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# The practice environment scale of the nursing work index short form in Turkish: a psychometric study

Furkan Cihat Arici<sup>1,2\*</sup>, Güzin Ayan<sup>3</sup> and Arzu Kader Harmancı Seren<sup>4</sup>

## Abstract

**Background** The work environment is a concept encompassing factors that increase or decrease a nurse's ability to practice the nursing profession competently and provide high-quality care. This study aims to adapt the short form of the Nursing Work Index-Nursing Work Environment Assessment Scale, which is used in many countries to evaluate the nursing work environment, to Turkish.

**Methods** The study sample consisted of 711 nurses. For this study, data were collected from the researchers' personal social media accounts (WhatsApp, LinkedIn, and Instagram) between October and December of 2024. The Turkish version of the short form of the Practice Environment Scale from the Nursing Work Environment Index was used to collect the data. After creating the Turkish version of the instrument through translation and back-translation and collecting data, the researchers conducted content validity analyses, construct validity tests, and internal consistency analyses to assess the instrument's psychometric properties.

**Results** The items' content validity ratios were 0.93, and correlation coefficients varied between 0.605 and 0.523. The one structure accounted for 56.122% of the total variance. PES-5 scale findings:  $\chi^2/df$  3.76, CFI 0.973, TLI 0.946, SRMR 0.031, RMSEA 0.090, CR 0.62. The standardized factor loadings for the scale items ranged from 0.610 to 0.743. The scale was compatible with its five items and one-factor structure. The items' standardized factor loadings ranged from 0.370 to 0.575. The Cronbach's alpha consistency value was 0.804.

**Conclusion** A short form of the practice environment scale of the Nursing Work Index is a valid and reliable tool in Turkish.

**Keywords** Psychometrics, Nurse work environment, Nursing work index, PES-5, Nursing, Nursing management

\*Correspondence:

Furkan Cihat Arici  
aricifurkancihat@gmail.com

<sup>1</sup>Istanbul Okan University Graduate School, Istanbul, Türkiye

<sup>2</sup>American Hospital, Nursing Management Department, Istanbul, Türkiye

<sup>3</sup>Kütahya Health Sciences University, Kütahya, Türkiye

<sup>4</sup>Fenerbahçe Üniversitesi, Istanbul, Türkiye



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## Introduction

The International Council of Nursing (ICN) reports that the pandemic has exacerbated the nursing workforce crisis, which existed even before the COVID-19 outbreak. The report emphasizes the need for strategic planning to stabilize and develop the nursing workforce, underscoring that the healthcare system is at risk of collapse without nurses. It also highlights that a critical component of such a plan is to provide a safe and supportive work environment for nurses [1].

The work environment encompasses factors that either enhance or inhibit a nurse's ability to practice the nursing profession competently and provide high-quality care [2]. A healthy work environment requires the working setting to value and respect nurses' professional expertise [3]. ICN's 2025 report extends this definition beyond physical safety, stating that a healthy work environment must support healthcare professionals' physical, mental, and well-being [4]. Wei et al. (2018) state that establishing and maintaining a healthy work environment has improved nurse retention [5].

The first studies on the nursing work environment were conducted in 1982 [6]. Subsequent studies have examined a range of topics, including the work environment, burnout [7, 8], intention to leave [8, 9], job performance [10], job satisfaction [8, 11–13], self-efficacy, and achievement motivation [14]. Furthermore, researchers have conducted numerous studies to establish a correlation between the work environment and patient outcomes. In addition, it affects the well-being of patients and clinicians [15, 16].

Various scales assess the nursing work environment [17, 18]. However, the Practice Environment Scale of the Nursing Work Index developed in 2002 [2] has been widely used in research and management due to its strong evidence base, strong structural validity [19], and applicability across diverse work settings [3]. This scale, translated into 24 languages and used in 35 countries [20], consists of 31 items across five subscales: Nurse Participation in Hospital Affairs; Nursing Foundations of Quality Care; Nurse Manager Ability, Leadership, and Support; Staffing and Resource Adequacy; and Collegial Nurse-Physician Relationships [2]. The Turkish version of the scale was validated in 2011 by Türkmen et al., indicating that higher PES-NWI scores are associated with more positive perceptions of the nursing work environment [21].

