Original Article

Validity and Reliability of the Persian Practice Environment Scale of Nursing Work Index

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Abstract

Background: The practice environment pivotal role in patients and nurses better outcomes is evident. Practice Environment Scale of Nursing Work Index (PES-NWI) is widely utilized to assess nursing work environments. The present study was conducted to demonstrate the validity and reliability of the Persian version of PES-NWI. **Materials and Methods:** The instrument was translated and its psychometrics were investigated by content, construct validity (factor analysis), and homogeneity (internal consistency and intraclass correlation) on a sample of 350 nurses at educational hospitals in East Azerbaijan, Iran. **Results:** The 30 items loaded onto 4 factors explained 34.95–50.06% of the variance. The items across the factors differed slightly from those reported by the original author of the PES-NWI. Cronbach's alpha and Pearson coefficient for the entire instrument and also for extracted factors was 0.70–0.96. **Conclusions:** The Persian version of PES-NWI has an appropriate level of validity and reliability in the Iranian setting for nurses. The subscale of Nursing Foundations for quality care needs modification.

Keywords: *Iran, nurse, practice environment scale of nursing, reliability, validity*

Introduction

In a well-structured organization, staffs' physical and psychological health is as important as its production and efficiency. On the other hand, staffs' psychological health is a determining factor regarding the promotion of efficiency, as well as presenting better and effective range of services.[1]

Organizational factors within an environment have the potential to change the provision of care, and consequently nurse and patient outcomes,[2] which are shortage of nurses, inappropriate working conditions, lack of organizational support, nurses' discontent, and increase in nurses' age.[3,4] Nurses compromise the most among hospital personnel.[5] Recruiting and maintaining nurses are a vital and crucial issue. In recent years, managers have paid more attention to nursing conditions for the sake of promoting their own hospitals' efficiency.[6]

Because of shortage of nurses, work pressure among nurses, and financial constraints, nursing itself is considered as a primary source of stress resulting in depression and psychological tension.[1] Studies have revealed that hospitals with supportive working environments have low degree of death rate than those lacking supportive environments.[7] Managers should pay close attention to the quality of work life, which has powerful impacts on the wellbeing of nurses and places them at risk of fatigue.[8]

The study of Labbaf Ghasemi *et al*. showed that nurses faced excessive shift turns (74.15%), nonspecialized tasks (77.6), and lack of motivation (43.9%) in their working environments; 30% to 40% of the nurses declared the tendency to quit their profession.[9] Azarang also confirmed that 75.4% of the nurses were dissatisfied with their working environment.[10]

Supportive nursing management is influential in increasing motivation, appropriate working environment, nurses' empowerment, efficiency, and job satisfaction; in addition, it reduces working pressure.[11] Iran, similar to other countries, is experiencing a shortage of nurses; therefore, a multifactor approach for retention of nurses is required. One significant factor that has received

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increasing attention in the last decade, particularly in USA, is the nursing practice environment, which is defined by Lake as "the organizational characteristics of a work setting that facilitate professional nursing practice."[12]

The environment construct of Practice Environment Scale of Nursing Work Index (PES-NWI) proposed by Lake considering favorable nursing practice indicates that there is professional autonomy, an adequate number of nurses based on patients' needs, participative management with collaborative decision making, a mutual relationship between professionals, particularly physicians and nurse, promotion opportunities, acknowledgement of the nurses' hierarchy for efficient leadership, and management in the hospitals.[13] The results of investigating the psychometrics of PES-NWI in various studies indicates validity and reliability of the PES-NWI in several countries of different contexts and languages including China, New Zealand, Spain, Australia, Switzerland, Belgium, England, Finland, Sweden, Ireland, Holland, and Norway.[14] There is dearth of knowledge regarding the Persian version of PES-NWI, which led to the present study to investigate the validity and reliability of PES-NWI in the Iranian setting.

