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Evidence-based practice nurses' competency: Spanish national survey and establishment of a scale of the EBP-COQ-Prof©

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Abstract

Aims: To discover the level of evidence-based practice competency of Spanish nurses, to develop a scale of the EBP-COQ-Prof© and to analyse the influence of different variables on the level of competency.

Background: The evidence-based practice competency has previously been assessed using a wide variety of instruments, although these have methodological limitations and lack associated scales that allow for the interpretation of the score obtained.

Method: Observational, cross-sectional, national study. Using an online questionnaire, data were obtained between January and March 2020 from nurses working in the National Health System. An ANOVA was performed along with multiple regression analyses. The *T*-score and percentiles were calculated to obtain the scale of the EBP-COQ-Prof©.

Results: 2,942 nurses participated. The score for the evidence-based practice competency was 130.29 (standard deviation 17.55). The multiple regression analysis showed a model comprised of 8 variables that explained 33% of the variance.

Conclusions: The Spanish nurses have a moderate level of evidence-based practice competency. The scale classifies the subjects into 3 levels: low, moderate and high competency.

Implications for Nursing Management: The scale proposed for the EBP-COQ-Prof© could be utilized to facilitate the diagnosis of evidence-based practice competency, and to monitor and plan individual and collective strategies to improve this competency.

KEYWORDS
competence, evidence-based practice, implementation, nurse, questionnaire, scale, setting norms, survey

1 | BACKGROUND

The use of evidence-based practices (EBP) in clinical practice is fundamental for improving health outcomes (Coster et al., 2018), the quality of care and patient safety (Melnyk et al., 2014). International organisations, such as the National Academy of Medicine of the United States and the World Health Organization (WHO), consider EBP as a core competency for all the health professionals, including nurses (McClellan et al., 2008; World Health Organization. Regional Office for Europe, 2015).

In order to rely on professionals who are competent in EBP, health organisations must understand and apply standards and competency frameworks that include all the EBP steps (Doležel et al., 2021; Melnyk et al., 2014), and must also have available validated and reliable instruments that can be used to measure the level of EBP competency of the nurses (Saunders & Vehviläinen-Julkunen, 2018). If these instruments were accompanied by national reference scales of EBP competency of nurses, this would help the national health services with the interpretation of the results obtained for their particular sample (Kendall et al., 1999).

The interest in understanding the level of EBP competency of nurses and their associated factors has increased in the past few years. An overview of systematic reviews, which included 59,382 nursing, medicine, physiotherapy and occupational therapy professionals from 24 countries, concluded that the attitudes and beliefs of the professionals towards EBP were positive and, in general, higher than knowledge and skills, while their use in clinical practices always obtained lower scores (Saunders et al., 2019). These findings coincided with results from studies conducted with nurses from European countries, including Spain (Patelarou et al., 2017; de Pedro-Gómez et al., 2011; Pétré et al., 2018; Solís-Muñoz, 2015).

Another systematic review with the participation of 18,355 nurses from 14 countries pointed out that nurses did not feel prepared for EBP, independently of their functions, clinical contexts or country (Saunders & Vehviläinen-Julkunen, 2016).

The EBP competency of nurses has been associated with aspects related to the nursing professionals themselves, with a positive relationship being observed for younger nurses with higher levels of education (Belowska et al., 2018; Melnyk et al., 2018) and EBP training (Skela-Savič et al., 2016), and with factors related to their work environments such as EBP mentoring and EBP culture (Melnyk et al., 2018).

However, some concerns should be specified. On the one hand, most of the studies were conducted at the local level with limited sample sizes and therefore may only show partial results or results that are not representative of health services at the national level. On the other hand, the EBP competency has been measured through the use of a wide variety of instruments, which limits their comparison. Some questionnaires are general in nature and measure various dimensions of EBP (attitude, knowledge/skills and utilization), while others measure a specific dimension (Saunders et al., 2019). These instruments are not supported by any current EBP competency framework for the development of its content validity (Leung et al., 2014; Ruzafa-Martínez et al., 2020), and show certain methodological deficiencies in their validation (Leung et al., 2014). Also, they do not have associated scales that allow for the interpretation of the score obtained by each subject (or group of subjects) as related to other subjects from the population they belong to. In general, the interpretation of the scores obtained after the application of the instruments has been based on the minimum and maximum scores of the scale, which could result in decontextualized interpretations, and is not very operational.

