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# Study of adaptation and validation of the Practice Environment Scale of the Nursing Work Index for the Portuguese reality

ESTUDO DE ADAPTAÇÃO E VALIDAÇÃO DA ESCALA AMBIENTE DE TRABALHO DA PRÁTICA DE ENFERMAGEM PARA A REALIDADE PORTUGUESA

ESTUDIO DE ADAPTACIÓN Y VALIDACIÓN DE LA ESCALA DEL AMBIENTE DE TRABAJO DE LA PRÁCTICA DE ENFERMERÍA PARA LA REALIDAD PORTUGUESA

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## ABSTRACT

**Objective:** Testing the psychometric properties of the Portuguese version of the *Practice Environment Scale of the Nursing Work Index*. **Method:** A descriptive, analytical and cross-sectional study, for the cross-cultural adaptation and validation of the psychometric properties of the scale. The study participants were 236 nurses from two hospitals in the regions of Lisbon and Vale do Tejo. **Results:** The 0.92 Cronbach's alpha was obtained for overall reliability and support of a five-dimension structure. **Conclusion:** The excellent quality of adjustment of analysis confirms the validity of the adapted version to hospital care settings, although there was no total coincidence of items in the five dimensions

## DESCRIPTORS

Working environment  
Nursing care  
Nursing staff  
Leadership  
Validation studies  
Reproducibility of results

## RESUMO

**Objetivo:** Testar as propriedades psicométricas da versão em português da escala *Practice Environment Scale of the Nursing Work Index*. **Método:** Estudo descritivo, analítico e transversal para a adaptação transcultural e validação das propriedades psicométricas da escala. Participaram 236 enfermeiros de dois Centros Hospitalares das regiões de Lisboa e Vale do Tejo. **Resultados:** Obteve-se um alfa de Cronbach de .92 para a confiabilidade geral e a sustentação de uma estrutura em cinco dimensões. **Conclusão:** A excelente qualidade de ajuste da análise corrobora a validade da versão adaptada em contextos de cuidados hospitalares, apesar da não coincidência total dos itens nas cinco dimensões.

## DESCRITORES

Ambiente de trabalho  
Cuidados de enfermagem  
Recursos humanos de enfermagem  
Liderança  
Estudos de validação  
Reprodutibilidade dos testes

## RESUMEN

**Objetivo:** Validar las propiedades psicométricas de la versión en portugués de la escala *Practice Environment Scale of the Nursing Work Index*. **Método:** Estudio descriptivo, analítico, transversal de la adaptación cultural y validación de las propiedades psicométricas de la escala. Participaron 236 enfermeros de dos centros hospitalarios de la regiones de Lisboa y Vale do Tejo. **Resultados:** Se obtuvo un alfa de Cronbach de 0.92 para la confiabilidad general, y la sustentación de una estructura en cinco dimensiones. **Conclusión:** La excelente calidad del ajuste del análisis corrobora la validez de la versión adaptada a los contextos de atención hospitalarios, aunque no existe una coincidencia plena de los ítems en las cinco dimensiones.

## DESCRIPTORES

Ambiente de trabajo  
Atención de enfermería  
Personal de enfermería  
Liderazgo  
Estudios de validación  
Reproducibilidad de resultados

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## INTRODUCTION

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Several theoretical frameworks have been used to explain or predict the relations between the work environment, the nursing care and the outcomes. It is important to know the relationships between the characteristics of the working environment of nursing practice, the nursing care and its consequences. It is believed that the factors of the work environment can influence nursing care. It is known that the quality of care is inherent to factors of Structure, Process and Outcomes.

The effectiveness model of the nursing role<sup>(1)</sup> emphasizes, values and characterizes the aforementioned dimensions. The Structure includes organizational factors that allow the development of work; the Process is reflected by the performance and development of activities inherent to provision of care, and the Outcomes express the effect of care, such as the level of health and satisfaction of standards and expectations. In practice, the Structure integrates the factors relative to the client, nurses and the organization. The Process integrates autonomous interventions, those resulting from medical prescriptions and interdependent such as team communication, case management and care coordination. The Outcomes consider the functional status, self-care, symptom control, side effects, customer satisfaction, among others.

