Knowledge, Attitude and Use of Evidence-Based Practice among nurses active on the Internet

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Objective. to determine the evidence-based practice (EBP) competence of Spanish and Latin-American nurses participating in professional forums on the Internet and estimate the influence of socio-demographic and professional factors on their competence, which was defined as knowledge of, attitude towards, and implementation of EBP. **Methodology:** An online survey was administered to a convenience sample of nurses active in Internet forums, comprising validated Spanish versions of the Evidence-Based Practice Questionnaire (EBPQ) and Practice Environment Scale of the Nursing Work Index (PES-NWI) and socio-demographics and professional variables. **Results:** 314 questionnaires were obtained (76.96%). The mean EBPQ score was 5.02 out of 7 (95%CI, 4.89-5.14). The variables associated with a higher competence in EBP were academic level, (p<03001), professional category (p=0.001), country of work (p<0.001), perception of practice environment (p=0,018) and research activities (p<0,036). **Conclusions:** These nurses showed a moderate level of EBP competence. They revealed a positive attitude towards EBP and achieved intermediate scores in both EBP-related skills and knowledge and their implementation. Higher academic levels and professional categories were associated with greater EBP competence. A practice environment perceived to be unfavorable has a negative influence on EBP implementation.

Keywords: health facility environment; questionnaires; advanced practice nursing; evidence-based practice; Internet.

Conocimientos, actitudes y uso de la Práctica Basada en la Evidencia entre enfermeras activas en la Internet

Objetivo. Determinar la competencia sobre la Práctica Basada en Evidencias (PBE) que tienen las enfermeras españolas e iberoamericanas con participación activa en grupos de Internet y establecer si existen factores sociodemográficos y profesionales influyentes en dicha competencia, definida como el conocimiento, actitud e implementación de la PBE. **Metodología.** Se administró

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una encuesta online a una muestra no probabilística de profesionales de enfermería activos en grupos de Internet. Incluía variables sociodemográficas, profesionales y los instrumentos Evidence-Based Practice Questionnaire (EBPQ) y Practice Environment Scale of the Nursing Work Index (PES-NWI) en versión española. **Resultados.** 314 encuestas fueron respondidas del total (76.96%). La puntuación media para el total del cuestionario EBPQ fue de 5.02 (IC 95%=4.89-5.14), sobre un máximo posible de 7. Las variables que se asociaron significativamente con una mayor competencia en la PBE fueron el nivel académico ($p<0.001$), la categoría profesional ($p=0.001$), el país de trabajo ($p<0.001$), la percepción del entorno de práctica ($p=0.018$) y las actividades relacionadas con la investigación ($p<0.036$). El grado de competencia sobre la PBE en esta muestra de profesionales de enfermería fue moderado, mostrando una actitud positiva hacia la PBE y puntuaciones intermedias tanto en habilidades y conocimientos, como en su implementación. **Conclusión.** A mayor nivel académico y categoría profesional se asocian con mayores competencias sobre la PBE. La percepción desfavorable del entorno de práctica influye de forma negativa en la disposición al uso.

Palabras clave: Ambiente de instituciones de salud; cuestionarios; enfermería de práctica avanzada, práctica clínica basada en la evidencia; Internet.

Conhecimentos, atitudes e uso da Prática Baseada na Evidência entre enfermeiras ativas na Internet

