Development and Validation of the Indonesian Version of Quality Nursing Work Environment (QNWE-I) Instrument

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Abstract

Background: Nursing shortages are a significant problem experienced by medical institutions worldwide as well as Indonesia. Understanding nurses' work environment is a proper strategy for enhancing the retention and overcoming shortages of nurses. The Quality Nursing Work Environment (QNWE) is a well-known tool that has been commonly used to evaluate the working atmosphere of nurses. However, the availability and validated version of the instrument for hospital nurses in Indonesia is not confirmed.

Purpose: This study aims to confirm the psychometric evaluation of the Indonesian version of QNWE instruments in hospital settings.

Methods: A cross-sectional study design and psychometric analyses were administered. The 65-item, eight-domain questionnaire was translated, adapted, and face-validated using content validity index (CVI) analysis. The construct validity and internal consistency of the translated version were tested using confirmatory factor analysis (CFA) and Cronbach's Alpha to 334 hospital nurses. The intraclass correlation coefficient (ICC) was employed to determine test-retest and interrater reliability analysis to 33 nurses and 10 ratters in the pilot testing.

Results: The CVI of the QNWE-I scale ranged from 0.86 to 1.00. The CFA determined an adequate model fit of the instrument. As to overall reliability, test-retest reliability of 0.90, ICC analysis of 0.82, and Cronbach's alpha of 0.96; was confirmed.

Conclusions: The psychometric evaluation of the QNWE-I showed excellent acceptability, validity, and reliability. Therefore, the QNWE-I can serve as a comprehensive instrument for assessing the quality of nurses' work environments in Indonesia.

Keywords: nursing work environment, instrument development, scale validation

1. Introduction

Studies have widely reported that nurses' work quality has significant influences on patient outcomes, organizations, and professionals. Recognizing that nurses comprise the largest component of the healthcare workforce in the world (Edmonson et.al., 2017), their contributions are acknowledged as a crucial basis for providing safe and good-quality care to patients (Dai et.al., 2016; Kieft et.al., 2014). Moreover, increases in aging populations around the world as well as in Indonesia along with various acute healthcare challenges, illness severities, and incidences of chronic illnesses have increased nurses' workload of providing health services and rates of burnout (Zhou et.al., 2018). Additionally, poor working environments encountered by nurses are also considered a notable issue in the worsening nursing shortage worldwide (Dai et al., 2016; Lin, Lu, & Huang, 2016). The growing demand for health care and the shrinking supply of trained personnel are leading causes of shortages of nurses in global health care (Littlejohn et al., 2012).

As global attention, Indonesia also faces a serious nursing shortage. On average, the shortfall of nursing staff in medical institutions reached 34.15% (Dewanto & Wardhani, 2018). Only 10% of all annual graduating nursing

students are absorbed by the hospital field, while the other 90% prefer to work as bank employees, cell-phone customer service providers, airplane staff, and entrepreneurs (Efendi et.al., 2018). In terms of demand, a recent study summarized that about 86.7% of both hospitals and public healthcare services in Indonesia have an insufficient number of nurses (Dewanto & Wardani, 2018). Several facts contribute to this shortage, such as low wages, a lack of hospitals' intentions to recruit nurses with a bachelor's degree, a high working load, uncomfortable work environment, less of appreciation, and the opportunity to work abroad for 5-fold higher wages than available in Indonesia (Nurdiana, Hariyati & Gayatri, 2019). Thus, it is logical that effective strategies are needed to resolve nursing shortages and low retention levels (Dai et al., 2016; Lin et al., 2016).

Enhancing the quality of nurses' work environments is a strategy to amplify retention and reduce the shortages of nurses (Lin et al., 2016). Evidence from earlier investigations identified that supportive environments improve nurses' satisfaction with their jobs and decrease tiredness and intentions of leaving the job. Other factors, such as improving leadership and management, instituting supportive practices, allowing greater involvement in projects, and encouraging problem-solving and decision making, all can contribute to organizational change and success (Bai, 2016; Van Bogaert et.al., 2013). Understanding the perceived of nurses and identifying related factors affecting their satisfaction with their practice environments will provide guidance that can be utilized to enhance work environments which beneficial to overcome nursing shortages and burnout and improve retention (Dai et al., 2016; Lin et al., 2016). Moreover, it is essential to adjust the hospital structure, culture, and organization that impacts nurses' work environments. Surveying the work environment and diminishing its shortcomings will empower the application of a continual improvement process that can enhance the quality of nursing care and its outcomes (Griffiths et al., 2016; Spence Laschinger, Zhu, & Read, 2016). Therefore, the use of measurement designed to evaluate and appraise nurses' work environments is critical for improving the quality of care, especially nursing care (Lin, Lu, & Huang, 2016; Neves et.al., 2018).

A review of the literature published various studies that investigated elements of nurses' work environments over the past two decades conducted in several countries including autonomy, control of nursing practice, culture, education, equipment, innovation, leadership, nurse management ability, nurse-physician relations, organizational support, pay, peer cohesion, respect, safety, scheduling, supplies, and resources (De Pedro-Gómez et al., 2012; Nurdiana, Hariyati & Gayatri, 2019; Shao et al., 2017; Warshawsky & Havens, 2011). Shang, Friese, Wu, & Aiken (2013), and Laschinger et al. (2016) also added that supportive environmental elements improve the quality of care and decrease adverse incidents, thus increasing satisfaction and enhancing health-related outcomes for patients, professionals, and institutions. In addition, attention could also be paid to nurses' characteristics such as work experience (Moradi, Maghaminejad, & Azizi-Fini, 2014), different work units (Kelbiso, Belay & Woldie, 2017), and differences in nurses' seniority (Lin et al., 2019).

