2834.1999.00148.x

Hurst, K. (2003). *Selecting and applying methods for estimating the size and mix of nursing teams: A systematic review of the literature commissioned by the Department of Health*. Nuffield Institute for Health.

Larson, E. L., Cohen, B., Liu, J., Zachariah, P., Yao, D., & Shang, J. (2017). Assessing intensity of nursing care needs using electronically available data [Article in Press]. *CIN – Computers Informatics Nursing*, *35*, 617–623. https://doi.org/10.1097/CIN.0000000000000375

Liljamo, P., Kinnunen, U. M., Ohtonen, P., & Saranto, K. (2017). Quality of nursing intensity data: Inter-rater reliability of the patient classification after two decades in clinical use. *Journal of Advanced Nursing*, *73*(9), 2248–2259. https://doi.org/10.1111/jan.13288

Needleman, J., Buerhaus, P., Pankratz, V. S., Leibson, C. L., Stevens, S. R., & Harris, M. (2011). Nurse staffing and inpatient hospital mortality.

New England Journal of Medicine, *364*(11), 1037–1045. https://doi.org/10.1056/NEJMsa1001025

NICE (2014). *Safe staffing for nursing in adult inpatient wards in acute hospitals*. Retrieved from https://www.nice.org.uk/guidance/sg1/resources/endorsed-resource-the-safer-nursing-care-tool-snct-11943902.

Saville, C. E., Griffiths, P., Ball, J. E., & Monks, T. (2019). How many nurses do we need? A review and discussion of operational research techniques applied to nurse staffing. *International Journal of Nursing Studies*, *97*, 7–13. https://doi.org/10.1016/j.ijnurstu.2019.04.015

Saville, C., Monks, T., Griffiths, P., & Ball, J. E. (2021). Costs and consequences of using average demand to plan baseline nurse staffing levels: a computer simulation study. *BMJ Quality & Safety*, *30*(1), 7–16. https://doi.org/10.1136/bmjqs-2019-010569

The Shelford Group (2014). *Safer nursing care tool implementation resource pack*. Retrieved from http://shelfordgroup.org/library/documents/Shelford_Safer_Nursing_23May14a.pdf.

Twigg, D., & Duffield, C. (2009). A review of workload measures: A context for a new staffing methodology in Western Australia. *International Journal of Nursing Studies*, *46*(1), 132–140. https://doi.org/10.1016/j.ijnurstu.2008.08.005

Yoshida, S., Matsushima, M., Wakabayashi, H., Mutai, R., Sugiyama, Y., Yodoshi, T., Horiguchi, R., Watanabe, T., & Fujinuma, Y. (2019). Correlation of patient complexity with the burden for health-related professions, and differences in the burden between the professions at a Japanese regional hospital: A prospective cohort study. *British Medical Journal Open*, *9*(2), e025176. https://doi.org/10.1136/bmjopen-2018-025176

Young, J., Lee, M., Prouty Sands, L., & McComb, S. (2015). Nursing activities and factors influential to nurse staffing decision-making. *Journal of Hospital Administration*, *4*(4), 24. https://doi.org/10.5430/jha.v4n4p24

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

How to cite this article: Saville C, Griffiths P. Ward staffing guided by a patient classification system: A multi-criteria analysis of "fit" in three acute hospitals. *J Nurs Manag*. 2021;29:2260–2269. https://doi.org/10.1111/jonm.13341

Accepted: 11 May 2021

DOI: 10.1111/jonm.13386

ORIGINAL ARTICLE

WILEY

Work environment and person-centred dementia care in nursing homes—A cross-sectional study

Johanna E. R. Rutten Msc[1,2] | Ramona Backhaus PhD[1,2] | Frans Tan PhD[3] | Marleen Prins MSc[4] | Henriette van der Roest PhD[4] | Ceciel Heijkants MSc[4] | Jan P. H. Hamers Professor[1,2] | Hilde Verbeek Professor[1,2]

[1]Department of Health Services Research, Care and Public Health Research Institute, Maastricht University, Maastricht, The Netherlands

[2]Living Lab in Ageing and Long-Term Care, Maastricht, The Netherlands

[3]Department of Methodology and Statistics, CAPHRI School for Public Health and Primary Care, Maastricht University, Maastricht, The Netherlands

[4]Department on Aging, Netherlands Institute of Mental Health and Addiction (Trimbos-institute), Utrecht, The Netherlands

Correspondence
Johanna E. R. Rutten, Department of Health Services Research, Care and Public Health Research Institute, Maastricht University, Maastricht, The Netherlands.
Email: johanna.rutten@maastrichtuniversity.nl

Funding information
This research project was funded by the Netherlands Organization for Health Research and Development (ZonMW, project number: 516012515)

Abstract

Aim: This study aims to explore the relationship between work environment, job characteristics and person-centred care for people with dementia in nursing homes.

Background: Person-centred care approaches have become a dominant indicator for good quality of care in nursing homes. Little is known about the relationship between work environment, job characteristics and person-centred care in nursing homes.

Method(s): Cross-sectional data from the LAD study were used. Direct care staff ($n = 552$) of nursing homes ($n = 49$) filled an online questionnaire about work environment characteristics and person-centred care. To examine relationships, multilevel linear regression analyses were conducted.

Results: Associations were found between a higher transformational leadership style, less social support from a leader, a higher unity in philosophy of care, higher levels of work satisfaction, more development opportunities, better experienced teamwork and staff-reported person-centred care.