Recently in Spain, the Evidence-Based Practice Competency Questionnaire, Professional version (EBP-COQ-Prof©) was developed, a questionnaire validated in Spanish that evaluates the EBP competency starting with the framework of competencies for general practice nurses by Melnyk (2014). It was designed to measure the attitude, knowledge, skills and utilization of EBP of nurses, and it had an adequate validity and reliability (Ruzafa-Martínez et al., 2020). In order to advance the knowledge obtained until now, in the present study, the main objective proposed was to discover the level of EBP competency of the nurses who work at the public health centres of the National Health System (NHS) of Spain through the EBP-COQ-Prof© questionnaire, and to develop a scale to be used in the Spanish context. Likewise, the influence of specific sociodemographic and professional variables on the level of EBP competency of the Spanish nurses was analysed.

2 | METHOD

2.1 | Design and setting

National, observational and cross-sectional study was stratified into the 17 autonomous communities of Spain.

2.2 | Study subjects and sample selection

The study population was composed of Spanish nurses who worked in public health centres belonging to the Spanish NHS, a total of 174,320 nurses (Ministerio de Sanidad, 2019). The inclusion criteria were as follows: nurses who were active in public health centres affiliated to the NHS, with a minimum experience of 1 year, who worked at a hospital or primary care centre and with any type of contract.

To calculate the sample size, a formula was utilized to estimate the mean of the population, utilizing a stratified design with proportional assignment. For its calculation, a standard deviation of 0.92 was assumed, as obtained in a previous study (Ruzafa-Martínez et al., 2020), with a confidence level of 95% and an error not greater than 0.075, thereby indicating that 813 subjects should be selected. Having in mind the proportion of nurses in the 17 autonomous communities, the sample was distributed in the following manner: Catalonia, 133; Andalusia, 122; Madrid, 110; Valencia, 78; Basque Country and Galicia, 50; Castile and Leon, 47; Castile-La Mancha, 37; Canary Islands, 35; Aragon, 32; and 7 other communities with at least 30 subjects. This implied a sample size of 904 nurses. A

stratified convenience sampling method was conducted according to the autonomous communities to obtain the sample size needed.

2.3 | Variables and instruments

An online form was created that comprised two sections:

1. Data on the health professional, which included the following sociodemographic variables: age and sex; education variables: degree year, training on EBP and highest level of nursing education; and professional variables: setting (urban/rural) and context of care (hospital/primary care), employment status, type of contract, years of professional experience, nursing student tutoring, number of articles read in the last month, access to the Internet at work, use of the Internet and other digital tools to access scientific information, the place where they habitually accessed the Internet to search information related to their professional practice, and working or not in a Best Practice Spotlight Organization® (BPSO®) centre: health centres that participate in the international programme of the Registered Nurses' Association of Ontario (RNAO), for the implementation of Clinical Practice Guidelines.
2. Evidence-Based Practice Competency Questionnaire, Professional version 'EBP-COQ-Prof©' (Ruzafa-Martínez et al., 2020). This instrument has an adequate validity and reliability, with a final model of 4 factors with 35 items, and confirmatory factor analysis (CFA) fit index values of $\chi^2 = 1{,}935.92$ ($df = 554$; $p < .001$), $\chi^2/df = 3.49$, CFI = 0.932, TLI = 0.927 and RMSEA = 0.093 (90% CI = 0.097 – 0.108). Cronbach's α for each factor ranged from 0.817 (factor III) to 0.948 (factor II). The 35 items were organised into 4 factors: factor I—attitude (8 items, range 8–40); factor II—knowledge (11 items, range 11–55); factor III—skills (6 items, range 6–30); and factor IV—utilization (10 items, range 10–50). The items were answered using a Likert scale ranging from 1 to 5 (a greater score indicates a greater competency). The overall score of the level of EBP competency had a range between 35 and 175 points.

2.4 | Data collection procedure

The data collection was performed online from January to March 2020, utilizing a national collaborative campaign named #Evidencer. The campaign asked for the participation of the nurses from the entire country through the social networks and professional schools, trade unions and scientific associations.

2.5 | Data analysis

The data were analysed having in mind the dimensions of the EBP-COQ-Prof© instrument. A univariate and descriptive analysis was performed, with central tendency measurements (mean and standard deviation). To create the EBP-COQ-Prof© scale, the mean scores of the dimensions and the total scores were calculated and transformed to a T-scale with a mean of 50 and standard deviation of 10, following a normal distribution, and to its corresponding scale in percentiles, both of which are widely used in Health Sciences (Kendall et al., 1999).

Afterwards, a bivariate analysis was conducted through a one-way ANOVA to discover the relationship between the EBP competency and the nursing professional variables. Those that were significant were included in multivariate models (multiple linear regression) to determine the influence of the variables analysed on the EBP competency. Also, a graphical analysis of the mean scores obtained according to the EBP-COQ-Prof© items, calculated with a range between 1 and 5 and desegregated according to the educational level of the nurses (bachelor's, master's, clinical nurse specialist and PhD) was performed. In the statistical analysis, a level of significance of 5% ($p \leq .05$) was considered. The analysis was conducted with the SPSS program v. 26.0.