Each item within the short-form PES-5 serves as a parsimonious representative of the original subscales from the long version, ensuring comprehensive thematic coverage within a unidimensional framework. Specifically, Item 1 represents the nurse's participation in hospital affairs domain, while Item 2 corresponds to Nursing foundations for quality of care. Item 3 encapsulates the

Nurse manager ability, leadership, and support dimension, Item 4 addresses Staffing and resource adequacy, and Item 5 reflects the Collegial nurse-physician relationships subscale. This structural alignment ensures that despite its abbreviated format, the instrument maintains high content validity by capturing the essential components of the broader nursing work environment construct [2, 3, 21].

In recent years, significant efforts have been made to simplify measurement scales to enhance their usability and efficiency [22]. Large-scale instruments often yield lower response rates, lower response quality, and longer data-collection processes [23, 24]. Lake (2024) conducted the psychometrics of a five-item short form of the PES-NWI to minimize respondent burden, maximize response rates, and facilitate routine work environment assessments. It concluded that it had strong psychometric properties [3].

In the contemporary context, as the nursing workforce crisis evolves into a global problem, evaluating the work environment becomes paramount [25]. Within the Turkish healthcare system, the nursing environment is marked by practical challenges including elevated workloads and the necessity for intensive nursing care [7, 10, 21, 26]. This predicament complicates the implementation of comprehensive assessments, such as the 31-item PES-NWI. A substantial body of research has demonstrated a clear correlation between the length of data collection instruments and the occurrence of response fatigue. As Polit and Back articulated in 2018, this phenomenon has the potential to impose an undue burden on participants, thereby compromising the integrity and reliability of the data [27]. In high-workload units, the PES-5 scale offers an optimized solution that minimizes data loss while maximizing participant compliance. The abridged version serves as a substitute to improve response rates while conserving study participants' time. This approach offers clinical managers a rapid screening mechanism within strategic decision-making processes. The PES-5 scale can be used as an alternative due to its time-saving and user-friendly features.

Since the literature review revealed no studies assessing the validity and reliability of this short form in Turkey, the study aimed to test the psychometric properties of a Turkish version of the Practice Environment Scale of The Nursing Work Index (PES-5). The psychometric study aims to test the validity and reliability of a Turkish short form of the Practice Environment Scale of the Nursing Work Index (PES-5). Two key research questions were whether the Turkish form of the PES-5 is valid (1) and reliable (2).

## Methods

### Procedure

The researchers conducted the scale adaptation process in accordance the International Test Commission guidelines (International Test Commission, 2017) and the Consensus-based Standards for the Selection of Health Measurement Instruments (COSMIN) framework [28].