Considering those nursing work environmental elements, nurses may have conflicting conceptions about a quality work environment among different countries because of differences in culture and healthcare systems. Therefore, a sensitive and fit measurement is needed to assess the nurses' work environment. The Practice Environment Scale of the Nursing Work Index (PES-NWI), the most commonly used measurement for assessing nursing practice environments, developed by Lake (2002) based on the NWI survey which evaluated the organizational traits that facilitate nursing practice. However, there is evidence reported that the PES-NWI was considered a simple instrument and is not consistently fit to be applied across countries (De Pedro-Gómez et al., 2012; Fuentelsaz-Gallego et al., 2013; Neves et al., 2018; Warshawsky & Havens, 2011). Thus, Lin et al. (2016) developed a set of comprehensive indicators identified as the Quality Nursing Work Environment (QNWE), a measurement scale for healthcare professionals that developed and used in Taiwan, based on the International Council of Nurses' considerations which represent quality nursing work environment indicators within the context of the current Taiwanese healthcare system (Lin et al., 2016). The scale referenced data from a large sample of nurses in Taiwan using eight domains (safe practice environment; staff quality; workload, salary and welfare; professional specialization and cooperation; work simplification; information technology; professional cultivation and development; support and caring) and consists of 65 items. The study report explicates that the QNWE is an adequate measurement for assessing nursing practice environments in Taiwan and was recommended for application in different contexts and nations, although different-language versions of the QNWE are currently unavailable. Thus, the development and cultural adaptation of this measurement scale is needed for further study.

To date, an effective nursing work environment measurement scale is not currently available in Indonesia. Adopting and adapting the QNWE Taiwanese version would be a suitable measurement scale for investigating the quality of the nursing work environment of Indonesian nurses, considering Indonesia has a similar Asian culture to that of Taiwan. Therefore, the purposes of the current study were to adopt the QNWE Taiwan version

into Bahasa Indonesia and then evaluate the psychometric properties of the Indonesian version of the Quality Nursing Work Environment in the hospital nurses settings.

2. Method

2.1 Study Design

This study used a cross-sectional survey design and consisted of two following phases such as development of QNWE Taiwan version and psychometric testing of the Indonesian version of QNWE.

2.1.1 Development of the Original Version of QNWE

This study used a set of QNWE Taiwan version that originally structured and validated by Lin et al (2016) to evaluate the quality of work environment perceived by nurses in hospital settings which consists of 64 items and eight domains: 'safe practice environment,' 'staff quality workload, salary, and welfare,' 'professional specialization and cooperation,' 'work simplification; information technology,' 'professional cultivation and development,' and 'support and caring' (Lin et al, 2016). The response format of the instrument used a 5-point Likert scale from 1 (totally unqualified) to 5 (fully qualified). The total scores of all items represent the scale score, with a possible range of 65 to 325. A higher score indicates a greater perceived quality of the work environment.

To develop the instrument, adaptation and translation procedures were obtained. Before the translation process has started, the researchers gained authorization to translate, develop and use the QNWE scale from the original authors. The translation procedures of this study followed Cha et al.'s (2007) translation model using comparisons of the back-translated version with the original version. Two independent bilingual translators were involved. A previously validated version of the QNWE for Taiwanese nurses was translated into Indonesian language by an Indonesian bilingual academic nursing expert in healthcare systems. Subsequently, a second professional academic English translation expert in health science then back-translated the Indonesian version into English, to check its uniformity with the original by a blinded method. Variations among the original English, translated and back-translated versions of the QNWE were discussed by the translators. The verified Indonesian translated version was produced and considered as the first draft of the Indonesian version of QNWE (QNWE-I).

2.1.2 Psychometric Testing of the QNWE-I

Two stages of psychometric testing were obtained in this study (Figure 1). Stage 1 evaluated the face validity and coefficient stability of the QNWE-I. Subsequently, stage 2 analysed the construct validity and internal consistency reliability of the instrument.
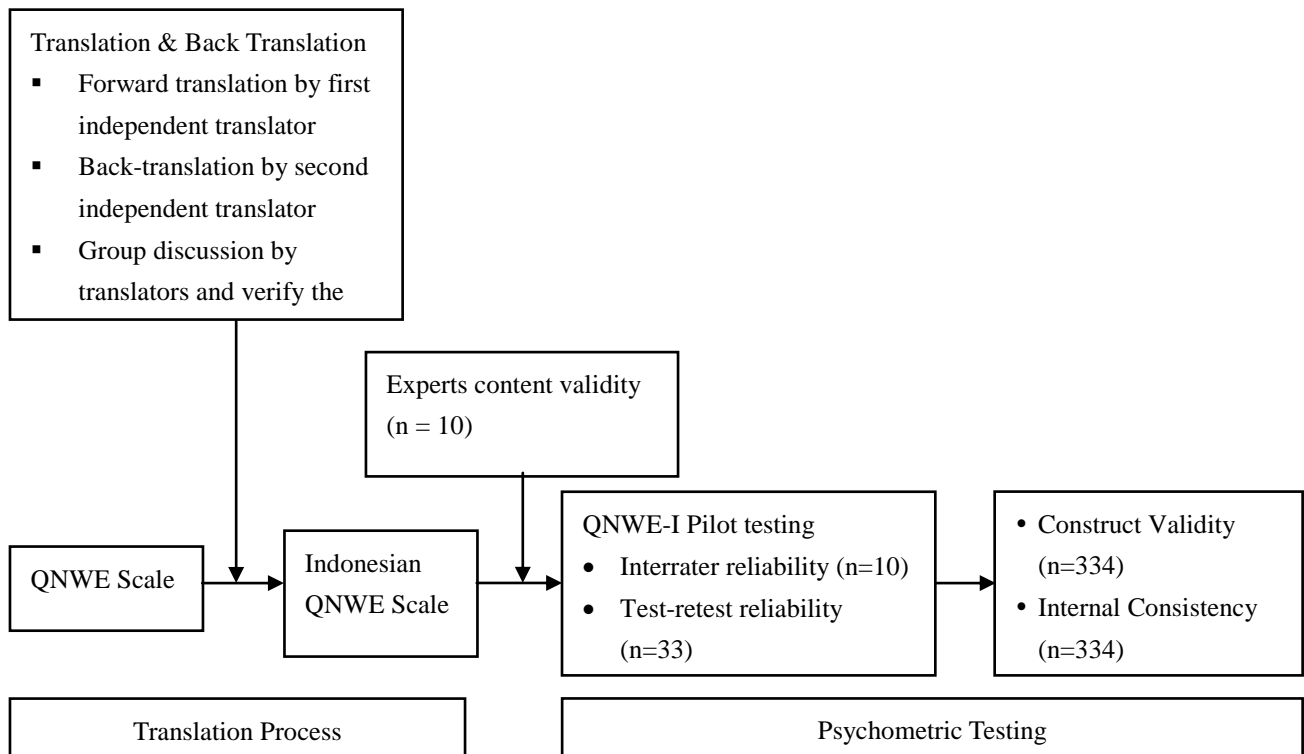
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┌─────────────────────────────┐
│ Translation & Back Translation │
│  ▪ Forward translation by first │
│    independent translator       │
│  ▪ Back-translation by second   │
│    independent translator       │
│  ▪ Group discussion by          │
│    translators and verify the   │
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Figure 1. Diagram of QNWE-I Development and Validation