Conclusion(s): In a complex nursing home environment, person-centred care is influenced by organisational and work characteristics, shared values and interpersonal relationships.

Implications for Nursing: Leaders may consider facilitating collaboration and creating unity between care staff, clients and family members in order to provide person-centred care. Therefore, a transformational leadership style, educational programmes and coaching for leaders are recommended.

KEYWORDS

job characteristics, nursing homes, person-centred care, transformational leadership, work environment

1 | INTRODUCTION

Continuously improving quality of care for nursing home residents is challenging for health care organisations. Therefore, improving and measuring the quality of care in nursing homes have been the focus of numerous studies in the past years (Castle & Ferguson, 2010; Heffels et al., 2020; Sion et al., 2019). One factor influencing the quality of care in the nursing home setting is the direct care staff.

The relationship between direct care staffing and quality of care has been investigated in several studies (Backhaus et al., 2014; White et al., 2019). For care staff, characteristics of their work environment and their work processes, such as good communication and coordination, are associated with the quality of care in nursing homes (Colon-Emeric et al., 2013; Schwendimann et al., 2014; Temkin-Greener et al., 2009). The model of Backhaus et al. (2017) suggests that work environment characteristics might mediate the relationship between staffing levels and quality of care. In this context, quality of care is mostly linked to clinical outcomes. Nevertheless, quality of care has been defined by more than clinical outcomes in the past years (Hanefeld et al., 2017; Sion et al., 2019).

In dementia care, which represents a large part of all nursing home care, a person-centred approach has become a dominant indicator for high quality of care in the past years (Edvardsson et al., 2008; McCormack, 2004; Simmons & Rahman, 2014). In 1997, Tom Kitwood introduced the concept of person-centred care, which means care is not organised around the disease but rather around the person. By putting the person at the centre of care, positive effects on well-being and reduced health issues are expected (Edvardsson et al., 2008; Kitwood, 1997; McCormack, 2004; McGilton et al., 2012).

The increasing importance of person-centred care as a quality indicator for dementia care requests the investigation of factors influencing person-centred care in nursing homes. Earlier studies have identified several work environment characteristics, such as leadership, as determinants for person-centred care (Backman et al., 2016; Dewar et al., 2019; Willemse et al., 2015). Recently, transformational leadership has become the desired leadership style in nursing (Lynch et al., 2018; Seljemo et al., 2020). The Box 1 provides more insight into transformational leadership.

Moreover, other work environment factors seem to play a crucial role in facilitating person-centred care in nursing homes. Environmental factors, such as positive team climate and work culture, have been associated with better quality of care (Backhaus et al., 2017; Schwendimann et al., 2014). A cross-sectional study by Van Beek and Gerritsen (2010) found that work environment factors are vital to provide individualized quality of care. Therefore, factors such as teamwork might also be associated with person-centred care. An earlier study demonstrated that effective teamwork results in more time to offer residents individualized care (Bowers et al., 2000). Based on this evidence, the work environment seems to play a crucial role for the delivery of person-centred care.

BOX 1 Characteristics of transformational leadership

Transformational leadership:

- Can be described as a type of relational leadership in which staff is motivated to achieve organisational goals and has trust and respect for the leader (Bass & Avolio, 1994);

Transformational leaders:

- Are described as warm and charismatic, with a personal authority that can create change through non-hierarchical teamwork (Miles & Asbridge, 2014);
- In contrast to hierarchical leaders, are more likely to recognize individual care staff preferences;
- Seem to have a positive effect on the well-being of clients (Nielsen et al., 2008; Weberg, 2010) and improve client outcomes in nursing homes (Wong & Cummings, 2007);
- Play an important role in promoting a clear philosophy of care to obtain professional development for direct care staff and person-centred dementia care (Rokstad et al., 2015).

Comprehensive theoretical models integrating work environment characteristics and their relationship with person-centred care are scarce. Since person-centred care became an important indicator for quality of care, it seems evident to investigate the relationship between work environment factors and person-centred care in nursing homes. In this study, the relationship between work environment characteristics (i.e. transformational leadership, teamwork, unity in philosophy of care), job characteristics (i.e. work conditions, satisfaction, social support, task variation and opportunities, autonomy and organisational commitment) and staff-reported level of person-centred care for people with dementia in nursing homes will be assessed.

2 | METHOD

In this study, data from 'Living Arrangements for people with Dementia (LAD)'-study database. The LAD study is a cross-sectional study into quality in a broad scope of dementia care environments in the Netherlands (Prins et al., 2019). Every two to three years this study is conducted, using questions related to different topics. We used data from 2016 to 2017 as these were the newest data, providing specific information on the topic of leadership and person-centred care.

2.1 | Sample

In October 2015, the Trimbos Institute invited 1,728 nursing homes from 363 different health care organisations, listed by the

Dutch Ministry of Health, Welfare and Sport, by mail to participate in the monitoring (Prins et al., 2019). In this study, data of a subsample were used, consisting of direct care staff (e.g. registered nurses, [certified] nurse assistants) working on a unit for people with dementia. Care staff in training were excluded (Prins et al., 2019).

2.2 | Data collection

All data were extracted from the LAD-study database. Participants received an informational letter with login information for the online questionnaire (Prins et al., 2019). Care staff working at wards for people with dementia were asked to complete an online questionnaire. To assess the relationship, data on work characteristics, level of transformational leadership, level of teamwork, unity in philosophy of care and level of person-centred care were extracted from the database. Table 1 presents the used variables and the measurement instruments. The level of person-centred care is based on how staff members perceive the care to be person-centred.