2.6 | Ethical considerations

The study was approved by the Ethics Committee of the University of Murcia (ID: 2540/2019). The professionals were invited to participate voluntarily through the online questionnaire. They were informed about the objectives of the study, clarifying that their participation was completely anonymous and that submitting the questionnaire granted their consent for participating in the study.

3 | RESULTS

3.1 | Sample description

The final sample was composed of 2,942 nurses from all 17 autonomous communities of Spain, well above the optimum sample size calculated. Table 1 shows the main characteristics of the participants, who had an average age of 41.8 ($SD = 9.8$); 79.3% ($n = 2{,}333$) were women, with an average work experience of 17.9 years ($SD = 10.0$).

3.2 | EBP competency of the nurses in Spain and the EBP-COQ-Prof© scale

The mean score of the level of EBP competency of the Spanish nurses was 130.28 ($SD = 17.55$). The results according to the dimensions revealed a mean score of 36.89 (SD 3.43) for attitude, 37.54 (SD 9.27) for knowledge, 22.94 (SD 3.61) for skills and 32.90 (SD 6.31) for utilization (Table 2).

The scaling of each of the dimensions and the EBP-COQ-Prof© total was defined by T-scores and percentiles (Table 2). This scale allows the direct scores obtained to be assigned to their corresponding

TABLE 1 Sociodemographic and professional variables of the sample (N = 2,942)

	M	SD
Age (years)	41.8	9.8
Years since completing the nursing degree (years)	20.1	10.0
Professional experience (years)	17.9	10.0
	n	**%**
Sex		
Male	609	20.7
Female	2,333	79.3
Educational level		
Bachelor's (only)	1,374	46.70
Master's	1,119	38.03
Clinical nurse specialist	261	8.87
Doctoral	188	6.40
Employment status		
Eventual	654	22.3
Interim	701	23.8
Permanent	1,587	53.9
Type of contract		
Full time	2,663	90.5
Part time	279	9.5
Setting		
Urban (>50,000 inhabitants)	2,022	68.7
Suburban (between 10,000 and 50,000 habitants)	651	22.1
Rural (<10,000 habitants)	269	9.1
Context of care		
Hospital	2,062	70.1
Primary care	880	29.9
Training on EBP, n (%)		
None	464	15.8
<40 hr	761	25.9
40–150 hr	860	29.2
>150 hr	857	29.1
Number of articles read in the last month		
0	588	20.0
1 and 3	1,241	42.2
>3	1,113	37.8
Working at a BPSO® centre		
Yes	635	21.6
No	2,307	78.4
Undergraduate nursing student tutoring		
Yes	1,451	49.3
No	1,491	50.7
Use of the Internet and other digital tools to access scientific information		
Yes	2,423	82.4
No	519	17.6
Access to the Internet at work		
Yes	2,667	90.7
No	275	9.3
Place where they most frequently access the Internet to consult information		
Home	2,284	77.6
Work	658	22.4

Abbreviations: *M*, mean; *SD*, standard deviation.

percentile and *T*-scores, facilitating their interpretation and comparison between dimensions even when the dimensions have different score ranges. For their use, once the direct EBP-COQ-Prof© scores were obtained from the sample studied, these were placed in the score range of the scale, after which the percentile or *T*-score that corresponded to it could be found, as shown in Table 2. When the direct scores had decimals, the ≤0.5 values were assigned to the lower percentile or *T*-score, and the values >0.5 were assigned to the greater percentile or *T*-score. The scale also classified the subjects into 3 levels of competency: low, if they were found between percentiles 1 and 25; moderate, if between percentiles 26 and 75; and high, if between percentiles 76 and 100.

3.3 | Explanatory model of the evidence-based practice competency

Table 3 shows the models obtained after the multiple regression, for the total EBP-COQ-Prof© score. Model 8 explained 33% ($R^2 = 0.33$) of the variance. In this case, the Durbin–Watson *D* confirmed the validity of the model ($D = 1.89$). The *t* test detected an association between all the following variables included in the model, with a probability of error below 0.05: number of articles read in the past month, training in EBP, having a master's degree, having a PhD degree, years after the end of the bachelor's in nursing degree, working in a BPSO® centre, tutoring of undergraduate nursing students and having a specialized nursing degree. The indicators of tolerance and the variance inflation factor (VIF) indicated the absence of colinearity between the variables.