2.2 Participant

Ten experts consisted of 5 academic nursing lecturers and 5 hospital nursing supervisors holding master's degrees and 33 nurses from medical wards participated to appraise face validity and coefficient stability of the instrument in the stage 1. Furthermore, 334 registered nurses working in three different departments of routine wards, special units, and critical units in two private hospitals in Yogyakarta province were recruited for stage 2 by utilizing purposive sampling method. There were no inclusion or exclusion criteria for participating in the stage 2. Participants were selected from nurses who voluntarily answer a questionnaire that personally received including a form presenting the project, requesting their participation, and guaranteeing full anonymity in the processing of the data.

2.3 Data Collection

The two stages of data collection were conducted in two private hospital in Yogyakarta, Indonesia from December 2015 to February 2016. For stage 1, one session of focus group discussion among ten experts was employed to identify the important items of the questionnaire, language clarity, and the feasibility of the target field. A 4-point rating system was used for this assessment. Panel expert members' discussion was performed to determine the scoring and comments. During this stage, amendments and revisions of the instrument were made before the final version of the instrument was approved by all members of the panel. Furthermore, the final Indonesian version of the QNWE was employed to conduct interrater and test-retest reliability analysis among ten expert ratters and 33 nurses. For stage 2, 334 nurses participated to evaluate the psychometric testing of the final version of QNWE-I.

2.4 Ethical Considerations

All participants provided a set page of written informed consent, study purpose, the procedure involved and the contact information of the researchers. The questionnaires were anonymous, and completion of the questionnaire was voluntary. The Institutional Review Board (IRB) letter was approved by the Ethics Committee Board of PKU Muhammadiyah Hospital (IRB No. 0546/PI.24.2/VIII/2015). Returning the questionnaires was considered informed consent, and all data were treated confidentially.

2.5 Data Analysis

Descriptive statistics (means, standard deviations, frequencies, and percentages) were utilized to analysed participants' characteristics. To determine the face validity of the scale, the content validity index (CVI) was calculated by experts along with the average CVI score for each item in the scale. The intraclass correlation coefficient (ICC) was employed to determine a one-week test-retest and interrater reliability analysis with values between 0.5 and 0.74 indicating moderate reliability and between 0.75 and 0.90 indicating good reliability. A confirmatory factor analysis (CFA) technique was tested to determine the overall model and the construct validity of the QNWE-I scale. To calculate the overall goodness-of-fit in CFA, a Chi-squared test was used (values of <3 indicates a good fit); the root mean squared error of approximation (RMSEA) and its 90% confidence interval (CI) (values of <0.05 indicates a good fit); the comparative fit index (CFI) (displaying a range of 0~1, with a minimum goodness-of-fit value of 0.95), and the standardized root mean squared residual (SRMR) (which indicates a good fit with values of <0.08. Following Hu and Bentler (1998), it was assumed that a model has adequate goodness of fit for an RMSEA of <0.05 and an SRMR of <0.08. The internal consistency reliability of QNWE-I was tested with Cronbach's alpha coefficient value of ≥ .7 (Pallant, 2013). All analyses were administered with SPSS 22.0 and AMOS 17.0 for Windows (SPSS, Chicago, IL, USA).

3. Results

3.1 Participant Characteristics

Ten experts and 33 registered nurses participated in stage 1 of the study (face validity, test-retest and interrater reliability analysis), whereas 334 nurses participated in stage 2 (construct validity and internal consistency reliability) which represented a response rate of 89.5% of all nursing staff. The majority of participants in the study were married (64.07%), female (79.34%), and working in routine wards (74.25%). Most of the participants ranged 31~40 years in age (62.57%) and had an educational level of a nursing bachelor's degree or above (51.19%). Practitioner nurses accounted for 94.01% of participants, with 58.38% having a lower level of working experience (Table 1). There were no missing data of responses to the questionnaires by participants. This indicates that all of the respondents took the questionnaire seriously. The study accepted 334 questionnaires as valid for a response rate of 100%.