Objetivo. Determinar a competência sobre a Prática Baseada em Evidências (PBE) que têm as enfermeiras espanholas e ibero-americanas com participação ativa em grupos de Internet e estabelecer se existem fatores sócio-demográficos e profissionais influentes em dita concorrência, definida como o conhecimento, atitude e implementação da PBE. **Metodologia**. Administrou-se uma enquete online a uma mostra não probabilística de profissionais de enfermagem ativos em grupos de Internet. Incluía variáveis sócio-demográficas, profissionais e os instrumentos Evidence-Based Practice Questionnaire (EBPQ) e Practice Environment Scale of the Nursing Work Index (PES-NWI) em versão espanhola. **Resultados**. 314 enquetes foram válidas (76.96%). A pontuação média para o total do questionário EBPQ foi de 5.02 (IC 95%=4.89-5.14), sobre um máximo possível de 7. As variáveis que se associaram significativamente com uma maior concorrência na PBE foram o nível acadêmico ($p<0.001$), a categoria profissional ($p=0.001$), o país de trabalho ($p<0.001$), a percepção do meio de prática ($p=0.018$) e as atividades relacionadas com a investigação ($p<0.036$). O grau de competência sobre a PBE nesta mostra de profissionais de enfermagem foi moderado, mostrando uma atitude positiva para a PBE e pontuações intermédias tanto em habilidades e conhecimentos, como em sua implementação. **Conclusão**. O maior nível acadêmico e categoria profissional se associam com maiores competências sobre a PBE. A percepção desfavorável do meio de prática influi de forma negativa na disposição ao uso.

Palavras chave: health facility environment; questionários; prática avançada de enfermagem; prática clínica baseada em evidências; Internet.

Introduction

Nurses, as health professionals, have the obligation of provide competent, safe and efficient care based on scientific evidence, and evidence-based practice (EBP) is recognized as the gold standard for healthcare delivery.[1] According to the United States Institute of Medicine, the application of EBP improves healthcare, reduces its costs, and increases the productivity of staff[2] and also contributes to the development of the discipline of nursing.[3] Superior health outcomes have been reported in patients receiving nursing care based on the optimal research-derived evidence than in those receiving habitual care.[4] Despite all these virtues, EBP is not free from criticism.[5]

Also, various authors have found that research-based evidence is not put into practice by nursing professionals or only in a limited manner.[6]

This situation appears difficult to reverse, because nursing practice is generally based on intuition and/or experience[4,7] rather than on research, which also leads to an unwarranted variability in clinical practice. The lack of time and authority, the characteristics of the work environment, and difficulties in locating and reviewing evidence and understanding statistical analyses have been implicated as obstacles to the implementation of EBP by nurses.[6] Other influential factors include the work position, access to human and material resources, and academic level; however, the degree of influence of these factors on EBP implementation by nursing professionals remains poorly understood.[8]

The use of online information to support clinical decision-making is quickly growing because of its easy access and up-to-date clinical information. Because of this, the Internet has become an important tool to facilitate EBP, providing health professionals a considerable amount of resources to support their practice. A recently review found that the Internet is a source of information that has increasingly grown over the last years among nurses and physicians[9] who use it mainly for clinical care and continuous professional development.[10] In one study, 84.1% of the nurses affirmed that the Internet had improved their practice, although they also reported concerns about the reliability of the information and about restrictions on Internet access in the workplace.[11] Another study found that the time the nurses spent on the Internet was a positive predictive factor of research utilization.[12]

Most studies on EBP to date have been carried out in the clinical setting and English-speaking countries with the objective of identifying barriers and facilitators for their implementation. However, it is also of interest to determine the level of EBP competence of nursing professionals who actively use the Internet as a source of information and to explore the factors that influence their competence level, defining competence as the knowledge of, attitude towards, and implementation of EBP. The objective of this study was to determine the degree of EBP competence of a group of Spanish and Latin-American nurses who actively participate in Internet forums, and to investigate the socio-demographic and/or professional factors that influence their EBP competence level.

Methodology

A cross-sectional descriptive observational study was conducted during the first half of 2011 using an online survey administered *via* Surveymonkey. A non-probabilistic sample of nurses was obtained from Internet forums. A search was carried out for forums that showed activity during the study period and were largely or totally formed by nurses. The following Google forums were selected by this means: 1) Critical, pediatric, and neonatal care nursing forum; 2) *GNEAUPP* Ulcer and wound list. Forum of the National Group for the Study and Advice in Pressure Ulcers and wounds; 3) *SEEIUC* Forum of the Spanish Society of Intensive Nursing and Coronary Units. Two non-Google forums were also identified: 4) *Tablón en blanco*. Nursing community forum; 5) *ForAndalus*. Nursing research forum. These forums comprised a total of 30 954 potential participants, although not all of them could be active in a given time. The study inclusion criterion was to be a nursing professional currently working in a health or care center. After selecting the forums to receive the survey, we registered as a user and sent a message inviting those who wished to participate to click on a link in the message (one for each forum) to the page for completion of the survey. This message was sent on April 1st 2011 and again at five days before the end of the recruitment period on April 31th 2011.