2.3 | Data analysis

Data analyses were performed with SPSS for Windows (version 24). First, sample characteristics, such as distribution and missing data, were explored. In order to prevent bias, 37 respondents who did not fill in most of the questions in the questionnaire were excluded from the original sample ($n = 589$). The remaining missing data ($n = 68$) in the new sample were imputed using multiple imputation techniques. To examine the relationship between work environment characteristics, such as transformational leadership, level of teamwork, job characteristics (independent variables) and staff-reported level of person-centred care (dependent variable), multilevel linear regression analyses (random intercept) were conducted, in which staff (level 1) was nested in nursing homes (level 2). We conducted a fully adjusted analysis in which we controlled for background characteristics (i.e. age of staff and role) and applied a significance level of 0.05. As most respondents were female (96%), we did not include the gender of staff as a covariate.

Intraclass correlation coefficients (ICCs) were calculated to test the correlation between staff members working in the same nursing home. With a value of 0.7, the ICC is considered to be moderate (Koo & Li, 2016). The variance inflation factors (VIFs) were calculated for

TABLE 1 Study variables and their measurement

	Variable	Measurement
Demographic variables	Age	Age in years
	Gender	Male/female
	Role	Clustered in 3 categories according to educational level and role (registered nurse, certified nurse assistant, nurse assistant)
Work environment	Social support from colleagues Social support from leader Autonomy Work conditions Work Satisfaction Task variations and opportunities Organisational commitment	Dutch version of The Leiden Quality of Work Questionnaire (LQWQ; van der Doef & Maes, 1999) 4-point Likert scale (1: totally disagree to 4: totally agree); 30 items The subscales 'social support from colleagues', 'social support from leader' and 'autonomy' consisted of 4 items The subscales 'work conditions', 'task variation & opportunities' and 'organizational commitment' consisted of 5 items The subscale 'work satisfaction' consisted of 3 items For each subscale, an average score was calculated per respondent
	Transformational leadership	Global Transformational Leadership Scale (GTL; Carless et al., 2000); 5-point Likert scale (1: rarely or none of the time to 5: (almost) all of the time); 7 items Per respondent, an average score was calculated
	Teamwork	11 statements have been developed by researchers of the Trimbos-institute based on theory about teamwork from Vroemen (1995). The statements contain topics as: open communication, mutual respect, flexible adjustment and showing initiative 4-point Likert scale (1: totally disagree to 4: totally agree) Per respondent, an average score was calculated
	Unity in philosophy of care	Questionnaire developed based on previous findings of the LAD study (Smit et al., 2017). Statements contain subjects linked to philosophy of care such as challenging behaviour, responding to the individual needs of the client and communication with the family carers (Trimbos Instituut, 2010); 5-point Likert scale (1: none of the time to 5: all of the time); 7 items Per respondent, an average score was calculated
Staff-reported person-centred care	Person-centred care	Dutch version of the Person-Centered Care Questionnaire (PCC) (Porock & Chang, 2013); 5-point scale (1: never to 5: always); 34 items Per respondent, an average score was calculated

all independent variables to test for multicollinearity. All values for the calculated VIFs were below 5, which indicates that no multicollinearity problem existed (García et al., 2015). A moderator analysis was conducted to test for the moderating effect of transformational leadership.

2.4 | Ethical considerations

All data were extracted from an existing database. The Medical Ethics Committee of the University Medical Center of Utrecht confirmed that the LAD study does not come under the scope of Medical Research Involving Human Subjects Act (reference number WAG/om/13/055932; Prins et al., 2019).

3 | RESULTS

3.1 | Descriptive statistics

A total of 49 nursing homes from 13 different elderly care organisations participated in the fourth measurement round of the LAD study. These are 3% of the invited nursing homes and 4% of the invited elderly care organisations. In total, 552 staff members from the 49 nursing homes (on average 11 per nursing home, ranging from 2 to 28 per nursing home) completed the online questionnaire, a 36% response rate. Of the 552 respondents, 67% were certified nurse assistants, 22% were nurse assistants, and 10% were registered nurses. Sample characteristics are described in Table 2. Results of the descriptive statistics are reported in Table 3.

TABLE 2 Characteristics of the sample ($n = 552$)

Characteristics of participants		
Age (years) *m* (±*SD*)		44.7 (±12.4)
	Gender *n* (%)	
Male		22 (4%)
Female		530 (96%)
	Function *n* (%)	
	Registered nurse	55 (10%)
	Certified nurse assistant	371 (67%)
	Nurse assistant	126 (23%)

3.2 | Factors influencing person-centred care in nursing homes

Results of the multilevel analysis are reported in Table 4. A more transformational leadership style and a lower level of social support from the leader were significantly related to higher staff-reported person-centred care ($p \leq .001$ and $p \leq .05$, respectively). In addition, higher unity in philosophy of care ($p \leq .05$), higher levels of work satisfaction ($p \leq .001$) of direct care staff, more task variation and opportunities ($p \leq .05$) and better experienced teamwork ($p \leq .05$) were significantly related to higher staff-reported person-centred care. Furthermore, the covariate nursing assistant was significantly related to person-centred care ($p \leq .05$), meaning that compared to registered nurses, nurse assistants indicated that less person-centred care was provided. Work conditions, social support from colleagues and organisational commitment were not significantly related to staff-reported person-centred care. Due to the significance level of .05, autonomy ($p \geq .05$) was considered non-significant, although the value of .054 was critical. The moderator analysis revealed that transformational leadership might have a moderating effect on the relationship between work conditions, autonomy, social support from the leader, organisational commitment, and higher unity in philosophy of care and staff-reported person-centred care.