Table 1. Characteristics of study participants (*N*=334)

Variable	*N*	*%*
Gender		
Male	69	20.65
Female	265	79.34
Age		
20-30 years old	82	24.55
31-40 years old	209	62.57
>40 years old	43	12.87
Marital status		
Married	214	64.07
Unmarried	120	35.92
Educational status		
High school and below	163	48.80
Bachelor's and above	171	51.19
Job status		
Position		
Practitioner nurse	314	94.01
Administrative nurse	20	5.98
Department		

Routine ward	248	74.25
Special unit	19	5.68
Critical unit	67	20.05
Experience		
Lower experience	195	58.38
Higher experience	139	41.61

3.2 Validity Analysis

This study revealed 2 items (item 43 & 61) from 64 were identified as overlapping with others and were unsuitable to be applied, and they were recommended to be removed due to low score rated by experts (iCVI=0.40; 0.37). The item-specific of CVI after items deleted was calculated with the average result ranging 0.86~1.00 for all factors of the QNWE-I, indicating that all items of the scale had excellent content validity. The final version of the scale consisted of 62 items. Moreover, to analyse construct validity, CFA was performed on the QNWE-I using all eight-factor structure. As shown in figure 2, all items loaded onto eight factors were strong, ranging from 0.50~0.90 ($p<0.05$). Correlations between factors also showed strong results ranging from 0.64~0.89 ($p<0.05$). The fit indexes results confirmed acceptable model fit (X^2/df=2.60; CFI=0.96; goodness-of-fit index (GFI)=0.93; all items' root mean square error of approximation (RMSEA)=0.08; mean expected cross-validity index (MECVI)=0.44; adjusted GFI (AGFI)=0.87; normed fit index (NFI)=0.96; and Tucker-Lewis index (TLI)=0.95). Therefore, the QNWE-I considered good construct validity.

3.3 Reliability Analysis

The reliability of the QNWE-I was established by calculating the internal consistency and stability. The one-week test-retest and interrater reliability analysis of the QNWE-I scale among 33 respondents and 10 ratters have calculated the overall ICC value at 0.90 and 0.82, which indicated all of the items are appropriate and highly stable. Furthermore, Cronbach's Alpha coefficients for the eight factors ranged from 0.79~0.96, indicating that the QNWE-I scale has satisfactory internal consistency (Table 2).

Table 2. Items description of the QNWE-I scale (N=334)

Item content	M	SD	Rank	Item rank	Cronbach's α
Domain 1: Safe practice environment	**3.62**	**0.60**	3		**0.96**
1. Has safe practice environment setup and maintenance standards, and can duly implement and continuosly improve them.	3.68	0.64		6	
2. Has budgets for ensuring safe practice environmental actions.	3.61	0.73		10	
3. Has an employee health exam program, and can provide further follow-up and management.	3.51	1.01		13	
4. Has occupational health management, intervention, and reporting mechanisms, and can evaluate and improve them.	3.58	0.84		11	
5. Has mechanisms for occupational hazard compensation, and can duly implement them.	3.69	0.82		5	
6. Duly implements infection control route planning and risk area control.	3.74	0.74		3	
7. Has protective equipment/devices and interventions for reducing biological hazards (e.g., body fluids, blood, and infectious medical wastes).	3.89	0.64		1	
8. Has protective equipment/devices and interventions to reduce physical hazards (e.g., electrical appliances, autoclaves, oxygen tanks, radiation, temperatures, and noise).	3.63	0.75		8	

9. Has protective equipment/devices and interventions to reduce chemical hazards (e.g., hazardous medications, organic materials).	3.65	0.72		7	
10. Duly implements practice environmental risk assessments and improvements.	3.87	0.66		2	
11. Has ergonomic equipment/devices (e.g., desks and chairs, work stations, work carts, lights, and space).	3.72	0.75		4	
12. Has equipment/devices to prevent ergonomic hazards (e.g., transfer boards, electric hospital beds, electric beds with weight scales).	3.33	0.90		16	
13. Implements ergonomic hazard prevention and management.	3.42	0.81		14	
14. Has established policies and standard operating procedures to prevent and handle workplace violence (e.g., bullying, sexual assault) and sexual harassment.	3.55	0.90		12	
15. Has workplace violence and sexual harassment reporting mechanisms and appropriate management.	3.61	0.85		9	
16. Provides support and coaches for employees who are victims of workplace violence or sexual harassment.	3.47	0.88		15	
Domain 2: Staff quality	**3.58**	**0.62**	7		**0.79**
17. The percentage of nurses with registered nursing licenses.	3.85	0.77		1	
18. The percentage of nurses with N2 ranking.	3.49	0.77		3	
19. The percentage of nurses with at least two years of work experience at the institution.	3.30	0.93		4	
20. The percentage of nursing managers/supervisors (including head nurses and above) with at least a master's degree.	3.69	0.92		2	
Domain 3: Workload, salary, and welfare	**3.32**	**0.72**	8		**0.92**
21. Has appropriate nurse-to-patient ratios in all three work shifts.	3.38	0.86		3	
22. Has a flexible manpower allocation system.	3.46	0.79		2	
23. Has support manpower to maintain reasonable workloads.	3.22	1.01		8	
24. Has salaries (including bonuses) similar to the market rate.	3.23	0.97		5	
25. Has night shift compensation similar to the market rate.	3.22	1.02		7	
26. Has a professional advancement system for nurses, and adjusts salaries/rewards based on their grade in the advancement system.	3.34	0.95		4	
27. Has various incentives for staff, regularly assesses and improves the incentive system, and provides appropriate and real-time rewards.	3.23	0.97		6	
28. Has excellent welfare programs (e.g., condolence payments or subsidies for insurance, injuries, rent, education, housing loans, uniforms, laundry, food, transportation, emergency relief, nursery, child	3.52	0.92		1	

care, daycare for the elderly, smoking cessation, travel, birthdays, weddings, funerals, etc.).

