

**Development of a short questionnaire based on the Practice Environment Scale-  
Nursing Work Index in primary health care.**

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**Background** Professional nursing environments determine the quality of care and patient outcomes. Assessing the quality of environments is essential to improve and obtain better health outcomes. Simplifying and shortening the way to evaluate environments reliably is also important to help nurses better understand the strengths and weaknesses of their environments. In that sense, identifying essential elements of nursing environments would allow the construction of short assessment tools to improve such environments. Objective: To construct a short tool to assess primary health care (PHC) nursing environments based on the Practice Environment Scale-Nursing Work Index (PES-NWI) questionnaire.

**Methods** Observational, cross-sectional, analytical study (data collection February-April 2015). Tool: PES-NWI (31 items). Population: PHC nurses (3 health districts in Valencia, Spain) with more than 3 months in the organization. The nurses were asked to select the 10 elements of the questionnaire (items) that they considered key to facilitate and improve professional care, establishing as a final selection criterion that they obtain a global election >40%. Variables: sociodemographic and 31 questionnaire items. Analysis: descriptive statistics, reliability, multidimensional scaling (ALSCAL), factor analysis, multiple linear regression. Finally, we have analyzed the concordance between both measurements (TOP10 score on the full scale score) using the Bland-Altman method.

**Results** Study sample=269 (Response rate=80.29%). Ten elements were identified based on selection frequency of the questionnaire PES-NWI. A factorial analysis explained 62.1% of variance, internal structure of 3 dimensions: 1- Participation in leadership and management, 2- Nursing foundations for quality of care, 3- Adequacy of resources, with **accumulate variance** explained: Component 1: 24%; **component 2**: 43.1%; **component 3**: 62.1%). Reliability (Cronbach's Alpha) was 0.816 for short

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questionnaire, and  $>0.8$  for all measurements. Stress=0.184 and RSQ=0.793. Bland-Altman method: the scaling tends to be 1.92 points higher (equivalent to a maximum deviation of 1.54%) than the full PES-NWI score (max score on PES-NWI=124 points).

**Conclusions** It is possible to identify essential elements of environments to construct a short tool that simplifies the study of PHC environments. Conducting rapid studies of environments will provide managers with information about specific elements that require prioritisation to enhance quality of care and safety.

**Keywords:** Primary Health Care, Community Health Nursing, Questionnaire Design, Quality of Health Care, Environment.

## Introduction.

Organisation can be understood as the “process of associating or combining groups that must carry out specific envisaged actions, with the appropriate and necessary means, in order to work in a sensible, rational and coordinated manner that facilitates goal achievement” (Mompert García & Durán Escribano, 2009). Thus, nursing care does not occur in an organisational vacuum, but is the product of interaction between professionals, patients, the public, and the health service. One aspect of this interaction is the professional practice environment for nursing, which the International Council of Nurses (Baumann, 2007) has defined as “*those settings that facilitate excellence and conscientious work... to ensure the health, safety and well-being of staff, promote quality patient care and improve motivation, productivity and outcomes*”.

The study of nursing practice environments began with what is now considered a historic study on magnetism and health (McClure, Poulin, Sovie, & Wandelt, 1983), and since then, significant associations have been found between optimal professional nursing practice environments and quality of care and more positive outcomes for users or patients (Copanitsanou, Fotos, & Brokalaki, 2017). Excellent nursing environments yield specific benefits such as higher quality care (Kramer & Schmalenberg, 2008; Schmalenberg & Kramer, 2008; Trinkoff et al., 2010), lower rates of mortality, adverse events and work accidents (Aiken et al., 2014; Trinkoff et al., 2010), greater autonomy and professional development of clinical nurses (Kramer & Schmalenberg, 2008), lower rates of turnover, absenteeism and vacancies in the nursing team (Jones & Gates, 2007), greater staff loyalty to the organisation and greater professional satisfaction (Hickson, 2013; Kelly, McHugh & Aiken, 2011), significantly lower costs and reduced administrative expenditure (Tai & Bame, 2017).