TABLE 3 Characteristics of study variables

	m(±*SD*)	Score range (minimum and maximum)	*n*
Work conditions[a]	2.6 (±0.5)	1.2–4.0	552
Autonomy[a]	2.9 (±0.4)	1.3–4.0	552
Social support leader[a]	3.0 (±0.6)	1.0–4.0	552
Social support colleagues[a]	3.2 (±0.5)	1.3–4.0	552
Work satisfaction[a]	3.0 (±0.6)	1.3–4.0	552
Task variation and opportunities[a]	2.8 (±0.4)	1.4–4.0	552
Organisational commitment[a]	2.9 (±0.5)	1.0–4.0	552
Teamwork[a]	3.0 (±0.4)	1.2–4.0	549
Transformational leadership[b]	3.3 (±0.9)	1.0–5.0	529
Unity in philosophy of care[b]	3.5 (±0.9)	1.0–5.0	529
Person-centred care[c]	3.0 (±0.4)	2.0–3.9	533

[a]Scale range 1: totally disagree to 4: totally agree.

[b]Scale range 1: rarely or none of the time to 5: (almost) all of the time.

[c]Scale range 1: never to 5: always.

TABLE 4 Factors influencing person-centred care in nursing homes

	B	*SE*	*p*-value
Work conditions	−0.038013	0.031476	.227
Autonomy	0.074740	0.038798	.054
Social support leader	−0.095797	0.030113	.001
Social support colleagues	−0.056112	0.034930	.108
Work satisfaction	0.126806	0.033051	.000**
Task variation and opportunities	0.100758	0.037321	.007
Organisational commitment	0.043237	0.034472	.210
Teamwork	0.123065	0.044665	.006
Transformational leadership	0.090501	0.017093	.000**
Unity in philosophy of care	0.045732	0.014141	.001
Certified nurse assistant	−0.014456	0.041851	.730
Nurse assistant	−0.097823	0.047358	.039
Age	0.001728	0.000996	.083

Note: Dependent variable: staff-reported person-centred care.

$p < .05$ is considered significant.

**Statistical significance $p < .001$.

4 | DISCUSSION

In this study, the association between work environment, job characteristics and staff-perceived person centeredness in nursing homes for people with dementia was assessed. Results indicated that work environment characteristics (i.e. transformational leadership, unity in philosophy of care, teamwork and three job characteristics [social support from leader, work satisfaction and task variation and development opportunities]) are associated with staff-reported person-centred care. Contrary to our expectations, no statistical associations were found for other job characteristics (work conditions, social support from colleagues, autonomy and organisational commitment) and staff-reported person-centred care.

The positive impact of leadership on person-centred care practices has been investigated earlier (Backman et al., 2016, 2020). The positive association between leaders who follow a more transformational leadership style and staff-reported person-centred care can be explained by attitudes that are embodied by a transformational leader (see Box 1). In the literature, four components of transformational leadership are described that could be relevant to explain this association: idealized influence, individual consideration, inspirational motivation and intellectual stimulation (Barbuto, 2005; Bass, 1995; Hall et al., 2002). A transformational leader who acts as a role model (idealized influence) experiences less resistance from staff towards change (Wang, 2011) and is likely capable of implementing interventions more easily, including those aimed at person-centred care. In addition, it has been reported that care staff has a desire to deliver person-centred care (Edvardsson et al., 2011; Simard & Volicer, 2020). By empowering care staff through individual consideration and inspirational motivation, a transformational leader can facilitate this preferred way of working.

Moreover, our results indicate that more unity in philosophy of care is associated with higher person-centred care. This is in line with earlier studies pointing out that communicating goals and visions are crucial for achieving high quality of care (Lynch et al., 2018; McCormack et al., 2012; Scalzi et al., 2006; Stolee et al., 2005).

Another result of our study is that teamwork is associated with person-centred care. By enabling shared decision-making, positive and effective staff relationships have been found to be important in providing person-centred care in prior studies (Carvajal et al., 2019; Efstathiou & Clifford, 2011). Other studies highlight teamwork as a key facilitator for providing person-centred care (Abbott et al., 2016; Oppert et al., 2018). The nature of care tasks requires partnership and teamwork among caregivers (Eldh et al., 2016). Furthermore, effective teamwork provides more free time for caregivers to deliver person-centred care (Oppert et al., 2018).

Higher task variation and opportunities, as well as work satisfaction, were also associated with staff-reported person-centred care. When care staff feels empowered and confident, they are more likely to work according to the wishes and needs of residents and experience more job satisfaction (Bishop et al., 2008; Squires et al., 2015). Prior studies also investigated the effect of person-centred care on job satisfaction among direct care staff. These studies show that a higher degree of person-centred care contributes to higher work satisfaction among nurses (Edvardsson et al., 2011; Rajamohan et al., 2019; Sjögren et al., 2015).

Our results show that less social support from a leader is associated with more staff-reported person-centred care. This could be explained by the assumption that teams who already perform more independently and provide high levels of person-centred care need less support from their leader. The theory of Tuckman and Jensen (1977) suggests that groups who reached the fourth out of five development stages within a group forming process perform more independently and need less or even no support from a leader to reach a common goal. The association between social support from

a leader, team performance and staff-reported person-centred care should be investigated more closely.