For data collection the online survey comprised three sections:

1. Socio-demographic variables: sex; age; country of work; academic level; years of professional experience; years since obtaining nursing

qualification; principal function at center; professional category; workplace, size of hospital (nº beds), participation in courses on research methodology and related congresses, conferences, or seminars; frequency of scientific journal reading; authorship of scientific articles or books/chapters, and presentation of posters/papers.

2. The validated Spanish version[13] of the Evidence-Based Practice Questionnaire (EBPQ)[14] includes 24 items distributed among three subscales (factors): practice, attitude, and knowledge/skills. Each item scores from 1 to 7, with higher scores being associated with a more positive attitude and a greater knowledge and use of EBP. It was previously established that the internal consistency of the Spanish version of the EBPQ was adequate.[13]

3. The validated Spanish version[15] of the Practice Environment Scale of the Nursing Work Index (PES-NWI)[16] measures the perception of nurses of their practice environment. It comprises 31 items distributed among five subscales: 1) Nurse participation in issues related to the health center; 2) Foundation of quality of nursing care; 3) Capacity, leadership, and support to nurses by nurse managers; 4) Dimension of nursing staff and adequacy of human resources, and 5) Relationship between physicians and nurses. (Cronbach's alpha=0.91 for total scale score). The response scale ranges between 1 (totally disagree with the statement) and 4 (totally agree). According to Lake *et al.,*[17] the environment can be classified as favorable (4-5 subscales with mean score >2.5), mixed (2-3 subscales with mean score >2.5), or unfavorable (0-1 subscale with mean score >2.5). This scale was used in the present study to compare EBPQ scores according to the type of work environment; the full results of its application in this sample of nurses have been previously published.[18]

Descriptive statistics were performed to characterize the sample and analyze the distribution of questionnaire responses (measures of central tendency and dispersion for quantitative variables, and frequencies and percentages for qualitative variables). Bivariate comparisons of means were done with parametric tests (Student's t-test, one-way ANOVA). Welch's robust test was used in cases of failure to comply with variance equality. Associations of socio-demographic variables and practice environment scores with EBPQ scores were analyzed using the Spearman rank correlation coefficient. In some of the analyses, quantitative variables were converted into categorical variables, and/or categories with small sample sizes were grouped and recodified. Cronbach's alpha was calculated to estimate the internal consistency. SPSS version 17.0 (IBM, Chicago, IL) was used for the data analyses, and $p<0.05$ was considered significant. The study was approved by the Bioethics Committee of the University of Jaen. Confidentiality and anonymity was guaranteed. Participants gave their informed consent by voluntarily completing and sending the survey.

Results

408 surveys were received, of which 314 (76.96%) were considered valid for EBPQ scores. The sample mainly comprised females nurses (74.2%); the mean (standard deviation [SD]) age was 43.31 yrs (SD=9.89), and the mean experience as nursing professional was 19.81 years (SD=10.24). In general, they carried out clinical/care work in a hospital setting, and the highest academic qualification for more than half of the sample was a 3-yr diploma course. At least one scientific journal article was read every month by 68.8% of the respondents. Further descriptive data are given in tables 1 and 2.