Domain 4: Professional specialization and cooperation	**3.81**	**0.52**	1		**0.93**
29. The nursing department has power to influence decisions about professional specialization.	3.67	0.72		5	
30. Has clear division of work among professional teams and can duly implement it.	3.66	0.67		6	
31. Has designated units responsible for supervising and managing non-nursing work (e.g., logistical support - environment cleaning, equipment/device maintenance, supply delivery).	3.77	0.70		4	
32. Has a culture of mutual respect among members of the multidisciplinary team.	3.98	0.62		1	
33. Has collaboration mechanisms and good communication among multidisciplinary team.	3.94	0.58		2	
34. Has mechanisms to facilitate cooperation among nursing team members within the unit and between units.	3.86	0.59		3	
Domain 5: Work simplification	**3.60**	**0.67**	4		**0.95**
35. Nursing administrators actively facilitate task simplification.	3.64	0.75		1	
36. Nursing staff duly implement task simplification.	3.62	0.72		2	
37. Has concrete interventions and effectiveness evaluation to promote work simplification.	3.56	0.72		5	
38. Encourages participating in work simplification and provides incentives.	3.58	0.74		3	
39. Has support and help from multidisciplinary teams for work simplification.	3.57	0.77		4	
Domain 6: Information technology	**3.77**	**0.67**	2		**0.88**
40. Has sufficient information technology and equipment/devices (e.g., E-nursing carts, mobile computers).	3.64	0.78		4	
41. Has appropriate patient safety maintenance systems (e.g., patient identification barcode system, medical order signoff system).	3.98	0.79		1	
42. Has nursing information systems that meet nursing staff work needs (e.g., drug dictionaries, nursing records system, and database searching functions).	3.73	0.81		3	
43. Has appropriate information management systems (e.g., nursing information systems, human resource management systems, nursing scheduling systems, and nursing managerial report systems).	3.77	0.78		2	
Domain 7: Professional cultivation and development	**3.58**	**0.64**	6		**0.96**
44. Nursing department has concrete direction and strategies for staff training.	3.60	0.78		4	
45. Hospital provides sufficient resources for nursing staff training and gets concrete results.	3.66	0.75		2	
46. Has a clinical nursing advancement system and mechanisms to promote staff professional ability,	3.62	0.80		3	

and regularly assesses and evaluates these.

47. Assists and inspires nursing staff in career development planning and obtains concrete results.	3.48	0.83		9	
48. Represents diverse nursing professional roles and functions (e.g., case managers, hospice nurse coordinators).	3.69	0.68		1	
49. Represents professional development of nursing practice and provides innovative examples.	3.54	0.74		6	
50. Patients and their families recognize the value of nursing professionals.	3.51	0.77		8	
51. Medical teams and hospital staff recognize the contribution of nursing professionals.	3.59	0.79		5	
52. Nursing professional development connects with international standards and has concrete strategies for doing so.	3.51	0.80		7	
Domain 8: Support and caring	**3.60**	**0.60**	5		**0.94**
53. Has nursing administrators participating in major hospital meetings (e.g., meetings related to budgeting, performance, rewards and punishments, human resources, and quality management).	3.81	0.65		1	
54. Incorporates opinions of nursing administrators in major decisions.	3.54	0.78		8	
55. Supports nursing department and provides necessary resources.	3.64	0.73		6	
56. Respects nursing department decisions related to human resources.	3.67	0.71		4	
57. Rewards nurses for their good performance, and praises them publicly.	3.45	0.87		9	
58. Has units responsible for supporting and helping nurses deal with various difficulties (e.g., issues related to adverse events, patient complaints, and medical disputes).	3.66	0.71		5	
59. Has staff nurses participating in nursing department meetings.	3.68	0.76		3	
60. Has flexible nursing scheduling principles which meet diverse needs.	3.75	0.68		2	
61. Cares about work and life needs of nursing staff.	3.56	0.79		7	
62. Provides nursing staff support groups or related activities and interventions for stress relief.	3.32	0.90		10	
QNWE-I					**0.96**