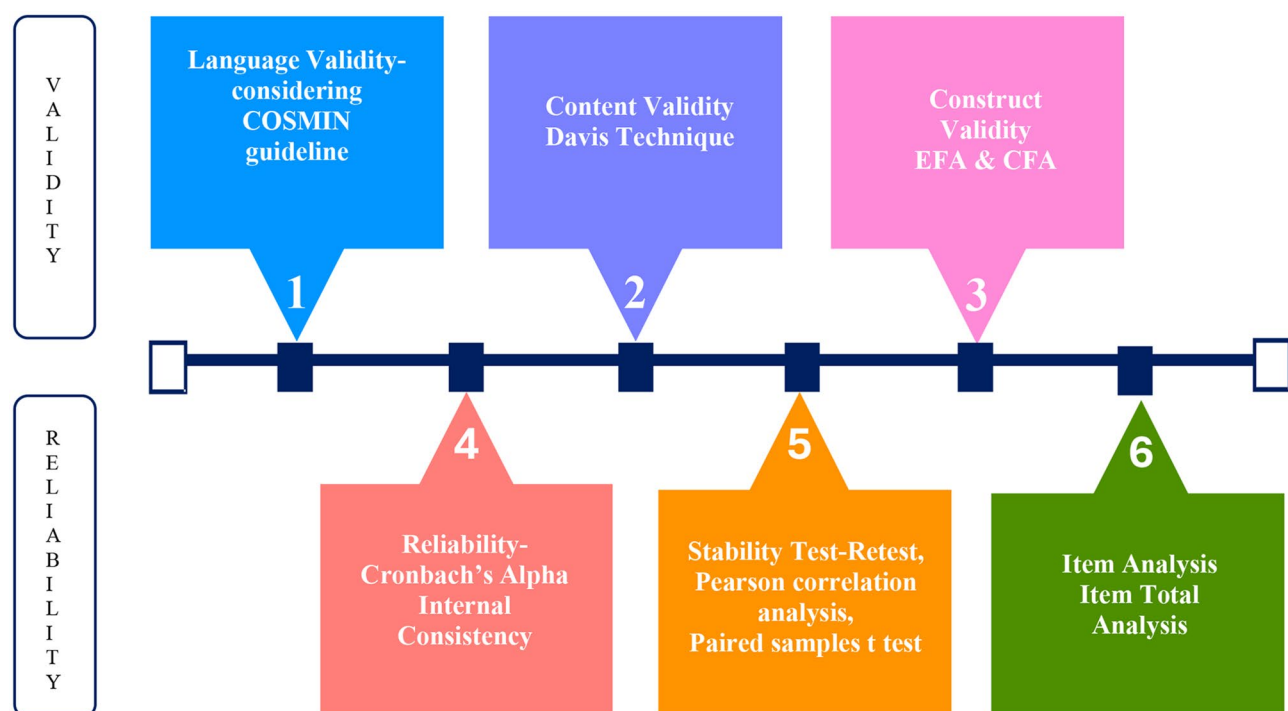
Firstly, the PES-5 scale, originally published in English, has been translated into Turkish by two translators who possess a high level of proficiency in both English and Turkish. Secondly, researchers meticulously reviewed the translations provided by the translation panel. This process entailed ensuring conceptual equivalence and selecting the most accurate and contextually appropriate expressions to create a single Turkish version of the scale. Thirdly, to ensure semantic equivalence, the final Turkish version was re-translated into English by two independent translators who were unaware of the original scale. The translated version was then compared with the original scale, and its near-identical nature confirmed the linguistic validity of the translation.

Fourthly, nine academics from diverse nursing disciplines, two frontline managers, and four middle manager specialist nurses provided expert opinions to assess the content validity of the items and the PES-5. They requested their opinions regarding the Turkish items and the entire form. A team of 15 experts assessed original and Turkish items and compared them, considering their meanings and grammatical structure. The submitted

form to the experts was evaluated using the Davis technique.

Subsequently, face validity was assessed to evaluate the instrument's readability and its perceived ability to measure the intended construct. A preliminary study was conducted using a convenience sample of 27 nurses. Each participant independently evaluated the scale items using a 4-point rating scale (1 = unclear/not understandable, 4 = very clear/understandable). The participants confirmed that the items were clear, understandable, and relevant to the nursing work environment, ensuring the scale's linguistic and conceptual accessibility. The results indicated that all items were assessed as clear and understandable (i.e., 3 or 4 points). Following a thorough review, it was determined that no modifications were required. Consequently, the adapted version was finalized for implementation in the primary study.

Finally, the construct validity of the PES-5 was assessed using an Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). Convergent validity was assessed by calculating the mean variance extracted (AVE) and composite reliability (CR) of the correlation matrix within the framework of confirmatory factor analysis (CFA). The instrument's stability over time was assessed through test-retest reliability. Furthermore, the scale's internal consistency was assessed using Cronbach's alpha and item-total correlations (Fig. 1).



**Fig. 1** Procedure of Validity and Reliability

### Setting and sample

The recommended sample size for psychometric scale adaptation studies varies considerably across the literature. While some researchers assert that a minimum of 300 participants is necessary [29], others argue that a sample size of 500–1000 is required to ensure robust psychometric evaluation [30]. However, they argue that maximizing sample size enhances the factor structure's stability and strengthens the generalizability of the findings [31, 32]. The researchers aimed to reach a minimum sample size of 600 participants, based on these arguments, to perform exploratory and Confirmatory factor analyses across different samples. Additionally, to ensure a comprehensive psychometric assessment, the study aimed to recruit 650–1000 participants, including at least 50 voluntary nurses for the test-retest procedure. Consequently, the final study sample consisted of 854 nurses recruited through convenience sampling and who voluntarily agreed to participate, excluding the test-retest sample.