The context of this study lies in aspects of the Structure. A systematic literature review of the past 12 years found that one of the most used tools to assess *nursing-sensitive outcomes* is the Practice Environment Scale of Nursing Work Index - PESNWI. The scale was proposed based on the Nursing Work Index (NWI), and initially was composed of 49 items with the purpose of measuring the presence of organizational attributes in the work environment of nurses<sup>(2)</sup>.

In 1981, the American Academy of Nursing has developed a nationwide study to identify and assess the *Magnet Hospitals*, thus called by attracting and retaining nurses<sup>(3)</sup>. These hospitals had a set of organizational characteristics, namely: decentralized decision making; effective, participatory and visible management and leadership; professional recognition and autonomy, *accountability*, responsibility for quality of care to clients, adequate staff and flexible hours. The results showed that these features were related to job satisfaction and quality of care.

The PESNWI was constructed based on the characteristics of the *Magnet Hospitals*, the Nursing Work Index and the results of using this index to measure organizational attributes of hospitals<sup>(2)</sup>. It is the favorite instrument for measuring organizational characteristics of the work environment of nurses<sup>(4)</sup> and the most widely used internationally<sup>(5)</sup>.

The concept of work environment in nursing practice is complex and defined as the characteristics of the work

context that facilitate or inhibit the professional nursing practice<sup>(6)</sup>. With the PESNWI, the authors tried to obtain appropriate measures for research models of result, which associated the environment of nursing practice with nurses and results on clients.

The guide called *National Quality Forum Endorsed Nursing-Sensitive Care Performance Measures* from 2009<sup>(7)</sup>, implemented by the *Joint Commission*, lists the PESNWI as one of the 12 measures for evaluating performance of the sensitive care in nursing. These measures are intended to analyze the factors of structure, process and outcomes of care that allow assessing the quality of care. They also start from the premise that nurses play a critical role in the care of hospitalized patients, and allow quantifying the effect that nurses and their interventions have on processes of quality of care in the evolution of the clients, being essential to support evidence-based human resource plans, understand the impact of the shortage of nurses, and optimize care outcomes. Consequently, the data collection for these measures will strengthen the available evidence and the understanding of the relationship between the structure factors, features and customer service processes, and the outcomes in the organization. Throughout time, the use of standardized specifications for these measurements will provide the basis for future comparisons between organizations and inside them.

Research has shown that the working environment factors in nursing care practice influence the evolution of the health status of clients, particularly in medical and surgical services<sup>(8)</sup>. A favorable working environment increases the interception of medication errors in intensive care<sup>(9)</sup>. The relationship between a positive working environment and the satisfaction and retention of nurses was also demonstrated<sup>(10-11)</sup>, as well as the safety of clients<sup>(12-13)</sup>. In contrast, when the work environment is not favorable, the lack of satisfaction of nurses, the burnout syndrome, emotional exhaustion and intention to leave the place of work/service are observed<sup>(14-19)</sup>. It was demonstrated that there is a relationship between the work environment and the results observed on clients, such as mortality<sup>(14)</sup>, falls, medication errors and other adverse events<sup>(8)</sup>. There is convincing evidence that an adequate practice environment is a good predictor of quality care<sup>(14,16-17,20-21)</sup>

The PESNWI evaluates the perception of the presence of a set of organizational characteristics in the hospital environment that support the professional nursing practice. This study aims to test the psychometric properties of the version in Portuguese.

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## METHOD

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This is a descriptive, analytical, cross-sectional study for cross-cultural adaptation and validation of the psychometric properties of an instrument. The study participants were 236 nurses of the acute care service of two Hospi-

tals in the regions of Lisboa and Vale do Tejo: the Centro Hospitalar de Lisboa Ocidental and the Centro Hospitalar Médio Tejo.