QNWE-I, Quality Nursing Work Environment Indonesian version.
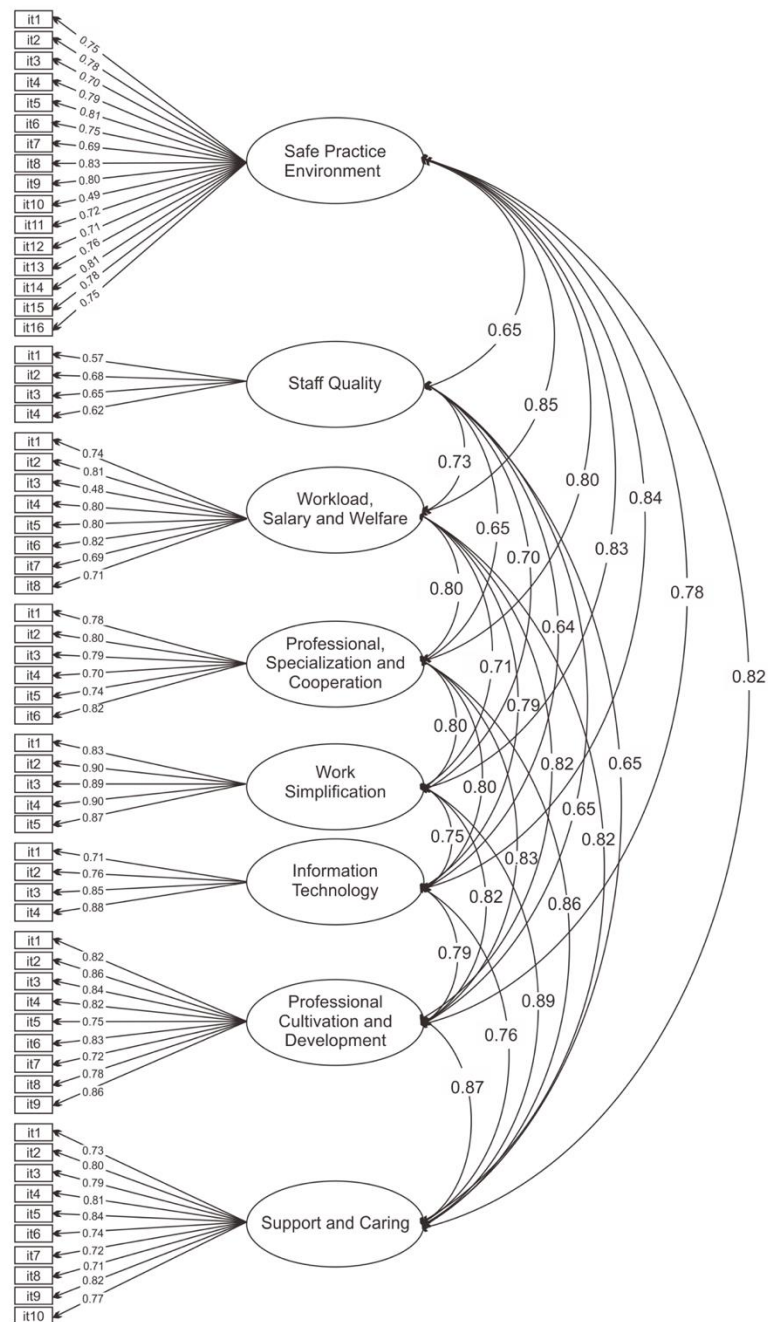
Figure 2. Confirmatory Factor Analysis of the QNWE-I Instrument (N=334)

4. Discussion

4.1 Validity of the QNWE-I

The goodness-of-fit test was used to verify the modified structure of the QNWE-I based on CFA results in our study. We found that the results were similar to those of other researchers (Chiang & Lin, 2009; Lin et al., 2016b; Parker et al., 2010). For instance, the Chi-squared analysis was significantly similar to other studies (Chiang & Lin, 2009; Lin et al., 2016). Furthermore, the ratio of the Chi-square value to its degrees of freedom was 5.60, the critical value of the Chi-square test with degrees of freedom equal to 1 is an indication of a good fit between the model and the data (Hair et al. 2006). Other CFA criteria also confirmed data fit utilizing the QNWE-I, such as CFI=0.96, GFI=0.93, AGFI=0.87, NFI=0.96, TLI=0.95, and RMSEA=0.08. Therefore, the internal consistency of the Indonesian version of the QNWE provides additional support for factor structure validity, and construction of the Indonesian version of the QNWE can be considered to be sufficient.

4.2 Reliability of the QNWE-I

The internal consistency reliability was confirmed by assessing values of Cronbach's α coefficient for each factor and the entire instrument. Results of this study indicate that the QNWE-I has good overall reliability to assess the working environmental quality of nurses in Indonesia. Similar to this study, a study conducted by Lin et al. (2016) showed that values of α coefficients for all subscales ranged 0.65~0.84, indicating excellent internal consistency reliability, which were slightly lower than those of the present study which ranged 0.79~0.96, but were still acceptable (Nunnally & Bernstein, 1994). In line with a study conducted by Aiken and Patrician (2000), they reported that a revised nursing work index (NWI) for measuring characteristics of nursing practice environments showed α coefficients that ranged 0.65~0.84, which also indicates good internal consistency of the individual subscales.

Furthermore, the development of the 62-item of QNWE-I is shorter than the original QNWE scale to assess the quality of the working environment of nurses, making the QNWE-I more acceptable and fit for administrators to use in assessing the quality of the work environment of Indonesian nurses. In translating the original QNWE, we adopted the process of scale translation described by Cha et al. (2007) because it is rigorous and better suited for low-resource settings, as it requires fewer translators than Brislin et al.'s method (Brislin, 1983). Qualified translators were selected not only for their bilingual skills but also for their knowledge of the healthcare management scales and their experience with scale translation. Translators who were familiar with an original scale before translation were found to generate translated scales that were marked by relatively high levels of conceptual equivalence with the original scale (Sidani et al., 2010). Moreover, the format of the QNWE-I is the same as that of the original QNWEI scale, that is, the final 62-item questions of QNWE-I use a 5-point Likert scale, thus ensuring technical equivalence.

Another strength of the QNWE-I is that the accuracy of the translation was pretested on a small sample of the target population to help identify any difficulties with understanding or interpreting items, as recommended by Brislin (1983). The pilot test group of 33 nurses reported no reading or interpretation problems. The 1-week test-retest reliability was 0.90 ($p<0.001$),[?] which was well above the 0.70 considered acceptable for a new instrument (Nunnally & Bernstein, 1994), indicating good stability of the QNWE-I scale.

4.3 Participants' Characteristics and Differences in the QNWE-I

The present study was an investigation into the reliability and validity of the Indonesian version of the QNWE in Indonesian hospital settings. To the best knowledge of the research team, this is the first academic examination of the QNWE in Indonesia. The findings were extracted in terms of eight factors. The eight factors were Safe practice environment, Staff quality, Workload, salary and welfare, Professional specialization and cooperation, Work simplification, Information technology, Professionalism and personal development, and Support and caring.