Participant selection adhered to the following criteria: a minimum of six months of experience within their current institution (1), at least one year of professional nursing experience (2), and possession of a bachelor's degree in nursing (3). Study-related information was distributed electronically via researchers' social media channels, including WhatsApp, LinkedIn, and Instagram, to facilitate participant recruitment. Participation in the study was entirely voluntary. A total of 143 responses that did not meet the inclusion criteria or contained incomplete survey data were excluded, yielding a final dataset of 711 valid responses. Face validity was assessed with 27 nurses, and test-retest with 47 nurses, in addition to the study sample.

### Data collection and instruments

In this study, the PES-5 scale, which was previously examined for validity and reliability in Turkish [3]. As a result, permission was obtained from the owner of the PES-5 scale by email. Subsequently, the necessary approval from the Ethics Committee was obtained in accordance with the Helsinki Declaration. The study collected data online between October and December 2024. A Microsoft Forms survey was disseminated via all researchers' social media platforms, including WhatsApp, LinkedIn, and Instagram. The survey comprised the Personal Information Form and PES-5 items. Only those who confirmed the consent form could proceed with the survey. The participants were required to provide a valid email address.

### Personal information form

The researchers incorporated questions on participants' age, gender, education, department/unit, professional experience, institutional characteristics, and work

positions, alongside the PES-5 items, to assess their demographic and professional attributes.

### PES-5 scale

The PES-5 scale included five items and one factor. Responses are on a 4-point Likert scale: strongly disagree (1), disagree (2), agree (3), and strongly agree (4). The PES-5 total score ranges from 5 to 20. Cronbach's alpha internal consistency coefficient was 0.89, and higher scores indicate a better environment for nursing practice [3].

### Data analyses

The researchers analysed the data using the Statistical Package for Social Sciences (SPSS, version 29) and Jamovi. The Davis technique was initially employed to examine the content validity of the items and the tool. The researchers performed descriptive statistics (number, percentage, mean, standard deviation) and psychometric analyses (content validity ratio, item-total correlations, Kaiser-Meyer-Olkin, and Bartlett's test).

Despite the established unidimensionality nature of the PES-5, this study employed a random-splitting method for factor analysis to ensure the stability of the factor structure within the Turkish context. In accordance with established best practices for ensuring the generalizability and reproducibility of research outcomes, the split-sample approach is employed to avert potential issues of misfit issues in cross-cultural adaptations [33]. The final sample was randomly partitioned into two subsamples (subsamples 1 and 2) by employing the "random sample of cases" option in IBM SPSS Statistics version 29.0. This sequential exploratory-to-confirmatory strategy was adopted to empirically verify that the construct's indicators align with cultural nuances before proceeding to a more restrictive testing phase [34, 35].

Subsample 1, comprising 356 participants, was used for exploratory factor analysis (EFA). In the Exploratory Factor Analysis (EFA) phase, the Maximum Likelihood (ML) extraction method was employed. Best practices dictate selecting ML because it enables the computation of a wide range of goodness-of-fit indices and provides more generalizable results. Rotation strategies (such as Promax or Direct Oblimin) are typically used to simplify data structures, but no rotation was applied in this study. This decision was based on the scale's clear unidimensional structure, and rotation is mathematically redundant when only a single factor is present [34, 35]. Bartlett's test of sphericity and the Kaiser–Meyer–Olkin (KMO) statistic were used to determine the feasibility of conducting a factor analysis.

Confirmatory Factor Analysis (CFA) was performed using a second subsample ( $n = 355$ ) to validate the identified structure. Model fit was assessed using the following

indices and criteria: chi-square/degrees of freedom ratio ( $\chi^2/df < 5$ ), Comparative Fit Index (CFI > 0.90), Tucker-Lewis Index (TLI > 0.90), and Standardized Root Mean Square Residual (SRMR < 0.06) with 90% confidence interval (CI), and Root Mean Square Error Approach (RMSEA < 0.08) [36–38]. Factor loadings were expected to be 0.30 and above [35, 39]. The instrument's reliability was assessed using Cronbach's alpha coefficients, with values greater than 0.70 indicating excellent internal consistency [34]. Finally, they performed a test-retest (Pearson correlation and paired-samples t-test) to analyse the PES-5's stability with 47 participants beyond the research sample.