### **Instrument**

The PESNWI has been extensively used in different studies and contexts. It has been adapted and validated in several countries such as China, New Zealand, Spain, Australia, Switzerland, Belgium, England, Finland, Sweden, Ireland, Holland and Norway. However, a validated version for nursing care in Portugal is unknown.

The instrument consists of 31 items distributed over five subscales, including: (i) Nurse participation in hospital affairs; (ii) Nursing Foundation for Quality of Care; (iii) Management and leadership of the head/executive nurse; (iv) Adequacy of human resources for quality care; and (v) Collegial relations between nurses and physicians. The first two subscales reflect the environment around the hospital, and the remaining three refer to more specific aspects. The answers are distributed in a Likert scale of 4 points (strongly agree, agree, disagree, and strongly disagree) aimed at evaluating the perception of organizational characteristics present in nursing practice. Its psychometric properties were established by homogeneity (internal consistency and intraclass correlation) and construct validity (factor analysis). The five factors explained 48% of variance, and the coefficients of internal consistency of the subscales ranged between 0.71 and 0.84, with a Cronbach's alpha ( $\alpha$ ) (total) between 0.82 and 0.94.

### **Procedures**

After the authors' authorization, the method of translation-back translation by two independent experts was used in the process of cultural adaptation and validation of the PESNWI for the Portuguese population. After checking the semantic equivalence of each item of the scale, there was a pre-test, in which the nurses first answered the questionnaire, and then were interviewed to evaluate whether they had understood the meaning of the questions and properly answered them.

After approval of the Board of Administration of the Hospitals of Lisboa Ocidental and Médio Tejo, and the informed consent of the key informants (nurses) for carrying out the study, came the period of data collection. The program SPSS version 19 was used for data analysis.

## **RESULTS**

The study participants were 236 nurses, mostly females (84.7%), aged 34 years on average ( $SD=7.52$ ), ranging between 22 and 57 years. The vast majority has a licenciante's degree (91.2%), a master's degree (5.9%) or a bachelor's degree (2.5%). An only nurse (0.4%) has

a PhD. The nurses work at the Centro Hospitalar Lisboa Ocidental (38.6%) and at the Centro Hospitalar Médio Tejo (61.4%).

Regarding the professional category, according to the Decree-Law number 437/91 from 8<sup>th</sup> November<sup>(22)</sup>, and the job position, the majority are nurses (69.3%) and licensed nurses (25.6%). Unit coordinators correspond to 3.8% of these professionals. Considering the totality of the sample, 87.7% work in care provision and 5.5% work as team leaders. All chiefs of service are in the category of head nurse. Among the 3.4% of specialist nurses, 2.1% work in care provision.

Regarding the work method in nursing, the majority (98.3%) uses a method focused on the centrality of customer care (reference nurse), and only 1.7% uses the functional method.

### **Fidelity and construct validity**

There were some steps prior to the factor analysis of items. The multicollinearity of the scale was assessed by the Bartlett's test of sphericity ( $BTS=3688.03$ ;  $p<0.000$ ), with extracted communalities above 0.40. The Kaiser-Meyer-Olkin test ( $KMO=0.888$ ) was used to analyze the adequacy of the factor structure of the sample, indicating that the extracted component explains a significant amount of variance of the results. Then, was performed a principal components analysis (PCA) with varimax rotation. From the analysis emerged seven components that explained 63.83% of total variance, with values of explanation of each component between 3.7% and 31.7%.

Since the result obtained by the authors identified five components in the original scale, knowing that the solutions with values above one (1) tend to overestimate the number of extracted factors, and combining the result of extraction with the scree plot (another criteria to meet in the PCA), the choice was analyzing the scale forcing the extraction of five components. The results obtained by varimax rotation indicated that this solution explains 56.1% of the total variance obtained, with values of explanation of each component between 4.2% and 31.7%.

With the extraction of five factors, two variables showed low communality (0.279 and 0.317), with one of them saturating all factors with near and weak values (0.2 and 0.3), the reason for its withdrawal. By performing a new PCA (28 items) to the aforementioned procedures, the following were obtained:  $KMO=0.891$ ;  $BTS=3480.16$  ( $p<0.000$ ); extracted communalities above 0.33. The rotation converged in six interactions (varimax).