In our sample, the majority of participants were certified nurse assistants, followed by nurse assistants. This is a typical configuration for the Dutch long-term care setting, where vocationally trained or baccalaureate-educated registered nurses make up the lowest percentage of direct care staff (Buljac-Samardzic et al., 2016; van der Windt & Talma, 2005). In the Netherlands, certified nurse assistants follow a 2- to 3-year vocational training (Huls et al., 2015). Nurse assistants are less educated and follow a 2-year educational programme (Willemse et al., 2014). Our findings show a negative association between nurse assistants and staff-reported person-centred care, as nurse assistants indicated that less person-centred care was provided. This could be due to a discrepancy of educational programmes trying to enhance person-centred care. Overall, educational programmes, such as training on the job, are aimed at staff from diverse occupations and educational levels (Hunter et al., 2016). Up to now, there is little evidence for long-term maintenance of knowledge gained by those training programmes (Aylward et al., 2003). Nurse assistants even report getting most of their knowledge through work-related experiences (Eraut, 2000; Hunter et al., 2016; Ozsoy & Ardahan, 2008). Furthermore, it has been reported that educational programmes for nurse assistants in the Netherlands are not focused enough on providing person-centred care in elderly individuals (Hamers et al., 2012). This discrepancy between educational programmes and actual knowledge gained in practice could explain a negative association between nurse assistants and provision of person-centred care. Further research is needed to investigate the relationship between the educational level of direct care staff and the provision of person-centred care in the nursing home setting.

Several limitations should be taken into account. Due to the cross-sectional design, we were only able to investigate associations and no cause–effect relationships. Therefore, our findings should be interpreted with care. A potential weakness may be that staff-reported person-centred care was measured on the basis of individual perceptions about their own performance and is therefore subjective. Additionally, it has been suggested that care staff are biased to give socially or politically correct answers about person-centred care (Willemse et al., 2015).

5 | CONCLUSIONS

This study has highlighted that transformational leadership, unity in philosophy of care, teamwork and three job characteristics (social support from leader, work satisfaction and task variation and development opportunities) are associated with staff-reported person-centred care. Future longitudinal studies could provide more insight into these relationships. Person-centred care could be improved by generating more evidence on the cause–effect relationships of work environment characteristics and person-centred care. Additionally, future research may investigate which components of transformational leadership are associated with more person-centred care behaviour in care staff. To facilitate person-centred care in nursing homes, it seems beneficial to train leaders to follow a more transformational leadership style.

6 | IMPLICATIONS FOR NURSING MANAGEMENT

The results highlight that in a complex environment such as a nursing home, a diversity of factors is associated with the desirable client outcome of person-centred care. Within the nursing home, relationships and collaboration play an important role. To achieve unity in philosophy of care and shared values, a collaboration between leaders, care staff, clients and family members is recommended. Leaders may consider facilitating collaboration by frequent evaluation, implementing teambuilding interventions (e.g. coaching) to strengthen teamwork within care teams and active involvement of clients and family members.

To effectively fulfil these tasks, leaders may use a transformational leadership style. They could consider follow educational programmes to learn about facets and characteristics of a transformational leadership style and could take part in learning communities to reflect on actions and their effect. This may enable them to balance interests of all parties involved in the nursing home, to work in a relationship-centred way and to facilitate person-centred care.

CONFLICT OF INTEREST

None to declare.

ETHICAL APPROVAL

The Medical Ethics Committee of the University Medical Center of Utrecht confirmed that the Living Arrangements for people with Dementia study does not come under the scope of Medical Research Involving Human Subjects Act (reference number WAG/om/13/055932).

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the Trimbos Institute upon request.

ORCID

Johanna E. R. Rutten https://orcid.org/0000-0003-1575-9821
Ramona Backhaus https://orcid.org/0000-0002-0817-9872

REFERENCES

Abbott, K. M., Heid, A. R., & Van Haitsma, K. (2016). "We can't provide season tickets to the opera": Staff perceptions of providing preference-based, person-centered care. *Clinical Gerontologist*, *39*(3), 190–209. https://doi.org/10.1080/07317115.2016.1151968

Aylward, S., Stolee, P., Keat, N., & Johncox, V. (2003). Effectiveness of continuing education in long-term care: a literature review. *The Gerontologist*, *43*(2), 259–271.

Backhaus, R., van Rossum, E., Verbeek, H., Halfens, R. J., Tan, F. E., Capezuti, E., & Hamers, J. P. (2017). Work environment characteristics associated with quality of care in Dutch nursing homes: A cross-sectional study. *International Journal of Nursing Studies*, *66*, 15–22. https://doi.org/10.1016/j.ijnurstu.2016.12.001

Backhaus, R., Verbeek, H., van Rossum, E., Capezuti, E., & Hamers, J. P. (2014). Nurse staffing impact on quality of care in nursing homes: A systematic review of longitudinal studies. *Journal of the American Medical Directors Association*, *15*(6), 383–393. https://doi.org/10.1016/j.jamda.2013.12.080

Backman, A., Ahnlund, P., Sjögren, K., Lövheim, H., McGilton, K. S., & Edvardsson, D. (2020). Embodying person-centred being and doing: Leading towards person-centred care in nursing homes as narrated by managers. *Journal of Clinical Nursing*, *29*(1–2), 172–183. https://doi.org/10.1111/jocn.15075

Backman, A., Sjögren, K., Lindkvist, M., Lövheim, H., & Edvardsson, D. (2016). Towards person-centredness in aged care–exploring the impact of leadership. *Journal of Nursing Management*, *24*(6), 766–774. https://doi.org/10.1111/jonm.12380

Barbuto, J. E. (2005). Motivation and transactional, charismatic, and transformational leadership: A test of antecedents. *Journal of Leadership & Organizational Studies*, *11*(4), 26–40. https://doi.org/10.1177/107179190501100403

Bass, B. M. (1995). Theory of transformational leadership redux. *The Leadership Quarterly*, *6*(4), 463–478. https://doi.org/10.1016/1048-9843(95)90021-7

Bass, B. M., & Avolio, B. J. (1994). *Improving organizational effectiveness through transformational leadership*. Sage.