Many instruments have been developed to study and monitor nursing practice environments (Norman, 2017), including the Practice Environment Scale of the Nursing Work Index (PES-NWI) (A.1), developed by Lake in the USA (Lake, 2002), originally with 32 items and 5 dimensions. The five subscales have been shown to have an acceptable internal consistency and reliability (Cronbach's Alpha, min 0.807, and max 0.916). This measures the characteristics of professional environments, defined as “the organisational characteristics that facilitate or constrain professional nursing practice”. The author assessed 7 instruments and 54 studies of multidimensional instruments, and concluded that the PES-NWI was the most useful instrument in this respect, whilst acknowledging that none of them was brief or swift to administer. It has also been suggested that the Practice (PES-NWI) presents greater methodological strength than the other tools available (Alzate, Bayer, & Squires, 2014; Gajewski, Boyle, Miller, Oberhelman, & Dunton, 2010) and is considered by most authors as the ideal instrument for assessing environments (Bonneterre, Liaudy, Chatellier, Lang, & de Gaudemaris, 2008). A more recent review also recommends its use, highlighting its “satisfactory psychometric performance, high discriminant ability, and opportunity for comparison across studies” (Swiger, Patrician, Miltner, Rajud, Breckenridge-Sproate, & Loanf, 2017). In short, this questionnaire has contributed to the development of safe work environments and quality, efficient nursing practice (Gu & Zhang, 2014), and has been validated in various cultural and geographical contexts (Liou & Cheng, 2009; Sermeus et al., 2011). In Spain, the questionnaire was initially validated and adapted for general nursing environments with registered nurses (with 1 item less than the original scale) (De Pedro Gómez et al., 2009) and later specifically for Primary Health Care (PHC) (De Pedro-Gómez et al., 2012). Recently, it was also assessed for content validity in 33 public hospitals in the Spanish national health system (Fuentelsaz-

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Gallego, Moreno-Casbas, & González-María, 2013). The studies conducted in Spain have mainly focused on appraising the quality of care environments in primary care. At an organisational level, primary and community care in Spain is arranged differently to hospital care. These differences are also found in **the United States, where home care agencies with better-rated professional work environments offer better patient care (Jarrin, Kang, & Aiken 2017)**. Nurses are much more independent, manage community health, and practise within community health centres and patients' own homes (Jarrín, Flynn, Lake, & Aiken, 2014). Previous studies have shown, however, that some of the organisational characteristics present in hospital care can be equally important in community care, influencing care excellence and clinical outcomes for patients (Flynn, 2007; Jarrín, Flynn, Lake, & Aiken, 2014).

In relation to the elements measured in environment assessment questionnaires, the essential elements for professional practice have been defined as *“those which nurses themselves recognise as very important or significant for enhancing care in the pursuit of continuous improvement and excellence”* (Kramer & Schalenberg, 2004), and various elements may be more essential than others to improve care, such as **the leadership of the coordinator, interprofessional relations and the nurse's empowerment within the organisation** (Anzai, Douglas, & Bonner, 2014; Van den Heede et al., 2013), even in a study about community-based settings (Jarrín et al., 2014; Mensik, 2006). The study by Mensik (Mensik, 2006) proposed that 10 elements were crucial for community care delivery, in agreement with other investigations conducted in hospitals (Kramer & Schalenberg, 2004). Finally, a recent experience in Spain pointed out that essential care elements could be identified by more than 40% of nurses (Gea-Caballero et al., 2017). Despite the organisational benefits derived from the use of the tool, **the author of the original questionnaire** has identified the need for a short version of the PES-NWI as a

priority (questionnaires evaluating environments have gradually reduced in size) (Lake, 2002), together with collecting further evidence about the questionnaire and assessing its performance in different practice environments (Lake, 2007). Having a short version of any instrument facilitates the exploration and collection of data, especially when exploring little or poorly studied environments, such as Primary Health Care, since the results in these environments have been related to burnout, satisfaction at work, quality of care and the intent to quit the job, postulated as essential information for the restructuring of work processes in the primary health care environment (Lorenz, 2014). Therefore, our goal was to develop a short version of the questionnaire –facilitating and simplifying data collection whilst maintaining the quality of the information obtained– by identifying the essential elements of professional nursing practice environments in Primary Health Care, i.e. those elements necessary to create optimal conditions for the provision of excellent nursing care practice. A further goal was to assess the representativeness of essential items in relation to the full PES-NWI questionnaire.

### **Materials & Methods.**

Study design: Observational, cross-sectional, multicentre and analytical study conducted in 2015, in PHC units in the Xàtiva-Ontinyent, Elx-Vinalopó and Torrevieja health districts (Valencia region, Spain), serving a population of 615,000 citizens. Population and sample: The study population comprised PHC nurses working in these health districts. The questionnaire was sent to the entire population of nurses (estimating that the minimum number of responses to ensure the validity of the study was 198, with CI 95%, 5% error and a nursing population N=335).

Inclusion and exclusion criteria: The inclusion criteria were: being a member of the health district's permanent PHC staff, with >3 months in post. Exclusion criteria were: only nurses who did not sign the informed consent to participate were excluded from the study.

Data were not collected during the summer months (July, August, September) to avoid the rise in nurses employed temporarily to cover for those in permanent positions.