The intraclass correlation coefficient (ICC) was also calculated, and it should exceed 0.60 to justify aggregation. Only one item of the dimension of Fundamentals of Nursing based on quality of care has value lower than 0.60 (0.54).

Chart 1 presents the final factor solution with the distribution of items in five factors, corresponding to each dimension, and the percentage of explained variance. The total variance of this factor solution explains 59.53% and has  $\alpha=0.92$ .

- Factor i – Management and leadership of the head nurse. This dimension values the management and leadership of head nurses and executive nurses.
- Factor ii – Adequate human resources to ensure the quality of care. This dimension provides support for nurses in their roles of training and sharing with colleagues, developing skills and promoting autonomy.
- Factor iii – Nurse-physician relationship. This relationship is more commonly known as ‘collegiate’ because this reflects its collaborative nature and implies the autonomy of nursing and its status in the organization<sup>(23)</sup>.
- Factor iv – Nurse participation in hospital affairs. This dimension coincides with the original scale and values career progression as well as personal and social aspects of nurses as employees of the organization.
- Factor v – Nursing foundation for quality of care. This dimension values the philosophy of quality of care and an expectation of a high standard service, based on a Model of Nursing in the provision of care<sup>(5)</sup>.

**Chart 1** – Structure of factor analysis with principal components extraction

<b>Factor i – Management and leadership of head nurse</b>					
Head nurse supports the nursing team (0.57)*	.85				
Head nurse is a good manager and leader (0.67)*	.81				
Head nurse supports the team in decision making (0.61)*	.81				
Nursing supervisors use errors as learning opportunities (0.60)*	.69				
Head nurse consults nurses in relation to problems and daily procedures (0.47)	.64				
Time and opportunities to discuss customer care with other nurses (0.47)	.48				
<b>Factor ii – Adequate human resources to ensure the quality of care</b>					
Enough nurses ensure the quality of care (0.71)*		.75			
Enough nurses carry out the work (0.73)*		.74			
Active development of staff (0.40)*		.63			
Nurses involved in the internal management of the hospital (0.55)		.62			
Merit and acknowledgement of the work well done (0.55)		.51			
Quality assurance program (0.48)		.47			
<b>Factor iii – Nurse-physician relationship</b>					
Lots of work between physicians and nurses (0.65)*			.72		
Group work between nurses and physicians (0.53)*			.68		
Physicians and nurses have good working relationship (0.55)*			.66		
Nurse director has power and authority as an executive (0.41)			.56		
Programs of embracement for newly hired nurses (0.47)			.45		
Nurse director is accessible and visible to employees (0.48)			.49		
<b>Factor iv – Nurse participation in hospital affairs</b>					
Opportunity of career growth (0.47)*				.87	
Opportunity of progression (0.51)*				.83	
Opportunity of nurses to participate in political decisions (0.52)*				.78	
Management listens and responds to the concerns of workers (0.51)*				.57	
<b>Factor v – Nursing foundation for quality of care</b>					
Written and updated plan of care for all clients (0.44)*					.79
Use of nursing diagnosis (0.49)*					.76
Care management promotes continuity of care (0.45)*					.72
Works with competent nurses (0.40)*					.44
Nursing care are based on a nursing model (0.45)*					.48
Opportunity of nurses to participate in committees and departments (0.42)*					.40
<b>% Explained variance (total=59.53)</b>	<b>33.24</b>	<b>9.73</b>	<b>7.04</b>	<b>4.91</b>	<b>4.61</b>
<b><math>\alpha</math> (total = 0.92)</b>	<b>.89</b>	<b>.85</b>	<b>.78</b>	<b>.85</b>	<b>.71</b>

\* Items coinciding in the factor, as in the original scale (values of the original scale are in parentheses).

Chart 2 presents the analysis of internal consistency and homogeneity of the PESNWI items. Thus, the means and standard deviations are showed together with the

coefficients of correlation between the item and the total scale (*r*-itc – Corrected Item Total Correlation) and finally, the alpha coefficient for the subscale.