Bishop, C. E., Weinberg, D. B., Leutz, W., Dossa, A., Pfefferle, S. G., Zincavage, & M. Zincavage, R. (2008). Nursing assistants' job commitment: Effect of nursing home organizational factors and impact on resident well-being. *The Gerontologist*, *48*, 36–45. https://doi.org/10.1093/geront/48.Supplement_1.36

Bowers, B. J., Esmond, S., & Jacobson, N. (2000). The relationship between staffing and quality in long-term care facilities: Exploring the views of nurse aides. *Journal of Nursing Care Quality*, *14*(4), 55–64. https://doi.org/10.1097/00001786-200007000-00009

Buljac-Samardzic, M., van Wijngaarden, J. D., & Dekker–van Doorn, C. M. (2016). Safety culture in long-term care: A cross-sectional analysis of the Safety Attitudes Questionnaire in nursing and residential homes in the Netherlands. *BMJ Quality & Safety*, *25*(6), 424–431. https://doi.org/10.1136/bmjqs-2014-003397

Carless, S. A., Wearing, A. J., & Mann, L. (2000). A short measure of transformational leadership. *Journal of Business and Psychology*, *14*(3), 389–405. https://doi.org/10.1023/A:1022991115523

Carvajal, A., Haraldsdottir, E., Kroll, T., McCormack, B., Errasti-Ibarrondo, B., & Larkin, P. (2019). Barriers and facilitators perceived by registered nurses to providing person-centred care at the end of life. A scoping review. *International Practice Development Journal*, *9*(2), 1–22. https://doi.org/10.19043/ipdj.92.008

Castle, N. G., & Ferguson, J. C. (2010). What is nursing home quality and how is it measured? *The Gerontologist*, *50*(4), 426–442. https://doi.org/10.1093/geront/gnq052

Colon-Emeric, C. S., McConnell, E., Pinheiro, S. O., Corazzini, K., Porter, K., Earp, K. M., Landerman, L., Beales, J., Lipscomb, J., & Hancock, K. (2013). CONNECT for better fall prevention in nursing homes: Results from a pilot intervention study. *Journal of the American Geriatrics Society*, *61*(12), 2150–2159. https://doi.org/10.1111/jgs.12550

Dewar, B., Barrie, K., Sharp, C., & Meyer, J. (2019). Implementation of a complex intervention to support leadership development in nursing homes: A multimethod participatory study. *Journal of Applied Gerontology*, *38*(7), 931–958. https://doi.org/10.1177/0733464817705957

Edvardsson, D., Fetherstonhaugh, D., McAuliffe, L., Nay, R., & Chenco, C. (2011). Job satisfaction amongst aged care staff: Exploring the influence of person-centered care provision. *International Psychogeriatrics*, *23*(8), 1205. https://doi.org/10.1017/S1041610211000159

Edvardsson, D., Winblad, B., & Sandman, P.-O. (2008). Person-centred care of people with severe Alzheimer's disease: Current status and ways forward. *The Lancet Neurology*, *7*(4), 362–367. https://doi.org/10.1016/S1474-4422(08)70063-2

Efstathiou, N., & Clifford, C. (2011). The critical care nurse's role in End-of-Life care: Issues and challenges. *Nursing in Critical Care*, *16*(3), 116–123. https://doi.org/10.1111/j.1478-5153.2010.00438.x

Eldh, A. C., van der Zijpp, T., McMullan, C., McCormack, B., Seers, K., & Rycroft-Malone, J. (2016). 'I have the world's best job'–staff experience of the advantages of caring for older people. *Scandinavian Journal of Caring Sciences*, *30*(2), 365–373. https://doi.org/10.1111/scs.12256

Eraut, M. (2000). Non-formal learning and tacit knowledge in professional work. *British Journal of Educational Psychology*, *70*(1), 113–136. https://doi.org/10.1348/000709900158001

García, C., García, J., López Martín, M., & Salmerón, R. (2015). Collinearity: Revisiting the variance inflation factor in ridge regression. *Journal of Applied Statistics*, *42*(3), 648–661. https://doi.org/10.1080/02664763.2014.980789

Hall, J., Johnson, S., Wysocki, A., & Kepner, K. (2002). *Transformational leadership: The transformation of managers and associates*. University of Florida IFAS Extension.

Hamers, J., Van Rossum, E., Peeters, J., Rameckers, V., & Meijs, N. (2012). *Ouderenzorg in het middelbaar beroepsonderwijs. Een inventarisatie bij zorgopleidingen (niveau 2 en 3)*. Maastricht University.