Data collection tool: We used the 31-item version of the PES-NWI questionnaire (*A.p.I*) validated and adapted to PHC in Spain (reliability: Cronbach's Alpha=0.913) (De Pedro-Gómez et al., 2012). The tool was self-completed by individuals online (Google Forms® via corporate emails). The PES-NWI encompasses 5 dimensions: Nurse participation in centre affairs (9 items), Nursing foundation for quality of care (10 items), Management and leadership of head nurse (5 items), Adequate human resources to ensure quality of care (4 items), and Nurse-Physician relationship (3 items). Data collection and analysis were carried out by different pairs of researchers to ensure impartiality. Researchers did not know the identity of participants.

Study variables: The sociodemographic variables collected were age, gender (male, female), level of education (diploma, degree, specialist qualification, master's degree, doctorate), professional experience (years: <2, 2-4, <4-10, >10), exercise of a management/leadership role (yes/no), health district, and place of work (Xàtiva/Ontinyent, Torrevieja, Elx/Crevillent). Each item in the questionnaire was presented as a dichotomous qualitative study variable (Nurses were asked to select the most important items to improve the care provided by them in primary health care: 'Yes, it is essential' / 'No, it is not essential'). Which items from the PES-NWI are considered an 'element' for the purposes of our study: we considered an element to be essential if it was indicated by a minimum of 40% of the study population (Gea-



Caballero et al., 2017). This was also partly because previous studies in the USA had also adopted a similar top-ten approach (Mensik, 2006; Kramer & Schalenberg, 2004).

The variables were grouped into the original dimensions of the PES-NWI questionnaire.

Data analysis: The statistical analysis ( $\alpha=.05$ ) was performed with SPSS v21. In terms of descriptive statistics (%), the global reliability of the survey tool as well as all the resulting sub-scales was measured using Cronbach's alpha. Construct validity was measured using exploratory factor analysis with analytical validation of the degree of correlation between the variables (Kaiser-Meyer-Olkin, KMO) and Barlett's test of sphericity. Factor analysis measured the total variance explained by the essential elements ('Top Ten') obtained, using principal component analysis (Varimax-Kaiser rotation). Confirmatory analysis was conducted using multidimensional scaling (ALSCAL, with measure of S-stress and RSQ). Finally, the concordance between both measurements was analysed using the Bland-Altman method.

Ethical aspects: Data were anonymised and protected according to relevant Spanish and European legislation (Organic Law 15/1999, European Directive 95/46/CE). The Ethics committee approved the study, and participants were provided with an information sheet and were required to sign a consent form. The authors declare no conflict of interest or funding. This research did not receive any specific grants from funding agencies in the public, commercial, or not-for-profit sectors.

## Results.

Descriptive results.

269 nurses completed the survey (response rate 80.29%). The majority of participants were 31-40 years of age (33.1%); only 16.7% of participants were younger than 30, and

30.1% were in the 51-60 age bracket. 64.7% were women. 75.5% had more than 5 years' experience in primary care, and 44.6% had more than 10 years' experience. In terms of educational achievement, 79.6% nurses were university educated. Only 10.4% were managers or charge nurses.

The results are presented in *Figure 1*, which identifies the 10 most essential items (TOP10) according to the ratings provided by the nurses surveyed. The cut-off at 10 items was partly determined by the nurses' ratings, as there was a large gap between the preference for items 10 and 11; this figure was perceived to be crucial according to the participants, receiving 6.9% more selections when compared to the following element (between the last item selected from the top ten and the eleventh item, there is a difference in the percentage of elections of 6.9%).

#### **Figure 1.**

Analysis results.

A factor analysis of the results for the full questionnaire, exploring rotated components (Varimax-Kaiser rotation), reproduced the original structure of the full questionnaire in 5 dimensions.

A factor analysis of the 10 essential elements, which we call the 'TOP10', explained 62.79% of the variance in 3 components (Accumulated Variance: Component 1: 24.96%; Component 2: 43.97%; Component 3: 62.79%).

To determine construct validity, additional exploratory factor analysis was carried out for the latent variables in the questionnaire, applying principal component analysis (PCA). The result of the Kaiser-Meyer-Olkin (KMO) test was 0.77. Bartlett's test of sphericity was statistically significant ( $p < 0.001$ ), chi-square = 1473.9. The results

achieved in the non-parametric test to perform multidimensional scaling as alternative to the confirmatory factor analysis obtains stress values = 0.184 and RSQ coefficient = 0.793. Varimax-Kaiser rotation of the 10 essential components indicated an internal structure of 3 dimensions (*Table 1*).