Materials and Methods

The present study is a methodological research for investigating the validity and reliability of the PES-NWI to use in a new environment in 2015. PES-NWI comprised 31 items for which the nurses responded on a scale of four points, ranging from 1 ("strongly agree") to 4 ("strongly disagree"). PES-NWI includes the following 5 factors: (1) nurses' participation in hospital affaires, (2) nursing foundations for quality of care, (3) collegial nurse–physician relationships, (4) leadership and support of nurses staffing and resource adequacy, (5) nurse manager ability.[13]

After authorization had been given by the original author (Lake) for translation of the international scale, we used content and construct validity and intraclass correlation coefficient (ICC) in the test and the retest (2-week interval). In this study, 350 participants were considered for factor analysis, internal (Cronbach's alpha), and retest consistency reliability of the instrument.

Following the visits to the nursing offices of the hospitals affiliated to the Tabriz University of Medical Sciences (TUMS), the nurses who were sampled randomly were eligible for the study if they were desirable to participate, had BS or higher academic degree in nursing, were working in the hospital for more than 6 months, and were able to speak, comprehend, read, and write in the Persian language. They were excluded if they chose to withdraw from the study. Initially, the consent form was filled by the participants of the study. Next, the researcher explained the objectives of the study to each participant during their free time in the morning, afternoon, and night shifts. Thereafter, the distributed instruments were responded by the nurses. A total of 440 questionnaires were distributed, of which 350 (79.5%) questionnaires were returned.

For the purposes of translation, the English PES-NWI was given to two translators fluent in English whose native language was Persian, and who were also familiar with the nursing practice environment. They separately translated the instrument from English to Persian. Next, the translated instruments were given to 30 nurses of the TUMS hospitals to be completed. The required discussion and recommendations about the accuracy, clarity, and simplicity of the items in the instrument were confirmed by the nurses who responded to the translated instrument. After agreement between the two translators, the initial Persian form of the instrument was prepared. Then, the instrument was given to an English native translator who fluent in Persian and was not familiar with the objective of the study or the main English form of the instrument. On comparing two forms of the translations (English and Persian), the final form of Persian instrument was prepared. There was no difference in terms of concepts between the translated version and the main version PES-NWI.

Cronbach's alpha and test–retest were used to investigate reliability for which the values greater than 0.7 had good reliability.[15] The reliability of internal consistency was determined by calculation of Cronbach's alpha at the beginning of the study as a pilot with 30 nurses for the entire instrument. Finally, the total study sample (350 nurses) was considered for each factor and the complete instrument. Burns and Grove consider a 2-week to 1-month interval for pen and paper instrument to be sufficient for the participants to lose recall of the items of the instrument and measures of constructs which are not expected to change over time.[15] Thus, in the present study, the reliability of test–retest was done with the sample of 30 nurses in the time interval of 2 weeks by calculating Spearman–Brown correlation coefficient between the two sets of scores obtained for each factor and the entire instrument. The content validity of scale was evaluated by 10 experts in nursing administration, and phrases with scores of less than 75% were considered to be clarified and simplified.

To determine the validity of the construct, exploratory factor analysis, confirmatory factor analysis, and discriminate validity methods were used. For exploratory factor analysis, the correlation matrix was calculated between the variables. Next, extraction of factors was done by principal axis factoring (PAF), and then varimax rotation was used to investigate the relation between the factors. Finally, Kazer Meier Olkin (KMO) test was applied to investigate the adequacy of the factor analysis model, indicating that the extracted component explains a significant amount of the results.

Bartlett's test, used for sphericity and variance, explained index by the factors and total. To evaluate the structure of the factors of exploratory factor analysis, goodness of fit of confirmatory factor analysis was done based on Chi-squared/degrees of freedom ($\chi 2$/df) <5, Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI) >0.9, Root mean square residual (RMSR) <0.1, Root Mean Square Error of Approximation (RMSEA) <0.08, comparative fit index (CFI) >0.9, Normed Fit Index (NFI) >0.9, Non-Normed Fit Index (NNFI) >0.9, Incremental Fit Index (IFI) >0.9, Relative Fit Index (RFI). Summarized to Confirmatory factor analysis was done based on $\chi 2$/df <5, RMSEA <0.08, GFI, AGFI, CFI, NFI, NNFI, and IFI >0.9.[15]

Data analysis was done by the Statistical Package for the Social Sciences (SPSS) version 14.0 (IBM SPSS Statistics for Windows, Version 20.0; IBM Corp., Armonk, New York, USA). *P* value of <0.05 was considered to be statistically significant.