## Results

### Participants' characteristics

The participants' ages ranged between 22 and 62 (Mean = 31.14,  $SD = 7.15$ ). 87.1% were female, 12.9% were male, 80.7% were in undergraduate programs, and 19.3% were in graduate programs. Nurses' professional and institute mean experiences were 4.97 ( $SD = 5.27$ ) years and 8.78 ( $SD = 7.39$ ) years, respectively. 66.5% worked at private hospitals, and 33.5% worked at the public ones. They primarily worked directly in inpatient wards, 86.1%, and worked in positions 72.2% of staff, and 27.8% in manager or educator positions.

### Language validity

First, a professional translator translated the PES-5 Scale items for adaptation. Secondly, researchers evaluated the original and translated items, considering the

context. Thirdly, the nurse experts assessed the translated statements after two bilingual academicians (two PhD degreed nurses). Lastly, the items were back-translated, and the researchers concluded them after discussing them with the original work's owner and ensuring clarity.

### Content validity

An expert team of 11 individuals was assembled to evaluate the validity of the content and features of PES-5. They requested their opinions regarding the Turkish items and the entire form. Davis technique-based content validity ratios (CVRs) of the items were 0.93. The content validity index (CVI) of the PES-5 was 0.93 (Table 1).

### Correlation analysis

Table 2 presents the correlation values from the item-total score analysis, which included 5 items from the Turkish version of the PES-5. The investigation yielded evidence that the item-total score correlation coefficients ranged from  $r = 0.52$  to 0.63.

### Construct validity

Initially, they made the Kaiser-Meyer-Olkin (KMO) and Barlett's tests to assess sample adequacy. The KMO value was 0.811, and the results of Barlett's test were significant ( $p < 0.001$ ). The researchers then conducted exploratory and confirmatory factor analyses (CFAs) to assess construct validity. The one-factor structure accounted for 55.71% of the total variance. PES-5 scale findings:  $\chi^2/df$  3.76, CFI 0.973, TLI 0.946, SRMR 0.031, RMSEA 0.090. The standardized factor loadings for the scale items ranged from 0.610 to 0.743. The scale was compatible with its five-item, one-factor structure (Fig. 2; Table 2). The indices are also presented in Table 2.

We tested the construct validity of the variables in the measurement model by examining composite reliability (CR) and average variance extracted (AVE). As shown in Table 3, the results were: AVE 0.25, CR 0.62, and  $CR > AVE$ .

### Item total analysis

The internal consistency of the PES-5 was also supported using item-total correlation coefficients. In our study, these coefficients ranged from 0.523 to 0.631, well above the 0.30 threshold. These high correlations indicate that each item has strong discriminatory power and contributes significantly to the overall unidimensional structure. This strengthens the scale's reliability in the Turkish nursing context [39].

### Internal consistency

The short version's internal consistency coefficient  $\alpha$  was 0.802 (Table 4).

**Table 1** Content validity results

Experts	Item 1	Item 2	Item 3	Item 4	Item 5
E1	B	B	B	C	B
E2	C	A	C	A	C
E3	A	A	A	A	A
E4	A	A	A	A	B
E5	A	B	A	A	A
E6	A	C	B	A	A
E7	A	A	A	A	A
E8	A	A	A	A	A
E9	A	A	A	A	A
E10	B	B	A	A	B
E11	B	B	B	B	B
E12	A	A	A	A	A
E13	A	A	A	A	A
E14	A	B	A	B	A
E15	A	A	A	A	A
A+B	14	14	14	14	14
CVR*	0.93	0.93	0.93	0.93	0.93
CVI**	0.93				

Note: "A= Very clear-relevant"; "B= Clear but needs minor revision"; "C= Clear but needs revision"; "D= Not clear-relevant." CVR\* = Content Validity Ratio of each item; CVI\*\* = Content Validity Index of the scale with five items