One of the surprising results of this study was that demographic variables were shown to significantly affect the QNWE-I, suggesting that the QNWE-I may be used to detect differences in quality working environments among different groups of nurses. For example, the total mean QNWE-I score for special unit nurses was significantly lower than that for nurses working in routine wards.

In this study, participants working in routine wards had a higher perceived QNWE compared to those working in critical units and special units. This indicates that critical units and special units are associated with high workloads and job burdens (Amarneh, 2017). In line with a study conducted by Mrayyan (2009), nurses working in critical units deal more with higher work stressors. Our study results suggest that special unit nurses may be appropriate targets for work-environment improvement initiatives. Improvements can then be evaluated by administering the QNWE-I, with increased scores indicating a better-quality working environment that is attributable to work-environment improvements.

Another finding showed that nurses with less experience highly rated their perceptions of the QNWE factor of Workload, salary, and welfare. This is a new finding, and is very logical in accordance with previous studies that described how young nurses have more challenges and passionate feelings when assessing their level of competencies for gaining advanced working experience (Kuokkanen et al., 2016). In line with previous studies, newly graduated nurses had a prosperous sense of high efficacy of their nursing competencies and knowledge, which supports their fundamental motivation to perform work well (Kuokkanen et al., 2016; Tiffen et al., 2014). A recent paper also revealed that nurses with low working experience were mostly satisfied and had fewer complaints about the salary they received, because they did not have much reference knowledge and experience about the salary (Leggat et al., 2010).

This present study also found high perceptions of the QNWE-I factor of a Safe practice environment for nurses with less experience. This finding was supported by a previous study conducted by Jang, Song, & Kang (2017) which reported that young nurses were more motivated to control and modify their safety work practice than were older nurses. Aligning with a study conducted by Kuokkanen et al. (2016), newly graduated nurses who worked in a hospital were actively concerned about the safe practice environment and cooperatively sought support for making their work practice environment safe.

Results for suitability under various factors of the QNWE-I may differ with the character of the variables in the study. The present study focused on an analysis of subjects' working experiences and suitable correlations of all QNWE-I factors. The results described how nurses with less experience highly perceived the factor of personalism and professional development. This confirms earlier study findings of young nurses who considered themselves more engaged in professional development than older ones (Kuokkanen et al., 2002). Likewise, Sun et al. (2011) discovered that older nurses were less empowered for career development than were younger ones. Presumably newly graduated nurses' short experience with nursing practice, different learning environments, and different clinical competence expectations impact their assessments of their empowerment (Kuokkanen et al., 2002; Lovrić et al., 2014).

5. Conclusions

The present study was an investigation into the validity and reliability of the Indonesian version of the QNWE in Indonesian hospital settings. To the best knowledge of the research team, this is the first academic investigation of the QNWE in Indonesia. This study contributes to the analysis of the Indonesian version of the QNWE which can be served as a scale for measuring the quality of nurses' work environments in hospital settings in Indonesia, and it performs to be a comprehensive scale for nurses in hospital settings. Overall, there were good results of the validity and reliability analysis in this study. The psychometric properties of the QNWE-I were sufficiently acceptable, and it is simple to administer. However, further appraisals are required if the instrument is needed to be applied in different contexts or countries. Furthermore, this study can support as a model for conducting a systematic psychometric analysis during the continued development of the QNWE with other unique sample types.

6. Limitation

This study was investigated among nurses in two private hospitals in Yogyakarta Province, Indonesia. To use this scale nationally, it would be necessary to involve numerous hospitals in all provinces of Indonesia in subsequent studies. Even though only two hospitals were involved in this study, it represented various nursing departments and acceptable participants.

References

Aiken, L. H., & Patrician, P. A. (2000). Measuring organizational traits of hospitals: The revised nursing work index. *Nursing Research, 49*(3), 146-153. https://doi.org/10.1097/00006199-200005000-00006

Bai, J. (2016). Does job satisfaction mediate the relationship between healthy work environment and care quality? *Nursing in Critical Care, 21*(1), 18-27. https://doi.org/10.1111/nicc.12122

Brislin, R. W. (1983). Cross-Cultural Research in Psychology. *Annual Review of Psychology, 34,* 363-400. https://doi.org/10.1146/annurev.ps.34.020183.002051

Cha, E. S., Kim, K. H., & Erlen, J. A. (2007). Translation of scales in cross-cultural research: issues and techniques. *Journal of Advanced Nursing, 58*(4). https://doi.org/10.1111/j.1365-2648.2007.04242.x

Dai, H. Da, Tang, F. I., Chen, I. J., & Yu, S. (2016). Taiwanese version of the work-related quality of life scale for nurses: Translation and validation. *Journal of Nursing Research, 24*(1), 58-67. https://doi.org/10.1097/jnr.0000000000000142

De Pedro-Gómez, J., Morales-Asencio, J. M., Sesé-Abad, A., Bennasar-Veny, M., Pericas-Beltran, J., & Miguélez-Chamorro, A. (2012). Psychometric testing of the Spanish version of the Practice Environment Scale of the Nursing Work Index in a primary healthcare context. *Journal of Advanced Nursing, 68*(1), 212-21. https://doi.org/10.1111/j.1365-2648.2011.05730.x

Dewanto, A., & Wardhani, V. (2018). Nurse turnover and perceived causes and consequences: a preliminary study at private hospitals in Indonesia. *BMC Nurs., 17*(52). https://doi.org/10.1186/s12912-018-0317-8

Edmonson, C., McCarthy, C., Trent-Adams, S., McCain, C., & Marshall, J. (2017). Emerging global health issues: A nurse's role. *Online Journal of Issues in Nursing, 22*(1), 2. https://doi.org/10.3912/OJIN.Vol22No01Man02

Efendi, F., Chen, C. M., Kurniati, A., Nursalam, & Yusuf, M. A. (2018). The situational analysis of nursing education and workforce in Indonesia. *The Malaysian Journal of Nursing, 9*(4).