Ethical considerations

Ethical approval was obtained from the TUMS before conducting the study (Ethics code No: 5/48382). The hospitals' authorities also permitted to conduct the study. The collected data were anonymous, the consent form was obtained, and the participants were allowed to withdraw from the study anytime they wanted.

Results

In our study, the majority (92%) of the nurses were women, had a bachelor's degree (93.4%), and a job experience of less than 1 year (8%) [Table 1]. Thirty-one items were confirmed as the result of PES-NWI content validity. Exploratory factor analysis revealed four factors explaining 34.95–50.06% of the variance [Table 2]. The "Nursing Foundations for quality care" factor of the PES-NWI needs modification. In the present study, Cronbach's alpha coefficient was 0.935 for the entire instrument and 0.70–0.92 for the four factors. ICC was 0.95 for the entire instrument and 0.85–0.96 for the four factors [Table 3].

Table 1: Demographic data of the participants

Option	Number (percent)
Gender	
Female	322 (92%)
Male	28 (8%)
Academic degree	
Associate	11 (3.1%)
BS	327 (93.4%)
MS	12 (3.4%)
Work experience	
<1 year	28 (8%)
1-2 years	28 (8%)
2-5 years	140 (40%)
>5 years	154 (44%)

In the investigation of the adequacy of factor analysis model based on the values (KMO = 0.93 and for Bartlett's test, Chi-square of Bartlett's test was 3947.10, degree of freedom 465, $P < 0.01$), the adequacy of the model was confirmed.

Discussion

The present study deals with the investigation of the reliability and validity of the Persian PES-NWI in Tabriz educational hospitals. The findings have been extracted in terms of four factors. The first factor was leading and supporting nurses. The second factor was the cooperation between nurses and physicians, the third was adequate working staff to treat patients, and finally the fourth factor was nursing foundations for quality care. Nursing management support was another factor that was not found to be significant in this study. In a study by Hegney *et al*. of the reliability and validity of PES-NWI carried out in Queensland Australia, four factors out of five were identified. Nurses' participation in hospital affairs were not significant in their study.[16] In the psychometrics study by Chiang and Lin of PES-NWI among nurses who worked in 5 hospitals in Southern Taiwan, the nonsignificant factor was the relationship between physicians and nurses.[11] In a cross-sectional study by Tominoga *et al*., that was aimed to study the characteristics of PES-NWI in Japanese Magnet Hospitals, all factors except nurses' participation in hospital affairs were significant.[17] Moreover in a cross-sectional study by Gunnarsdottir, nursing practice environments were analyzed by modified nursing indexes via the participation of 650 nurses in the Island. The findings revealed that the nurses had better condition in terms of their relations with physicians compared to the other four factors.[18] A study by Nunez regarding cultural measurement equivalence of the PES-NWI between two groups of Asian/Pacific Islander and White/Non-Hispanic registered nurses (RN) revealed that the majority of the subscales were statistically significantly different except for two subscales addressing hospital affairs and nurse managers.[19] It could be concluded that, based on different contexts, we will have slightly different factor extractions.

Paying attention to the value of Cronbach's alpha coefficient for each factor and the entire instrument, internal consistency reliability was confirmed. Other studies also confirmed its internal consistency. Similar to our study, studies by Chiang and Lin, Salgueiro *et al*., and Fuentelsaz *et al*., the Cronbach's alpha coefficient was 0.89–0.93.[11,16,20,21]

The ICC value was 0.85–0.96 in our study, considering values ≥0.7 to be acceptable,[22] the stability of the instrument was satisfactory which is similar to other studies.[23,24]

Looking at the KMO index value of balanced factor analysis and Barttlets test, a meaningful linkage can be understood.