**Table 2** Construct validity analysis' results

Items	PES-5	CVRs*	Item total point correlation Coefficients	Exploratory Factor Analysis Factor loadings for Factor I	Confirmatory Factor Analysis Confirmatory Factor Analysis Estimate values for Factor I
				<i>n</i> = 711	<i>n</i> = 356
1	Administration that listens and responds to nurse concerns	0.93	0.605	0.688	0.537
2	A clear philosophy of nursing that pervades the patient care environment	0.93	0.602	0.676	0.516
3	A supervisor who is a good manager and leader	0.93	0.631	0.743	0.575
4	Enough staff to get work done	0.93	0.523	0.610	0.370
5	Good teamwork between nurses and physicians	0.93	0.569	0.620	0.478

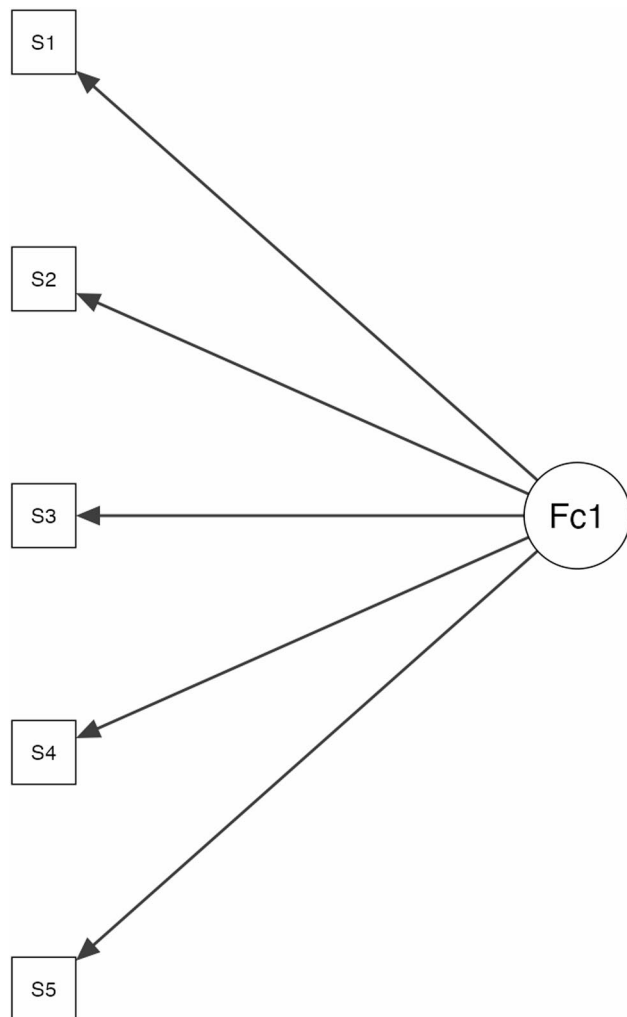
**Exploratory Factor Analysis Test - Total Variance Explained**

Factors 1	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
	2.806	56.122	56.122	2.272	45.449	45.449

**Confirmatory Factor Analysis Results and Fit Indices**

Chi square	Degree of freedom	Chi square / Degree of freedom	CFI	TLI	SRMR	RMSEA
18.8	5	3.76	0.973	0.946	0.031	0.090

\*CVRs = Content Validity Ratios



**Fig. 2** Path Diagram. \*Fc1 = Factor

**Table 3** CR and AVE values of the PES-5

Items	PES-5	AVE	CR
1	Administration that listens and responds to nurse concerns	0.25	0.62
2	A clear philosophy of nursing that pervades the patient care environment		
3	A supervisor who is a good manager and leader		
4	Enough staff to get work done		
5	Good teamwork between nurses and physicians		

**Test-Retest reliability analysis**

A test-retest test was applied to a group of 47 nurses. There were two weeks between the first and second tests. No statistically significant difference was observed in the participants' mean scores across the two applications ( $t = 0.466, p = 0.643$ ). Moreover, statistically significant, substantial, and positive correlations occurred between the first and second measurements ( $r = 0.813, p < 0.001$ ).