**Chart 2** – Analysis of internal consistency and homogeneity of the scale items

Items	Mean	SD	r itc	$\alpha$ *
Physicians and nurses have good working relationship	3.0	0.62	0.53	0.92
Head nurse supports the nursing team	3.3	0.73	0.56	0.92
Active development of staff	3.0	0.69	0.49	0.92
Opportunity of career growth	1.7	0.97	0.46	0.92
Opportunity of nurses to participate in political decisions	1.8	0.92	0.54	0.92
Nursing supervisors use errors as learning opportunities	2.8	0.83	0.68	0.92
Time and opportunities to discuss customer care with other nurses	2.7	0.80	0.70	0.92
Enough nurses ensure the quality of care	2.2	0.87	0.61	0.92
Head nurse is a good manager and leader	3.1	0.77	0.66	0.92
Nurse director is accessible and visible to employees	2.5	0.97	0.59	0.92
Enough nurses carry out the work	2.2	0.83	0.59	0.92
Merit and acknowledgement of the well done work	2.4	0.84	0.75	0.91
Nurse director has power and authority as an executive	2.6	0.82	0.47	0.92
Lots of work between physicians and nurses	2.6	0.75	0.58	0.92
Opportunity of progression	1.7	0.83	0.53	0.92
Works with competent nurses	3.4	0.51	0.27	0.92
Head nurse supports the team in decision making	3.0	0.79	0.53	0.92
Management listens and responds to the concerns of workers	2.0	0.75	0.50	0.92
Quality assurance program	2.5	0.74	0.59	0.92
Nurses involved in the internal management of the hospital	2.0	0.77	0.55	0.92
Group work between nurses and physicians	2.7	0.73	0.58	0.92
Programs of embracement for newly hired nurses	2.7	0.82	0.50	0.92
Nursing care are based on a nursing model	3.2	0.66	0.45	0.92
Opportunity of nurses to participate in committees and departments	2.8	0.76	0.45	0.92
Head nurse consults nurses in relation to problems and daily procedures	3.1	0.65	0.60	0.92
Written and updated plan of care for all clients	3.4	0.62	0.28	0.92
Care management promotes continuity of care	3.2	0.72	0.21	0.92
Use of nursing diagnosis	3.5	0.57	0.22	0.92

Caption: \* if item deleted

Following the analysis of fidelity and validity of the construct, was calculated an index for each of the components obtained, where 2.5 is considered neutral (1-4 range), as performed by its authors. Then, an average for each of the components per Hospital was calculated, finding the highest averages for the dimensions of management and leadership of head nurses,

nurse-physician relationship, and adequacy of human resources for quality of care in the Centro Hospitalar de Lisboa Ocidental. The dimension of nursing foundation for quality of care had the highest averages in the Centro Hospitalar Médio Tejo. The dimension of participation of nurses in the affairs of the hospital had the same mean value in both contexts (Chart 3).

**Chart 3** – Descriptive statistics of the subscales by hospital context

Subscales	N	Minimum	Maximum	Mean	SD
Management and leadership MT	144	1.00	4.00	2.89	0.61
Management and leadership LO	91	1.17	4.00	3.17	0.60
Nurse-physician relationship MT	145	1.17	4.00	2.54	0.56
Nurse-physician relationship LO	90	1.83	3.83	2.92	0.42
Participates in hospital affairs MT	144	1.00	4.00	1.80	0.74
Participates in hospital affairs LO	90	1.00	3.75	1.80	0.72
Adequate human resources MT	145	1.00	4.00	2.35	0.61
Adequate human resources LO	91	1.00	3.83	2.41	0.57
Nursing foundation for quality MT	145	2.33	4.00	3.26	0.41
Nursing foundation for quality LO	90	2.17	4.00	3.21	0.42

Caption: MT – Centro Hospitalar Médio Tejo; LO – Centro Hospitalar Lisboa Ocidental.



### Sensitivity and convergent validity

Data indicate that, on average, nurses have a clearly positive perception of the role of head nurses as managers and leaders and they value the quality of care. However, they have a negative perception of the nurse-physician relationship (Chart 4).