**Table 1**

Reliability was determined using Cronbach's alpha (entire questionnaire=0.943), and for the 5 questionnaire dimensions (D1 to D5), with all measurements obtaining >0.8 (D1=0.87; D2=0.85; D3=0.93; D4=0.84; D5=0.81). The reliability coefficient (Cronbach) for all of the TOP10 questionnaire items combined was 0.816. The Cronbach values for the dimensions of the short questionnaire were D1=.727; D2=0.705; D3=0.899. Below, we present the TOP10 essential elements for quality care grouped into 3 dimensions, and define the dimensions (*Table 2*).

**Table 2.**

We explored the predictive and explanatory power of the TOP10 in relation to the overall PES-NWI score in our sample (*Table 3*) using multiple linear regression. We found that the short scale closely predicted the overall scores obtained using the PES-NWI.

**Table 3**

Finally, we analysed the concordance between both measures (PES-NWI and TOP10) using the Bland-Altman method. Previously it was found that the distribution was Gaussian and that it fulfilled all the conditions required to apply the method.

The scaling (TOP10 score on the full scale) tends to be 1.92 points higher (equivalent to a maximum deviation of 1.54%) than the full PES-NWI score (max score on PES-NWI=124 points). The maximum differences in 95% of the cases are between -14.6 and 10.76 points. The bias of the TOP10 with respect to the PES-NWI is, therefore, 1.92 points (Figure 2).

#### **Figure 2.**

#### **Discussion.**

We aimed to synthesise and prioritise the essential elements for improving PHC, using the Spanish version of the PES-NWI questionnaire as a basis to construct a short nursing environment assessment tool. The TOP10 presents an internal structure centred around 3 dimensions, and the reliability –internal consistency– of the short questionnaire and its dimensions is confirmed according to Cronbach's original criteria for short questionnaires (Cronbach, 1951). The psychometric tests performed, including Bartlett's test of sphericity and Kaiser-Meyer, are within the intervals accepted in the literature to measure construct validity (Kaiser, 1974). When the multidimensional scaling technique was used as a non-parametric alternative to confirmatory factor analysis (Porcar Gómez & Escalante Gómez, 2009) we also obtained acceptable stress values. In addition, the Bland-Altman method has given a result that we consider good, with a high prediction power from the TOP10, in relation to the complete PES-NWI questionnaire. Overall, and based on these psychometric results, we propose a short,

‘TOP10’ questionnaire based on the PES-NWI. If additional studies consolidate these findings, it could be a short, quick and flexible alternative option for the study and assessment of professional nursing work environments.

The acceptable percentage of variance explained by these 10 elements, together with the antecedents that already affirmed that there could be 10 key elements to explore nursing work environments (Mensik, 2006, 2007; Schmalenberg & Kramer, 2008; Gea-Caballero et al., 2017), support our focus on detecting the 10 most significant elements for nurses.

Our results are in line with those obtained by Mensik (Mensik, 2006, 2007) for home-care environments in the United States. Thus, our essential elements coincided with at least 10 of the elements proposed by Mensik: support from managers/administrators, focus on collaborative practices and multidisciplinary roles, partnership with physicians, interprofessional relations, promotion of professional competence, and control of contextual characteristics of the environment, which would include adequate allocation of human resources, nurse training and long-term allocation of patients to nurses (Aiken et al., 2008; Jarrín et al., 2014; Kieft, de Brouwer, Francke, & Delnoij, 2014). With respect to their applicability in different environments, Mensik (Lake, 2002) has stated that the essential elements are probably common to or very similar in settings as diverse as hospital, community or home-based care (Mensik, 2006). Consequently, we suggest that it would be relevant and appropriate to conduct comparative research in different environments and cultures.

A study of hospital environments (Schmalenberg & Kramer, 2008) using the Essentials of Magnetism (EOM) tool has indicated the essential elements of magnetism: the authors found 10 essential elements, 8 of which accounted for most of the variance and were termed the essential 8. Our findings present a high degree of agreement with these

results, on up to 7 items if the last item is analysed carefully, which includes both clinical competence and training support. A recent study in Spain (Gea-Caballero et al., 2017) highlighted a number of essential elements that agree with the Top Ten proposed in the current manuscript (*Table 4*).

**Table 4.**

In our study, the most important factor for improving care was nursing leadership, a finding that coincides with most other studies (Jarrin et al., 2014; Mensik, 2006, 2007; Van den Heede et al., 2013); these studies have also stressed the importance of other factors in our Top Ten, e.g. provision of adequate resources and good relationships between nurses/physicians.