Table 1. Sample characteristics (N= 314)

Variables	n (%)
Academic level	
Technician	8 (2.5)
Diploma	158 (50.3)
Bachelor degree	57 (18.2)
Master degree	85 (27.1)
Doctorate	6 (1.9)
Professional function	
Clinician	255 (81.2)
Management	59 (18.8)
Professional category	
Registered nurse	169 (53.8)
Clinical nurse specialist	86 (27.4)
Ward manager	32 (10.2)
Division manager	20 (6.4)
Director of nursing	7 (2.2)
Type of center (N=311)	
Primary care	93 (29.7)
Hospital < 200 beds	58 (18.4)
Hospital 200-500 beds	65 (20.7)
Hospital > 500 beds	70 (22.3)
Nursing homes	18 (5.7)
Others	7 (2.3)
Country of work	
Spain	223 (71.0)
Mexico	24 (7.7)
Argentina	17 (5.4)
Peru	10 (3.2)
Venezuela	8 (2.5)
Colombia	8 (2.5)
Ecuador	6 (1.9)
Others	18 (5.8)

Table 2. Frequency of nurses that stated they have done at least a research activity in the corresponding time frame. (N= 314)

	Time frame			
Activity	**Never**	**In past year**	**In past 5 years**	**More than 5 years**
Research or evidence courses	16.6	42.7	31.8	8.9
Attending scientific conferences	21.0	48.4	23.6	7.0
Articles publication	56.7	15.3	20.1	8.0
Publication of books or chapters	71.3	9.9	10.2	8.6
Poster or paper presentations	33.4	35.0	23.6	8.0

EBP practice and attitudes to and knowledge of EBP

The mean total EBPQ score was 5.02 out of 7 points (95% CI, 4.89-5.14). The Attitude subscale obtained the highest mean score, 5.35 points (95% CI, 5.22-5.48), while the mean Practice subscale score (mean=4.85; 95% CI, 4.68-5.02) was similar to that for the Knowledge/skills subscale (mean=4.85; 95% CI, 4.72-4.99). The items with lowest mean score in each subscale were: "I critically evaluated, establishing criteria, any bibliographic reference found" in the Practice subscale (mean=4.58; 95% CI, 4.38-4.78); "New evidence is so important that I try to find time gaps in my work for this purpose", in the Attitude subscale (mean=4.39; 95% CI, 4.19-4.60); and "Investigation skills" in the Knowledge/skills subscale and in the questionnaire as a whole (mean=4.13; 95% CI, 3.95-4.30). The Cronbach's alpha values were 0.96 for the whole survey, 0.92 for the Practice factor; 0.79 for the Attitude factor; and 0.96 for the Knowledge/skills factor.

Influential factors in EBP competence

Correlation analysis results showed that higher academic level (rho=0,303; p≤0.01) and professional category (rho=0,221; p≤0.01) were directly related to a greater EBP competence. Both academic level and professional category correlated positively and significantly with all EBPQ subscales, with the exception of the Attitude subscale and professional category. A higher PES-NWI score (more favorable evaluation of the environment) was also correlated with greater EBP competence (rho=0,147; p≤0.05), although the strength of the associations observed was weak, and no significant relationship was found with two of the PES-NWI subscales (leadership and resources). The PES-NWI participation subscale was the only environment factor that correlated positively and significantly with all EBPQ subscales and EBPQ total score (rho=0,232; p≤0.01).

No significant differences were detected in total EBPQ or subscale scores as a function of sex (t=1.43; p=0.155), age (F=0.69; p=0.560), years of experience (F=1.76; p=0.155), years since qualification (F=0.92; p=0.430), professional function (t=0.17; p=0.864), workplace (F=0.80; p=0.448), number of beds at the hospital (F=2.91; p=0.057), and research courses attended (F=0.90; p=0.444). However, significant differences were found according to their academic level, professional category, country of work, perception of practice environment, (table 3) and variables related to research training activities.