Fuentelsaz-Gallego, C., Moreno-Casbas, M. T., & González-Marín, E. (2013). Validation of the Spanish version of the questionnaire Practice Environment Scale of the Nursing Work Index. *International Journal of Nursing Studies, 50*(2), 274-80. https://doi.org/10.1016/j.ijnurstu.2012.08.001

Griffiths, P., Ball, J., Drennan, J., Dall'Ora, C., Jones, J., Maruotti, A., … Simon, M. (2016). Nurse staffing and patient outcomes: Strengths and limitations of the evidence to inform policy and practice. A review and discussion paper based on evidence reviewed for the National Institute for Health and Care Excellence Safe Staffing guideline development. *International Journal of Nursing Studies, 63*, 213-225. https://doi.org/10.1016/j.ijnurstu.2016.03.012

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate data analysis: Pearson new International edition* (7th ed.). London, England: Pearson Education

Hu, L. T., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to under parameterized model misspecification. *Psychological Methods, 3*(4), 424-453. https://doi.org/10.1037/1082-989X.3.4.424

Kelbiso, L., Belay, A., & Woldie, M. (2017). Determinants of Quality of Work Life among Nurses Working in Hawassa Town Public Health Facilities, South Ethiopia: A Cross-Sectional Study. *Nursing Research and Practice, 17*, 5181676. https://doi.org/10.1155/2017/5181676

Kieft, R. A. M. M., De Brouwer, B. B. J. M., Francke, A. L., & Delnoij, D. M. J. (2014). How nurses and their work environment affect patient experiences of the quality of care: A qualitative study. *BMC Health Services Research, 14*, 249. https://doi.org/10.1186/1472-6963-14-249

Lake, E. Y. (2002). Development of the Practice Environment Scale of the Nurse Work Index. *Research in Nursing Research, 25*(3), 176-88. https://doi.org/10.1002/nur.10032

Laschinger, H., Zhu, J., & Read, E. (2016). New nurses' perceptions of professional practice behaviours, quality of care, job satisfaction and career retention. *Journal of Nursing Management, 24*(5). https://doi.org/10.1111/jonm.12370

Lin, C. F., Huang, C. I., Yang, C. M., & Lu, M. S. (2019). The Relationship between Work Environment Satisfaction and Retention Intention among Nursing Administrators in Taiwan. *Journal of Nursing Research 27*(5), 1-9. https://doi.org/10.1097/jnr.0000000000000312

Lin, C. F., Lu, M. S., & Huang, H. Y. (2016). The psychometric properties and the development of the indicators of quality nursing work environments in Taiwan. *Journal of Nursing Research, 24*(1), 9-20. https://doi.org/10.1097/jnr.0000000000000106

Littlejohn, L., Campbell, J., Collins-mcneil, J., Littlejohn, L., Salem, W., Salem, W., … Salem, W. (2012). Nursing Shortage : A Comparative Analysis. *International Journal of Nursing, 1*(1), 22-27.

Moradi, T., Maghaminejad, F., & Azizi-Fini, I. (2014). Quality of Working Life of Nurses and its Related Factors. *Nursing and Midwifery Studies, 3*(2). https://doi.org/10.5812/nms.19450

Neves, T. M. A., Parreira, P. M. S. D., Graveto, J. M. G. N., Rodrigues, V. J. L., & Marôco Domingos, J. P. (2018). Practice environment scale of the nursing work index: Portuguese version and psychometric properties. *Journal of Nursing Management, 26*(7), 833-841. https://doi.org/10.1111/jonm.12606

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York: NY: McGraw-Hill.

Nurdiana, N., Hariyati, R. T. S., & Gayatri D. (2019). Head nurse strategy for increasing nurse retention: A factor analysis. *Enferm Clin, 29*(2), 560-566. https://doi.org/10.1016/j.enfcli.2019.04.087

Pallant, J. (2013). *SPSS survival manual: A step by step guide to data analysis using*. Berkshire, England: McGraw-Hill.

Shang, J., Friese, C. R., Wu, E., & Aiken, L. H. (2013). Nursing practice environment and outcomes for

oncology nursing. *Cancer Nursing, 36*(3), 206-12. https://doi.org/10.1097/NCC.0b013e31825e4293

Shao, J., Tang, L., & Ye, Z. (2017). Measuring the Nursing Work Environment in Mainland China. *Nursing Research, 66*(4), 311-322. https://doi.org/10.1097/nnr.0000000000000221

Spence Laschinger, H. K., Zhu, J., & Read, E. (2016). New nurses' perceptions of professional practice behaviours, quality of care, job satisfaction and career retention. *Journal of Nursing Management, 24*(5), 656-65. https://doi.org/10.1111/jonm.12370

Van Bogaert, P., Kowalski, C., Weeks, S. M., Van heusden, D., & Clarke, S. P. (2013). The relationship between nurse practice environment, nurse work characteristics, burnout and job outcome and quality of nursing care: A cross-sectional survey. *International Journal of Nursing Studies, 50*(12), 1667-77. https://doi.org/10.1016/j.ijnurstu.2013.05.010

Warshawsky, N. E., & Havens, D. S. (2011). Global use of the practice environment Scale of the Nursing Work Index. *Nursing Research, 60*(1), 17-31. https://doi.org/10.1097/NNR.0b013e3181ffa79c

Zhou, M., Zhao, L., Kong, N., Campy, K. S., & Qu, S. (2018). What Caused Seriously Shortage of Chinese Nurses?. *Iranian Journal of Public Health, 47*(7), 1065-1067.