This high level of agreement indicates that such consensus is not likely to be attributed to chance. Rather, we believe it reflects a trend in the results of the studies carried out, suggesting that, independently of the questionnaire employed or the environment studied, nurses tend to consider certain elements of particularly important to improve nursing care.

The information obtained by isolating these 10 items from the questionnaire presented a high predictive power (90.7%) in relation to the overall score obtained with the full PES-NWI questionnaire, and explained 62.79% of total variance, **with a slight overestimation of 1.54% points according to the Bland-Altman method, which we consider acceptable, despite yielding broad deviation.** Consequently, using our proposed TOP10 tool at an operational level (research and/or management) will yield a positive result because it provides a short, simple method to rapidly obtain reliable information on the general characteristics of a professional nursing environment. Future

research is required to confirm and increase the evidence and to broaden it to the field of hospital care.

Therefore, we propose a short tool with 3 dimensions selected for their central role in the analysis of professional environments, and which include elements from all the dimensions in the PES-NWI; the first dimension includes items related to leadership and management of healthcare services; the second **dimension** relates to fundamentals of nursing for the quality of care and relations with other professionals, an aspect related to independence for decision-making and self-management of nursing practice (Burton, 2010); the third one refers to the availability of human resources. Additionally, the developer of the original PES-NWI questionnaire (Lake, 2002) considers that the item 'relationships between nurses and physicians' can be confused with autonomous practice in nursing, an aspect identified by other authors (**Chouinard, 2017**). In our study, we defined that an 'adequate' relationship between nurses and doctors could refer to autonomous practice and control over their sphere of practice (Kieft et al., 2014). Construction of this short tool is in line with the recommendation of the author of the PES-NWI questionnaire (Lake, 2007), who has stressed the importance of improving evidence on the scale and constructing short versions for evaluating environments (our Top Ten proposal is administered in <2 minutes), as well as implementing and testing it in different nursing practice environments (**PHC environments from Spain in our study, an under-researched work environment**). We advocate its use in pilot evaluations of primary care environments, as well as once a complete picture of a given environment is ready, and following **organisational** changes in order to evaluate their impact. We believe that short tools for assessing environments, which simplify data collection, will facilitate the evaluation and improvement of these. Consequently, the construction of a short tool based on a questionnaire such as the PES-NWI, which has been widely

adapted, translated and used in many countries worldwide, is important to simplify the process of obtaining information about the most significant elements of nursing environments in order to facilitate the study and improvement of nursing work environments.

Limitations: This study is exploratory. Therefore, additional studies of practice environments with the new simplified and revised PES-NWI tool could yield further evidence concerning the validity of the Top Ten essential elements and contribute to improving quality of care by modifying these environments in order to create better conditions that make it possible to continue optimising nursing care. **It is necessary to improve the reliability of the TOP 10, as well as to reduce the deviations obtained for the short questionnaire measurements, since these are high and must, therefore, be reduced.**

We are aware that our TOP10 is an unsuitable choice if the goal is to obtain exhaustive information on all 5 dimensions of the PES-NWI questionnaire, because it does not replicate the original structure (dimensions) and, therefore, does not have the capacity to explain the information in full. It yields equivalent information for dimensions 1, 2 and 4, **but offers less information for dimensions 3 and 5.** This represents **another** limitation of the study, particularly with regard to D5, which is a short dimension. However, for D3 (leadership), we believe that the element we propose is fully representative of the dimension as a whole, which could compensate for the loss of information obtained: a good leader and team coordinator ought to support the staff, see mistakes as opportunities to improve, be understanding and praise quality work.

## **Conclusions.**



Our study identified ten key elements **based on the items of the PES-NWI scale**: those elements of the environment that are especially relevant to professional nursing practice in PHC. This has enabled the development of a rapid environment assessment tool consisting of 10 items (TOP10), which has shown **acceptable** predictive power regarding the full questionnaire.

Since professional environments and nursing activity are variable organisational factors, use of this short tool will simplify data collection and facilitate decision-making for managers in relation to improving quality and outcomes in the population.