Table 3. Evidence-Based Practice Questionnaire (EBPQ) scores according to professional category, country of work, practice environment, and academic level

Factors	EBPQ Practice		EBPQ Attitude		EBPQ knowledge		EBPQ Total	
	Mean±SD	Statistics (p-value)	Mean±SD	Statistics (p-value)	Mean±SD	Statistics (p-value)	Mean±SD	Statistics (p-value)
Professional category (N=314)		F=5.22 (p=0.002)		F=1.95 (p=0.122)		F=8.41 (p<0.001)		F=5.46 (p=0.001)
Registered nurse	4.59±1.53		5.28±1.10		4.56±1.15		4.81±1.09	
Clinical nurse specialist	5.35±1.26		5.56±1.17		5.26±1.14		5.39±1.00	
Ward manager	5.04±1.55		5.42±1.22		5.04±1.11		5.17±1.20	
Direction	4.69±1.79		5.00±1.53		5.20±1.18		4.96±1.36	
Country of work (N=312)		t=-3.48 (p=0.001)		t=-2.17 (p=0.031)		t=-3.92 (p<0.001)		t=-3.71 (p<0.001)
Spain	4.67±1.49		5.25±1.10		4.69±1.11		4.87±1.05	
Latin-America	5.31±1.48		5.57±1.33		5.26±1.28		5.38±1.21	
Practice environment (N=295)		F=0.867 (p=0.421)		F=5.99 (p=0.003)		F=4.89 (p=0.008)		F=4.09 (p=0.018)
Unfavorable	4.75±1.57		5.08±1.26		4.63±1.24		4.82±1.16	
Mixed	5.00±1.31		5.58±1.04		4.97±1.03		5.18±0.97	
Favorable	4.97±1.59		5.53±1.09		5.12±1.12		5.21±1.12	
Academic level (N=306)		F=11.06 (p<0.001)		F=7.66 (p=0.001)		F=16.20 (p<0.001)		F=15.46 (p<0.001)
Diploma	4.49±1.48		5.15±1.05		4.54±1.04		4.72±0.98	
Bachelor degree	5.26±1.45		5.73±1.16		5.23±1.14		5.41±1.11	
Master degree PhD	5.27±1.39		5.56±1.15		5.25±1.11		5.36±1.06	

Thus, the nurses with superior academic qualifications obtained higher scores for the total EBPQ and each subscale. In comparison to non-specialist registered nurses (RNs), Clinical Nurse Specialists (CNSs) reported a more positive evaluation of their capacity for EBP implementation but showed no significant difference in Attitude subscale score. Higher scores for the total EBPQ and for all subscales were obtained by nurses working in Latin-American countries than by those working in Spain. Significantly lower scores in all EBPQ subscales except for the Practice subscale were obtained by nurses who perceived their practice environment to be unfavorable than by those classifying their environment as mixed or favorable.

Regarding variables related to research, nurses who had been involved in these activities more frequently obtained significantly higher scores in all subscales, except for the Attitude subscale, in comparison to those who had not. Thus, nurses who during the previous year participated in congresses, conferences, or seminars on research methodology ($F=8.87$; $p<0.001$); published scientific articles ($F=4.19$; $p=0.006$); or books/chapters ($F=3.04$; $p=0.036$), and presented posters/papers ($F=4.03$; $p=0.008$) showed greater EBPQ competence. But just attending courses on research methodology has no influence ($F=0.90$; $p=0.444$). Nurses who read at least one scientific article per month scored higher than those who did not in the total EBPQ ($F=11.61$; $p<0.001$) and in each subscale (Practice: $F=9.00$; $p<0.001$; Attitude: $F=6.96$; $p=0.001$; Knowledge/skills: $F=9.48$; $p<0.001$).