Table 2: Exploratory factor analysis of selected items of the nursing work index

Loading in the Lake's (2002) study			Loading in the current study			
			Factor 1 V=34.949*	Factor 2 V=41.070	Factor 3 V=45.796	Factor 4 V=50.058
Nurse Participation in Hospital Affairs	0.55	1-Staff nurses are involved in the internal governance of the hospital	0.81			
	0.52	2-Opportunity for staff nurses to participate in policy decisions	0.721			
	0.51	3-Many opportunities for advancement of nursing personnel	0.687			
	0.51	4-An administration who listens to and responds to employee concerns	0.683			
	0.48	5-A director of nursing highly visible and accessible to staff	0.680			
	0.47	6-Career development/clinical ladder opportunity	0.663			
	0.47	7-Nursing administrators consult with staff on daily problems and procedures	0.642			
	0.42	8-Staff nurses have the opportunity to serve on hospital and nursing department committees	0.640			
	0.41	9-A chief nursing executive equal in power and authority to other top level hospital executives	0.636			
Nursing Foundations for Quality of Care	0.49	10-Use of nursing diagnoses	0.635			
	0.48	11-An active quality assurance program	0.633			
	0.47	12-A preceptor program for newly hired RNs	0.617			
	0.45	13-Nursing care is based on a nursing, rather than a medical, model	0.615			
	0.45	14-Patient care assignments that foster continuity of care, i.e., the same nurse cares for the patient from one day to the next	0.598			
	0.44	15-A clear philosophy of nursing that pervades the patient care environment	0.591			
	0.44	16-Written, up-to-date nursing care plans for all patients	0.547			
	0.42	17-High standards of nursing care are expected by the administration	0.481			
	0.40	18-Active in service/continuing education programs for nurses	0.541			
	0.40	19-Working with nurses who are clinically competent		0.746		
Nurse Manager Ability, Leadership, and Support of Nurses	0.67	20-A head nurse who is a good manager and leader.		0.701		
	0.61	21-A head nurse/supervisor who backs up the nursing staff in decision making, even if the conflict is with a physician			0.828	
	0.60	22-Supervisors use mistakes as learning opportunities, not criticism			0.726	
	0.57	23-A supervisory staff that is supportive of the nurses			0.458	
	0.55	24-Praise and recognition for a job well done	0.636			
Staffing and Resource Adequacy	0.73	25-Enough staff to get the work done			0.395	
	0.71	26-Enough registered nurses to provide quality patient care				0.594
	0.50	27-Adequate support services allow me to spend time with my patients				0.581
	0.47	28-Enough time and opportunity to discuss patient care problems with other nurses				0.489
Collegial Nurse-Physician Relations	0.65	29-A lot of teamwork between nurses and doctors	0.481			
	0.55	30-Physicians and nurses have good relationships				0.471

*Variance

Table 3:The reliability of the PES-NWI sub scores

Factors	Mean	Standard deviation	Min (%)	Max (%)	Cronbach's alpha	ICC	Spearman	Pearson
Factor 1	2.87	0.53	0	4 (1.1)	0.925	0.94	−0.75	−0.14
Factor 2	2.50	0.61	3 (0.9)	13 (3.7)	0.787	0.85	−0.028	−0.091
Factor 3	3.12	0.61	0	36 (10.3)	0.696	0.92	−0.022	−0.24
Factor 4	2.70	0.53	0	6 (1.7)	0.782	0.96	−0.036	−0.10

In the Chiang and Lin study (2009),[11] KMO was 91% and Barttlet's results was also meaningful ($P < 0.001$). Further, in Salgueiro *et al*.,[20] the KMO was 91% with positive Barttlet's results ($P < 0.001$). This showed that the factor analysis could be carried out on this dataset and the adequacy of the model was confirmed.

Study limitations

The response rate (79.5%) was acceptable and suitable for covering statistical power; nevertheless, some concerns can be made about the profile of non-respondent nurses, who potentially could have different perceptions about their practice environments. The second limitation is that the present study is confined to the university educational hospitals of one province of Iran and further research to ascertain the applicability of the PES-NWI in different settings is recommended.

Conclusions

The Persian version of PES-NWI has an appropriate level of validity and reliability in the Iranian setting for the nurses and could be a helpful instrument for measuring organizational factors that could play a key role in any strategic planning at healthcare centres, aimed at redesigning roles or empowering nurses. The subscale of nursing foundations for quality care needs modification, and more studies in the Iranian setting are needed to confirm these findings.

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Conflicts of interest

There are no conflicts of interest.

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