## References.

- Aiken, L. H., Sloane, D. M., Bruyneel, L., Van den Heede, K., Griffiths, P., Busse, R., ... Sermeus, W. (2014). Nurse staffing and education and hospital mortality in nine European countries: a retrospective observational study. *The Lancet*, 383(9931), 1824–1830. [https://doi.org/10.1016/S0140-6736\(13\)62631-8](https://doi.org/10.1016/S0140-6736(13)62631-8)
- Alzate, L. C. C., Bayer, G. L. A., & Squires, A. (2014). Validation of a Spanish Version of the Practice Environment Scale of the Nursing Work Index in the Colombian Context. *Hispanic Health Care International*, 12(1), 34–42. <https://doi.org/10.1891/1540-4153.12.1.34>
- Anzai, E., Douglas, C., & Bonner, A. (2014). Nursing practice environment, quality of care, and morale of hospital nurses in Japan. *Nursing & Health Sciences*, 16(2), 171–178. <https://doi.org/10.1111/nhs.12081>
- Baumann, A. (2007). *Entornos de práctica favorables: lugares de trabajo de calidad = atención de calidad al paciente. Conjunto de instrumentos para información y actuación.* (CIE - Consejo internacional de Enfermeras, Ed.) (1st ed.). Ginebra: CIE - Consejo internacional de Enfermeras.
- Bonneterre, V., Liaudy, S., Chatellier, G., Lang, T., & de Gaudemaris, R. (2008). Reliability, validity, and health issues arising from questionnaires used to measure Psychosocial and Organizational Work Factors (POWFs) among hospital nurses: a critical review. *Journal of Nursing Measurement*, 16(3), 207–230. <https://doi.org/10.1891/1061-3749.16.3.207>
- Burton, J. (2010). *WHO healthy workplace framework and model: background and supporting literature and practices.* Geneva: World Health Organization (WHO). Retrieved from <http://www.who.int/iris/handle/10665/113144>
- Chouinard, V., Contandriopoulos, D., Perroux, M., & Larouche, C. (2017). Supporting nurse practitioners' practice in primary healthcare settings: a three-level qualitative model. *BMC Health Serv Res*, 17(1), 437. doi: 10.1186/s12913-017-2363-4
- Copanitsanou, P., Fotos, N., & Brokalaki, H. (2017). Effects of work environment on patient and nurse outcomes. *British Journal of Nursing*, 26(3), 172-176. doi: 10.12968/bjon.2017.26.3.172.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297–334.
- 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), 212–221. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/21711384>
- De Pedro Gómez, J., José Miguel Morales, A., Albert Sesé, A., Bennasar Veny, M., Artigues Vives, G., & Pericás Beltran, J. (2009). Validación y adaptación al español de la escala del entorno de práctica enfermera del Nursing Work Index. *Metas de Enfermería*, 12(7), 65–75.
- Flynn, L. (2007). Extending Work Environment Research Into Home Health Settings. *Western Journal of Nursing Research*, 29(2), 200–212.

- <https://doi.org/10.1177/0193945906292554>
- Fuentelsaz-Gallego, C., Moreno-Casbas, M. T., & González-María, 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), 274–280. <https://doi.org/10.1016/j.ijnngardnerustu.2012.08.001>
- Gajewski, B. J., Boyle, D. K., Miller, P. A., Oberhelman, F., & Dunton, N. (2010). A Multilevel Confirmatory Factor Analysis of the Practice Environment Scale. *Nursing Research*, 59(2), 147–153. <https://doi.org/10.1097/NNR.0b013e3181d1a71e>
- Gea-Caballero, V., Castro-Sánchez, E., Juárez-Vela, R., Díaz-Herrera, M. Á., de Miguel-Montoya, I., & Martínez-Riera, J. R. (2017). Elementos esenciales de los entornos profesionales enfermeros en Atención Primaria y su influencia en la calidad del cuidado. *Enfermería Clínica*, 28(1), 27–35. <https://doi.org/10.1016/j.enfcli.2017.07.008>
- Gu, L.-Y., & Zhang, L.-J. (2014). Assessment tools of nursing work environment in magnet hospitals: A review. *International Journal of Nursing Sciences*, 1(4), 437–440. <https://doi.org/10.1016/j.ijnss.2014.10.013>
- Hickson, J. (2013). New nurses' perceptions of hostility and job satisfaction. *Journal Nursing Administration*, 43(5), 293–301. doi: 10.1097/NNA.0b013e31828eebc9
- Jarrín, O., Flynn, L., Lake, E. T., & Aiken, L. H. (2014). Home Health Agency Work Environments and Hospitalizations. *Medical Care*, 52(10), 877–883. <https://doi.org/10.1097/MLR.0000000000000188>
- Jarrin, O.F., Kang, Y., & Haiken, L.H. (2017). Pathway to better patient care and nurse workforce outcomes in home care. *Nursing Outlook*, 65(6), 671–678. doi: <https://doi.org/10.1016/j.outlook.2017.05.009>
- Jones, C.B., & Gates M. (2007). The cost and benefits of nurse turnover: a business case for nurse retention. *Online Journal Issues of Nursing*, 12(3) Manuscript4. doi: 10.3912/OJIN.Vol12No03Man04
- Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, 39(1), 31–36. <https://doi.org/10.1007/BF02291575>
- Kelly, L.A., McHugh, M.D., & Aiken L.H. (2011). Nurse outcomes in Magnet and non-Magnet hospitals. *Journal Nursing Administration*, 41(10), 428–33. doi: 10.1097/NNA.0b013e31822eddbbc
- Kieft, R. A., de Brouwer, B. B., Francke, A. L., & Delnoij, D. M. (2014). How nurses and their work environment affect patient experiences of the quality of care: a qualitative study. *BMC Health Services Research*, 14(1), 249. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/24923663>
- Kramer, M., & Schalenberg, C. (2004). Essentials of a magnetic work environment, part 1. *Nursing*, 34(6), 50–54. Retrieved from <http://ovidsp.ovid.com/ovidweb.cgi?T=JS&NEWS=n&CSC=Y&PAGE=fulltext&D=ovft&AN=00152193-200406000-00043>
- Kramer, M., & Schmalenberg, C. (2008). The practice of clinical autonomy in hospitals:

- 20 000 nurses tell their story. *Critical Care Nurse*, 28(6), 58–71. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/19047696>
- Lake, E. T. (2002). Development of the practice environment scale of the nursing work index. *Research in Nursing & Health*, 25(3), 176–188. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1002/nur.10032/abstract>
- Lake, E. T. (2007). The Nursing Practice Environment. *Medical Care Research and Review*, 64(2\_suppl), 104S–122S. <https://doi.org/10.1177/1077558707299253>
- Liou, S.-R., & Cheng, C.-Y. (2009). Using the Practice Environment Scale of the Nursing Work Index on Asian Nurses. *Nursing Research*, 58(3), 218–225. <https://doi.org/10.1097/NNR.0b013e3181a308cd>
- Lorenz, V.R., Guirardello E.B. (2014). The environment of professional practice and Burnout in nurses in primary healthcare. *Revista Latino Americana Enfermagem*, 22(6), 926-33. doi: 10.1590/0104-1169.0011.2497
- McClure, M. L., Poulin, M. J., Sovie, M., & Wandelt, M. (1983). Magnet hospitals. Attraction and retention of professional nurses. Task Force on Nursing Practice in Hospitals. American Academy of Nursing. *American Nurses Association Publications*, (G-160), 1–135. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/6551146>
- Mensik, J. S. (2006). *Describing essentials of magnetism and quality in home health* (Dissertation). The University of Arizona. Retrieved from <http://hdl.handle.net/10150/194049>
- Mensik, J. S. (2007). The Essentials of Magnetism for Home Health. *JONA: The Journal of Nursing Administration*, 37(5), 230–234. <https://doi.org/10.1097/01.NNA.0000269742.40137.a6>
- Mompart García, M. P., & Durán Escribano, M. (2009). *Administración y gestión de servicios de enfermería*. (D. A. de Enfermería, Ed.), *Coleccion Enfermeria S21* (2nd ed., Vol. ADMINISTRA). Madrid.
- Norman, R.M., & Sjetne.I.S. (2017). Measuring nurses' perception of work environment: a scoping review of questionnaires. *BMC Nursing*, 16, 66. doi: 10.1186/s12912-017-0256-9
- Porcar Gómez, M. L., & Escalante Gómez, E. (2009). Límites de la explicación interna (norma de internidad). Análisis de Escalamiento Multidimensional. *Revista Electrónica de Investigación y Docencia*, 2, 59–77. Retrieved from <http://revistaselectronicas.ujaen.es/index.php/reid/article/view/1107/931>
- Schmalenberg, C., & Kramer, M. (2008). Essentials of a Productive Nurse Work Environment. *Nursing Research*, 57(1), 2–13. Retrieved from <http://ovidsp.ovid.com/ovidweb.cgi?T=JS&NEWS=n&CSC=Y&PAGE=fulltext&D=ovft&AN=00006199-200801000-00002>
- Sermeus, W., Aiken, L. H., Van den Heede, K., Rafferty, A. M., Griffiths, P., Moreno-Casbas, M. T., ... Zikos, D. (2011). Nurse forecasting in Europe (RN4CAST): Rationale, design and methodology. *BMC Nursing*, 10(1), 6. <https://doi.org/10.1186/1472-6955-10-6>
- Swiger, P.A., Patrician, P.A., Miltner, R.S., Rajud, D., Breckenridge-Sproate, S., & Loanf, L.A. (2017). The Practice Environment Scale of the Nursing Work Index:

An updated review and recommendations for use. *International Journal Nursing Studies*, 74, 76-84. doi: 10.1016/j.ijnurstu.2017.06.003