Discussion

In this study, Spanish-speaking nurses active in online forums displayed a moderate degree of EBP competence, similar to the findings of other studies for nurses in different settings.[1,4,7,19] They scored highest in the Attitude subscale of the EBPQ, indicating a good predisposition to use evidence and a belief in the value of EBP to improve the care they provide. The exponential growth in available information over recent years has increased the challenge faced by nurses in translating evidence from research to clinical practice. The possibility of accessing discussion groups and other resources online may contribute to facilitating the implementation of new knowledge and thereby improving healthcare outcomes.[20]

EBP competence was related to academic level, professional category, country of work, evaluation of the practice environment, and participation in research-related activities (with the exception of participation in courses on research methodology). The finding of improved EBP competence in nurses with superior academic qualifications was previously reported[7,8,21] and corroborated by qualitative data on the perception by nurses that a higher academic level provides a greater capacity to localize and evaluate evidence.[22] The nurses with postgraduate training were more frequently engaged in research activities, indicating its role in providing the tools and knowledge required to take part in research. However, the importance of participating in research activities and reading scientific journals for the application of research evidence remains unclear.[8] In this study, a 68,8% of participants refers reading one scientific article per month at least, a percentage higher than the obtained by Moreno-Casbas *et al*.[23] (59.1%) although lower if we compare it only with the active researches (96.7%). Lower scores were obtained by the RNs than by those in higher work positions with the exception of the Attitude subscale score. Bonner *et al.*[21] found that a higher work category was significantly associated with superior scores for knowledge of, attitude towards, and utilization of research. In the present study, however, the professionals in the highest categories (managers) showed a worse attitude than those in lower categories, and their implementation of EBP did not correspond with the knowledge they reported; this contradicts the idea that superior research knowledge favors a better attitude due to a greater perception of the positive impact of EBP.[22]

The significantly higher EBP competence shown by nurses from Latin America than by those from

Spain has not previously been reported. This may be attributable to the higher level of academic training in the former. Thus, a five-year degree or post-graduate degree in nursing was possessed by 83.1% of the nurses from Latin American in comparison to 33.2% of those from Spain. In various Latin America countries, nursing doctorate programs began more than a decade ago[24] meanwhile in Spain, until a few years ago, the access to doctorate studies for nurses were very complicated, preventing the development and acquisition of skills and knowledge in research. These results are also likely to be influenced by differences in work organization/functions between Latin America and Spain. The lack of other studies comparing EBP competence among Latin American and Spanish nurses makes difficult drawing any conclusion, so more research is needed in this topic.

The nursing practice environment was also found to influence EBP competence in the present study population. The only previous study that applied both the EBPQ and PES-NWI[25] questionnaires reported that the total PES-NWI score was a highly influential factor. Although the PES-NWI was initially created for hospitals, it has been used in other settings like Primary Care, with similar results by those obtained from hospitals.[18,25] Other authors also found a positive relationship between organizational attributes and the implementation of research.[12] Hence, contextual/organizational aspects appear to play a major role in the clinical application of research evidence. Although the difference was not significant, the professionals with greater work experience considered themselves more qualified to develop EBP, contrasting with the report by de Pedro-Gómez *et al*.[25] of significantly higher EBPQ scores in professionals with less experience. In future studies, it would be interesting to address similarities and differences among the professional practice models adopted by different organizations for EBP implementation.

Limitations. An important limitation is that only 408 of almost 31000 Internet-groups users responded to the survey, although it is necessary to keep in mind that some of the users could not be more longer active in the forums, not access the Internet/forums during the survey period or not meet the inclusion criterion. It is possible to think that the users answering the survey were among the most active and motivated ones. The ability to extrapolate these results is limited by our use of a non-probabilistic sample and the online administration of the questionnaire. The gathering of data *via* the Internet can also affect the reliability of results, and the utilization of self-administered questionnaires can produce an overestimation of the scores. Finally, the study design (cross-sectional descriptive) prevents the evaluation of cause-effect relationships.

Conclusions

Spanish-speaking nursing professionals who participate in online forums reveal a moderate degree of EBP competence. They show a positive attitude towards evidence-based decision-making and obtain intermediate scores for EBP skills/knowledge and implementation. EBP competence is greater with higher academic level and professional category, a more favorable practice environment, and a more frequent participation in research activities. Higher competence scores were also obtained by nurses working in Latin America than by those in Spain. Identification of these influential factors can help to develop more effective strategies for enhancing the implementation of EBP by nurses.

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