**Discussion**

The nursing work environment is critical to supporting high-quality, safe patient care and positively impacting the patient and nurse experience. A positive nursing work environment can increase patient satisfaction, improve patient outcomes, reduce mortality, decrease nurse burnout, decrease turnover intentions, and increase job satisfaction [16]. Therefore, researchers conducted psychometric testing of the PES-5, a short version of the Nursing Work Environment Scale for nurses.

The experts evaluated the items by comparing their meanings in the original work and in the Turkish translation [40, 41]. They recommended minor revisions to clarify the meanings of the items in Turkish.

**Table 4** Participants' scale scores and internal consistency analysis results

PES-5 Scale	Minimum	Maximum	Mean	Standard Deviation	Cronbach's alpha value	
Total score	5	20	13.64	2.76	0.804	
Domains and Scale	Mean (SD) Test	Mean (SD) Re-test	Correlation Analysis		Paired sample t test	
			r	p	t	p
Total Score	13.66 (2.56)	13.55 (2.54)	0.813	< 0.001	0.466	0.643

Davis' technique, developed by a nurse researcher had developed, was utilized for content validity analysis [42]. They mainly rated the translated items as "quite appropriate." The content validity ratios of the questionnaire items exhibited a value of 0.93, which is an acceptable (> 0.80) value in the literature [42]. The study found that the scale's content validity was high and that its items were well aligned with the conceptual framework. The PES-5 in Turkihs was meticulously reviewed to ensure its comprehensibility and validity, with particular attention devoted to its appearance and content validity. The required sample size for face validity ranges from 10 to 30 [43]. The study's adequate sample size ensures face validity.

While construct validity in scale adaptation studies is conventionally assessed through Confirmatory Factor Analysis (CFA) [32], this study initially employed Exploratory Factor Analysis (EFA). Given that the PES-5 represents a condensed version of the original PES and its structural composition may differ within the local context, EFA was conducted in accordance with the recommendations of the academic responsible for the Turkish adaptation and validation of the long-form scale [40, 44]. This methodological approach evaluated the scale's dimensionality within the Turkish setting.

The suitability of the data for EFA analysis was rigorously assessed. The KMO measure of sampling adequacy was 0.811, which exceeds the recommended threshold of 0.70 [45]. Furthermore, Bartlett's test of sphericity reached statistical significance ( $p < 0.001$ ), thereby confirming that the correlation matrix was not an identity matrix and was appropriate for factor extraction. The subsequent EFA confirmed a robust unidimensional structure for the PES-5, with factor loadings ranging from 0.610 to 0.743. These loadings significantly exceed the commonly accepted threshold of 0.40 [46], demonstrating a strong empirical relationship between the items and the underlying construct. Crucially, each of the five items successfully represents one of the original PES-NWI dimensions: Nurse participation in hospital affairs, Nursing foundations for quality of care, Nurse manager ability, leadership, and support, Staffing and resource adequacy, and Collegial nurse-physician relationships. This structural alignment indicates that the PES-5 achieves high structural parsimony while effectively preserving the

multidimensional essence of the original scale, providing compelling evidence for its validity in the Turkish nursing context.

Following EFA, the Turkish short-form version retained the fundamental properties of the English original, thereby confirming its structural coherence and unidimensionality. Subsequently, CFA was performed to assess the model's fit. The results indicated that  $X^2/df$  (< 5), SRMR, and CFI (> 0.90) all met the established fit criteria [36–38]. The RMSEA was calculated as 0.090. The RMSEA point estimate is slightly above the 0.08 threshold, but it's still within the acceptable range for models with low degrees of freedom, which is common in short, 5-item scales [39].

The PES-5 demonstrated convergent validity with an AVE of 0.25 and a CR of 0.62. While these values are below the strict threshold of 0.50, the literature suggests that convergent validity is supported when the CR exceeds 0.60 even with a lower AVE [47]. As Flora and Flake (2016) noted, psychometric indices in brief, unidimensional scales can be sensitive. These results indicate that, although the items capture a broad spectrum of the nursing environment, the scale maintains acceptable internal consistency and structural integrity [39].