- Tai, T.W., Bame, S.I. (2017). Organizational and Community Factors Associated With Magnet Status of U.S. Hospitals. *Journal Healthcare Management*, 62(1):62-76. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/28319992>
- Trinkoff, A. M., Johantgen, M., Storr, C. L., Han, K., Liang, Y., Gurses, A. P., & Hopkinson, S. (2010). A Comparison of Working Conditions Among Nurses in Magnet® and Non-Magnet® Hospitals. *JONA: The Journal of Nursing Administration*, 40(7/8), 309–315. <https://doi.org/10.1097/NNA.0b013e3181e93719>
- Van den Heede, K., Florquin, M., Bruyneel, L., Aiken, L., Diya, L., Lesaffre, E., & Sermeus, W. (2013). Effective strategies for nurse retention in acute hospitals: A mixed method study. *International Journal of Nursing Studies*, 50(2), 185–194. <https://doi.org/10.1016/j.ijnurstu.2011.12.001>

Table 1:

NUMBER ORIGINAL ÍTEM	ESSENTIAL ELEMENTS (TOP10) OF THE PES-NWI	COMPONENTS		
		1	2	3
<b>1</b>	Nurses at the centre have opportunities to participate in decisions that affect centre policies.	.753 <sup>a</sup>	-.098	.195
<b>11</b>	There is an active programme for guaranteeing and improving quality.	.666 <sup>a</sup>	.327	.118
<b>14</b>	The allocation of patients to each nurse promotes continuity of care (e.g. the same nurse cares for the patient over time).	-.104	.804 <sup>a</sup>	.183
<b>15</b>	There is a common, well-defined nursing philosophy that permeates the patient care environment.	.411	.649 <sup>a</sup>	.207

<b>18</b>	Nurses are offered continuing education programmes.	.639 <sup>a</sup>	.383	-.058
<b>19</b>	Nurses at the centre present satisfactory clinical competence.	.410	.582 <sup>a</sup>	-.079
<b>20</b>	The supervisor/coordinator is a good manager and leader.	.685 <sup>a</sup>	.163	.214
<b>25</b>	There are sufficient employees to do the job properly.	.104	.082	.939 <sup>a</sup>
<b>26</b>	There is a sufficient number of qualified nurses to provide quality care.	.224	.206	.890 <sup>a</sup>
<b>31</b>	Practice is based on appropriate collaboration between nurses and physicians.	.333	.401 <sup>a</sup>	.197

Table 2

DIMENSION	ITEM	ITEM DESCRIPTION	NORMALISATION
<b>1 Participation in management and leadership</b>	<b>1</b>	Nurses at the centre have opportunities to participate in decisions that affect centre policies.	.753
	<b>11</b>	There is an active programme for guaranteeing and improving quality.	.666
	<b>18</b>	Nurses are offered continuing education programmes.	.639
	<b>20</b>	The supervisor/coordinator is a good manager and leader.	.685
<b>2 Focus on nursing care and interdisciplinary relationships</b>	<b>14</b>	The allocation of patients to each nurse promotes continuity of care (e.g. the same nurse cares for the patient over time).	.804
	<b>15</b>	There is a common, well-defined nursing philosophy that permeates the patient care environment.	.649
	<b>19</b>	Nurses at the centre present satisfactory clinical competence.	.582
	<b>31</b>	Practice is based on appropriate collaboration between nurses and physicians.	.401
<b>3 Adequate resources</b>	<b>25</b>	In general, there are sufficient employees to do the job.	.939
	<b>26</b>	There is a sufficient number of qualified nurses to provide quality	.890

care.

Table 4

<b>ORGANISATIONAL ATTRIBUTE</b>	<b>Staff nurses % (Kramer)</b>	<b>HHC<sup>a</sup> nurses % (Mensik)</b>	<b>% Gea et al. 2018</b>	<b>Top Ten % (Gea)</b>
Working with other nurses who are clinically competent	80.1	72.6	39.6	44.5 <sup>b</sup>
Good nurse/doctor relationships and communication	79.2	60.4	43.8	56.3
Nurse autonomy and accountability	73.5	51.9	46.5 <sup>c</sup>	(51.7) <sup>c</sup>
Supportive nurse manager, supervisor	69.5	80.2	48.6	60.5
Control over nursing practice	68.9	13.2	---	---
Support for education	66.2	38.7	49.3	44.5
Adequate nursing staff	62.5	79.2	41	47.1
Concern for patient is paramount	62.0	89.6	45.8	46
Flexible work schedule	---	67.9	---	---
Continued competency	---	44.3	49.3	44.5
Adequate support services	---	41.5	32.6	41.1
Nurses have opportunities to participate in decisions that affect centre policies	---	---	54.2	50.6