Chart 4 – Estatística descritiva das dimensões.

Dimensions	Minimum	Maximum	Mean	SD
Management and leadership of head nurse	1	4	3.00	.62
Adequate human resources	1.17	4	2.69	.54
Nurse-physician relationship	1	4	1.80	.72
Nurse participation in hospital affairs	1	4	2.37	.59
Nursing foundation for quality of care	2.17	4	3.24	.41
Total scale	1.57	4	2.68	.43

Regarding the other dimensions, they are at the threshold of the neutral point, with a more positive perception of the adequacy of human resources to ensure quality of care, and a more negative perception of the nurse participation in hospital affairs (Chart 4).

Given the averages found, and the averages of dimensions per hospital setting, a t-test of two independent samples was done in order to check any statistical differences. There were significant differences between groups for the dimensions of management and leadership ( $t = -3.49$ ;  $p < 0.001$ ) and nurse-physician relationship ( $t = -5.95$ ;  $p < 0.000$ ), strengthening the foregoing in relation to differences observed in the two contexts.

Then, was analyzed the relation between the dimensions and the scale in total. It was found that in each of the dimensions the items are significantly and positively correlated with each other and with the scale. Only one item showed a significant relation at 0.05. All others were significant at 0.01. Correlation values ranged between 0.36 and 0.91, with the strongest generally coinciding with the factor weights obtained by the PCA.

### DISCUSSION

The results show that the dimensions obtained by factor analysis were kept despite obtaining a slightly different structure, as in other studies<sup>(23-24)</sup>. It was found that at least 50% of items in each dimension showed higher factor weights than the original scale. The items coinciding with the dimensions are presented mainly with factor weights  $\geq 0.70$ .

The results show that the management and leadership of the head nurse are valued, and they have been identified as a significant predictor of positive outcomes for nurses and clients<sup>(7,25-26)</sup>.

The participation of nurses is also highlighted as part of the organization to ensure quality of care, and an adequate number of nurses is required for this purpose

Team work stands out in the nurse-physician relationship, besides the good relationship between them. The role of the nurse director seems important in this dimension as an element of power and authority, as well as in programs of embracement of new nurses. An effective partnership work between nurses and doctors is an important component of a positive work environment<sup>(3)</sup>. Together with the other elements of environmental organization, this factor has been consistently identified as having significant influence on the results<sup>(7,14,27)</sup>.

The involvement of nurses in the affairs of the hospital can be an opportunity for improvement and progress in the career by sharing the concerns and participating in political decisions.

The dimension of quality of care is based on a nursing model, on the development of written and updated care plans, on continuity of care, as well as on provision of care by competent nurses. Associated with this dimension were found lower mortality rates, greater satisfaction of nurses at work, higher quality of care<sup>(7,28)</sup> and fewer adverse events<sup>(29)</sup>.

The Cronbach alpha values found in most subscales are clearly highly satisfactory and ranged between 0.90 and 0.91, indicating that grouped items contribute to the evaluation of the work environment factors of nursing practice.

### CONCLUSION

This study aimed to test the psychometric properties of the Portuguese version of the PESNWI. For reaching this end, its translation into Portuguese was done and it was called Escala Ambiente de Trabalho da Prática de Enfermagem (Scale of Work Environment of Nursing Practice). It was applied to 236 nurses working in acute care services of the Centro Hospitalar Lisboa Ocidental and the Centro Hospitalar Médio Tejo.

The analysis of results showed the scale has internal consistency and fidelity, both as a whole ( $\alpha = .92$ ) as in each of the dimensions ( $\alpha$  between 0.71 and 0.89), which were subjected to factor analysis with extraction by principal components, and the model explained 59.53% of variance. In relation to dimensions, some items did not coincide with those obtained by the authors. Items with higher load were kept, and most of the weight factor values obtained were higher, as well as internal consistency values. Just as in the original instrument, strong, significant relationships were found between all the dimensions, and with the scale as a whole.

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