The results clearly indicate that the structural model is stable. The items represent distinct and diverse aspects of the nursing environment. This leads to higher unique variance rather than excessive redundancy. These findings supported the PES-5's acceptable model fit [36–38].

Given its widespread use, Cronbach's  $\alpha$  was employed to assess the reliability of the Turkish PES-5 [48]. DeVellis (2022) reported that the minimum acceptable  $\alpha$  coefficient value is 0.70 for social sciences research [34]. The Cronbach's alpha values for the scale in the Turkish version of the scale were notably high, indicating high reliability. Moreover, the  $\alpha$  coefficients for the Turkish version were higher than those of the Greek version's [49].

Psychometry literature recommended a test-retest reliability analysis to demonstrate the scale's stability over time. Accordingly, measurements obtained from the same group at least two weeks apart can be evaluated using a t-test and/or a Pearson correlation analysis in paired groups [50]. The stability of the PES-5 Turkish version was evaluated using the test-retest method.

The scale was administered twice to a sample of 47 voluntary nurses, with an interval of 2 weeks between administrations.

The mean scores obtained from the initial and subsequent administrations exhibited no significant differences. Furthermore, the correlation between the two applications' scores exceeded the acceptable threshold (0.70 and above), as defined previously by Streiner et al. [51]. These findings indicate that the scale's scores remained stable, supporting the questionnaire's reliability.

### Limitations

The convenience sampling method was the first limitation. Secondly, the present study employed convenience sampling via social media platforms, which may lead to selection bias. It is plausible that nurses who are active online systematically differ from those who are not, potentially limiting the representativeness of the sample. The third limitation of this study concerns the AVE and CR values falling slightly below conventional thresholds, reflecting a strategic trade-off between statistical parsimony and the preservation of thematically indispensable items. These items were deliberately retained to ensure validity and to capture the critical clinical realities of the nursing work environment that purely statistical refinements might have overlooked. In addition, the RMSEA and factor loadings demonstrate acceptable fit, but these results must be interpreted with caution. Fit indices in brief unidimensional models can be sensitive to low degrees of freedom. Furthermore, self-report surveys as the data collection method may introduce response bias, as participants' responses could be influenced by social desirability or recall limitations.

### Conclusion and implications

The researchers conducted a translation and back-translation process for the questionnaire, and the items' content validity ratios and the questionnaire's content validity index exceeded the required thresholds. The tests confirmed the construct validity of the measurement model, and the questionnaire demonstrated high internal consistency. Therefore, the study concluded that the Turkish PES-5 is valid and reliable for assessing nurses' perceptions of their work environment. The psychometric properties of the questionnaire demonstrate its effectiveness in evaluating nurses' perceptions of their work environment. Consequently, healthcare and nurse managers can efficiently assess nurses' perceptions and develop targeted programs to enhance the work environment. In addition, researchers studying this topic may find the PES-5 questionnaire helpful for evaluating the work environment from nurses' perspectives.

### Abbreviations

CFA	Confirmatory Factor Analysis
EFA	Exploratory Factor Analysis
CVR	Content Validity Ratio
CVI	Content Validity Index
CFI	Comparative Fit Index
TLI	Tucker-Lewis Index
SRMR	Standardized Root Mean Square
SD	Standard Deviation
RMSEA	Root Mean Square Error of Approximation
CR	Composite Reliability
AVE	Average Variance Extracted
ML	Maximum Likelihood
DI	Discrimination index

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### Author contributions

Conceptualization: FCA, GA, AKHS; Methodology: FCA, AKHS, GA; Validation: FCA, GA, AKHS; Investigation & Resources: FCA, GA; Writing: FCA, GA, AKHS; Original Draft & Project administration: FCA, GA, AKHS; Review & Editing: GA, AKHS; Visualization: FCA Supervision: AKHS.

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### Data availability

Data are available upon reasonable request from the first author.

### Declarations

#### Ethics approval and consent to participate

This study was approved by the Koç University Social Sciences Research Ethics Committee (October 10, 2024, 2024.316.IRB3.125). Additionally, the voluntary nurses enrolled in the study provided both verbal and written informed consent. The study was conducted according to the Declaration of Helsinki.

#### Consent for publication

Not applicable.

#### Competing interests

The authors declare no competing interests.

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