Hanefeld, J., Powell-Jackson, T., & Balabanova, D. (2017). Understanding and measuring quality of care: Dealing with complexity. *Bulletin of the World Health Organization*, *95*(5), 368. https://doi.org/10.2471/BLT.16.179309

Heffels, J. C., Everink, I. H., Oosterloo, M., Roos, R. A., & Schols, J. M. (2020). Measuring the quality of care in nursing home residents with early-onset neurodegenerative diseases: A scoping review. *BMC Palliative Care*, *19*(1), 1–9. https://doi.org/10.1186/s12904-020-0528-0

Huls, M., de Rooij, S. E., Diepstraten, A., Koopmans, R., & Helmich, E. (2015). Learning to care for older patients: Hospitals and nursing homes as learning environments. *Medical Education*, *49*(3), 332–339. https://doi.org/10.1111/medu.12646

Hunter, P. V., Hadjistavropoulos, T., & Kaasalainen, S. (2016). A qualitative study of nursing assistants' awareness of person-centred approaches to dementia care. *Ageing & Society*, *36*(6), 1211–1237. https://doi.org/10.1017/S0144686X15000276

Instituut, T. (2010). *Eenduidigheid in Visie op Zorg [Unity in care philosophy]*. Retrieved from https://assets.trimbos.nl/docs/d7f965e8-0103-4c84-bb3a-b1036c70911d.pdf

Kitwood, T. M. (1997). *Dementia reconsidered: The person comes first*. Open University Press.

Koo, T. K., & Li, M. Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of Chiropractic Medicine*, *15*(2), 155–163. https://doi.org/10.1016/j.jcm.2016.02.012

Lynch, B. M., McCance, T., McCormack, B., & Brown, D. (2018). The development of the Person-Centred Situational Leadership Framework: Revealing the being of person-centredness in nursing homes. *Journal of Clinical Nursing*, *27*(1–2), 427–440. https://doi.org/10.1111/jocn.13949

McCormack, B. (2004). Person-centredness in gerontological nursing: An overview of the literature. *Journal of Clinical Nursing*, *13*, 31–38. https://doi.org/10.1111/j.1365-2702.2004.00924.x

McCormack, B., Roberts, T., Meyer, J., Morgan, D., & Boscart, V. (2012). Appreciating the 'person' in long-term care. *International Journal of Older People Nursing*, *7*(4), 284–294. https://doi.org/10.1111/j.1748-3743.2012.00342.x

McGilton, K. S., Heath, H., Chu, C. H., Boström, A.-M., Mueller, C., M. Boscart, V., McKenzie-Green, B., Moghabghab, R., & Bowers, B. (2012). Moving the agenda forward: A person-centred framework in long-term care. *International Journal of Older People Nursing*, *7*(4), 303–309. https://doi.org/10.1111/opn.12010

Miles, A., & Asbridge, J. E. (2014). On the need for transformational leadership in the delivery of person-centered clinical practice within 21st century healthcare systems. *European Journal for Person Centered Healthcare*, *2*(3), 261–264. https://doi.org/10.5750/ejpch.v2i3.938

Nielsen, K., Randall, R., Yarker, J., & Brenner, S.-O. (2008). The effects of transformational leadership on followers' perceived work characteristics and psychological well-being: A longitudinal study. *Work & Stress*, *22*(1), 16–32. https://doi.org/10.1080/02678370801979430

Oppert, M. L., O'Keeffe, V. J., & Duong, D. (2018). Knowledge, facilitators and barriers to the practice of person-centred care in aged care workers: A qualitative study. *Geriatric Nursing*, *39*(6), 683–688. https://doi.org/10.1016/j.gerinurse.2018.05.004

Ozsoy, S. A., & Ardahan, M. (2008). Research on knowledge sources used in nursing practices. *Nurse Education Today*, *28*(5), 602–609. https://doi.org/10.1016/j.nedt.2007.09.013

Porock, D., & Chang, Y. (2013). *Person-centered care in long term care: Direct care staff questionnaire psychometrics and scoring manual version 1*. University at Buffalo, State University of New York.

Prins, M., Willemse, B. M., Heijkants, C. H., & Pot, A. M. (2019). Nursing home care for people with dementia: Update of the design of the Living Arrangements for people with Dementia (LAD)-study. *Journal of Advanced Nursing*, *75*(12), 3792–3804. https://doi.org/10.1111/jan.14199

Rajamohan, S., Porock, D., & Chang, Y. P. (2019). Understanding the relationship between staff and job satisfaction, stress, turnover, and staff outcomes in the person-centered care nursing home arena. *Journal of Nursing Scholarship*, *51*(5), 560–568. https://doi.org/10.1111/jnu.12488

Rokstad, A. M. M., Vatne, S., Engedal, K., & Selbæk, G. (2015). The role of leadership in the implementation of person-centred care using Dementia Care Mapping: A study in three nursing homes. *Journal of Nursing Management*, *23*(1), 15–26. https://doi.org/10.1111/jonm.12072

Scalzi, C. C., Evans, L. K., Barstow, A., & Hostvedt, K. (2006). Barriers and enablers to changing organizational culture in nursing homes. *Nursing Administration Quarterly*, *30*(4), 368–372. https://doi.org/10.1097/00006216-200610000-00009

Schwendimann, R., Zúñiga, F., Ausserhofer, D., Schubert, M., Engberg, S., & De Geest, S. (2014). Swiss nursing homes human resources project (SHURP): Protocol of an observational study. *Journal of Advanced Nursing*, *70*(4), 915–926. https://doi.org/10.1111/jan.12253

Seljemo, C., Viksvee, P., & Ree, E. (2020). The role of transformational leadership, job demands and job resources for patient safety culture in Norwegian nursing homes: A cross-sectional study. *BMC Health Services Research*, *20*(1), 1–8. https://doi.org/10.1186/s12913-020-05671-y

Simard, J., & Volicer, L. (2020). Loneliness and isolation in long-term care and the Covid-19 pandemic. *Journal of the American Medical Directors Association*, *21*(7), 966–967. https://doi.org/10.1016/j.jamda.2020.05.006

Simmons, S. F., & Rahman, A. N. (2014). Next steps for achieving person-centered care in nursing homes. *Journal of the American Medical Directors Association*, *15*(9), 615–619. https://doi.org/10.1016/j.jamda.2014.06.008

Sion, K. Y., Haex, R., Verbeek, H., Zwakhalen, S. M., Odekerken-Schröder, G., Schols, J. M., & Hamers, J. P. (2019). Experienced quality of post-acute and long-term care from the care recipient's perspective – A conceptual framework. *Journal of the American Medical Directors Association*, *20*(11), 1386–1390.e1. https://doi.org/10.1016/j.jamda.2019.03.028

Sjögren, K., Lindkvist, M., Sandman, P. O., Zingmark, K., & Edvardsson, D. (2015). To what extent is the work environment of staff related to person-centred care? A cross-sectional study of residential aged care. *Journal of Clinical Nursing*, *24*(9–10), 1310–1319. https://doi.org/10.1111/jocn.12734

Smit, D., Willemse, B., de Lange, J., Tuithof, M., & Pot, A. M. (2017). *Daily occupation of care home residents with dementia as observed by staff–implications for care and research practice. Seize the day!*. https://reigershoeve.nl/assets/docs/userfiles/Seizetheday.pdf#page=38

Squires, J. E., Hoben, M., Linklater, S., Carleton, H. L., Graham, N., & Estabrooks, C. A. (2015). Job satisfaction among care aides in residential long-term care: A systematic review of contributing factors, both individual and organizational. *Nursing Research and Practice*, *2015*, 1–24. https://doi.org/10.1155/2015/157924

Stolee, P., Esbaugh, J., Aylward, S., Cathers, T., Harvey, D. P., Hillier, L. M., Keat, N., & Feightner, J. W. (2005). Factors associated with the effectiveness of continuing education in long-term care. *The Gerontologist*, *45*(3), 399–405. https://doi.org/10.1093/geront/45.3.399

Temkin-Greener, H., Zheng, N., Katz, P., Zhao, H., & Mukamel, D. B. (2009). Measuring work environment and performance in nursing homes. *Medical Care*, *47*(4), 482–491. https://doi.org/10.1097/mlr.0b013e318190cfd3

Tuckman, B. W., & Jensen, M. A. C. (1977). Stages of small-group development revisited. *Group & Organization Studies*, *2*(4), 419–427. https://doi.org/10.1177/105960117700200404

Van Beek, A. P. A., & Gerritsen, D. L. (2010). The relationship between organizational culture of nursing staff and quality of care for residents with dementia: questionnaire surveys and systematic observations in nursing homes. *International journal of nursing studies*, *47*(10), 1274–1282.

van der Doef, M., & Maes, S. (1999). The Leiden Quality of Work Questionnaire: Its construction, factor structure, and psychometric qualities. *Psychological Reports*, *85*(3), 954–962. https://doi.org/10.2466/pr0.1999.85.3.954

van der Windt, W., & Talma, H. (2005). *De arbeidsmarkt voor verpleegkundigen, verzorgenden en sociaal-pedagogen in de zorgsector 2004–2008*. Prismant.

Wang, L. (2011). An alternative explanation for transformational leadership effectiveness: The role of leader proactive feedback-seeking behavior in the relationship between transformational leadership and subordinate performance. State University of New York at Buffalo.

Weberg, D. (2010). Transformational leadership and staff retention: An evidence review with implications for healthcare systems. *Nursing Administration Quarterly*, *34*(3), 246–258. https://doi.org/10.1097/NAQ.0b013e3181e70298

White, E. M., Aiken, L. H., Sloane, D. M., & McHugh, M. D. (2019). Nursing home work environment, care quality, registered nurse burnout and job dissatisfaction. *Geriatric Nursing*, *41*(2), 158–164. https://doi.org/10.1016/j.gerinurse.2019.08.007

Willemse, B., De Jonge, J., Smit, D., Visser, Q., Depla, M. F., & Pot, A. M. (2015). Staff's person-centredness in dementia care in relation to job characteristics and job-related well-being: A cross-sectional survey in nursing homes. *Journal of Advanced Nursing*, *71*(2), 404–416. https://doi.org/10.1111/jan.12505

Willemse, B. M., Depla, M. F. I. A., Smit, D., & Pot, A. M. (2014). The relationship between small-scale nursing home care for people with dementia and staff's perceived job characteristics. *International Psychogeriatrics*, *26*(5), 805–816. https://doi.org/10.1017/S1041610214000015

Wong, C. A., & Cummings, G. G. (2007). The relationship between nursing leadership and patient outcomes: A systematic review. *Journal of Nursing Management*, *15*(5), 508–521. https://doi.org/10.1111/j.1365-2834.2007.00723.x

How to cite this article: Rutten, J. E. R., Backhaus R., Tan F., Prins M., van der Roest H., Heijkants C., Hamers J. P. H., & Verbeek H. Work environment and person-centred dementia care in nursing homes—A cross-sectional study. *J Nurs Manag*. 2021;29:2314–2322. https://doi.org/10.1111/jonm.13386