3.4 | EBP competency and level of education

The results of the comparison between the mean scores obtained for the dimensions and the total score obtained in the EBP-COQ-Prof©, according to the level of education of the nurses, allow us to explain the overall results and demonstrates the usefulness of the scale (Table 4). In a general manner for all the dimensions and the overall EBP competency, lower mean scores were observed for nurses with a bachelor's degree as compared to nurses with higher levels of postgraduate education (master's, clinical nurse specialist and PhD), especially in the dimensions knowledge and skills. More specifically in the level of EBP competency, the bachelor's degree nurses were found in the 25th percentile, indicating that they had a low level of competency, as 75% of the nurses obtained higher scores. As the level of education increases, so does the level of EBP competency, until reaching the 80th percentile for nurses with a PhD, who have a high level of competency, as only 20% of the nurses obtained higher scores. Lastly, Figure 1 shows the mean scores of the EBP-COQ-Prof© items with scores ranging from 1 to 5, from lower to higher, and desegregated according to the level of education of the nurses. These findings show a generalized pattern, where in most of the items, the responses of the nurses with a PhD degree always obtained a higher score (more competent), followed by the ones from clinical nurse specialist, master's and lastly bachelor's. However, this trend disappears and it is even inverted in some of the items related to the use of the EBP in work environments.

TABLE 2 Mean scores of the EBP dimensions and total competency and the EBP-COQ Prof© scale on percentiles and *T*-scores among Spanish nurses

	Attitude			Knowledge			Skills			Utilization			Total		
Mean	36.89			37.54			22.94			32.90			130.28		
SD	3.43			9.27			3.61			6.31			17.55		
Min-max scores	8–40			11–55			6–30			10–50			35–175		
Competency level	PC	DS	*T*	PC	DS	*T*	PC	DS	*T*	PC	DS	*T*	PC	DS	*T*
Low	1	8–26	18	1	11–14	25	1	6–13	23	1	10–21	25	1	35–85	24
	5	27–31	33	5	15–22	33	5	14–16	31	5	22–24	33	5	100–106	33
	10	32	36	10	23–24	35	10	17–18	36	10	25–28	38	10	107–118	37
	25	33–35	45	25	25–32	44	25	19–21	45	25	29–31	44	25	119–126	43
Moderate	40	36–37	50	40	33–36	48	40	20–22	47	40	32	49	40	127–131	48
	50	38	53	50	37–38	50	50	23	50	50	33	50	50	132–135	51
	–	–	–	60	39–41	54	60	24	53	60	34–35	53	60	136–139	53
	–	–	–	70	42–43	56	–	–	–	70	36	55	70	140–141	55
High	75	39	56	75	44	57	75	25	56	75	37	56	75	142–144	57
	–	–	–	80	45	58	80	26	58	80	38–40	58	80	145–151	58
	–	–	–	90	46–49	62	90	27–28	61	90	41–42	63	90	152–157	62
	–	–	–	95	50–52	66	95	29	67	95	43–49	66	95	158–174	66
	100	40	59	100	53–55	69	100	30	70	100	50	77	100	175	75

Abbreviations: DS, direct scores; PC, percentile; *SD*, standard deviation; *T*, t-scores.

TABLE 3 Stepwise multiple linear regression model in evidence-based practice (*n* = 2,943)

| Model | R | R² | Corrected R² | Std. error of estimations | Change statistics | | | Durbin–Watson D |
					Change in R²	Change in F	Sig. of change in F	
1	0.46	0.21	0.21	14.99	0.212	638.24	0.000	1.89
2	0.54	0.29	0.29	14.21	0.080	266.78	0.000	
3	0.55	0.30	0.30	14.09	0.013	43.04	0.000	
4	0.56	0.31	0.31	14.03	0.006	19.72	0.000	
5	0.56	0.32	0.31	13.98	0.006	20.01	0.000	
6	0.57	0.32	0.32	13.91	0.004	23.75	0.000	
7	0.57	0.33	0.32	13.87	0.004	13.65	0.000	
8	0.57	0.33	0.33	13.85	0.003	10.34	0.001	

| Model 8 | Unstandardized coefficients | | Standardized coefficients | | | Collinearity | |
	B	Std. error	Beta	t	Sig.	Tol	VIF
(Constant)	113.75	0.89		128.21	0.000		
Number of articles read	7.45	0.43	0.32	17.13	0.000	0.84	1.19
Training in EBP	4.30	0.30	0.27	14.28	0.000	0.81	1.23
Master's degree	3.30	0.61	0.10	5.42	0.000	0.89	1.13
PhD degree	5.03	1.14	0.08	4.41	0.000	0.91	1.10
Years after Nursing degree	−0.15	0.03	−0.09	−5.18	0.000	0.90	1.12
BPSO® centre	3.16	0.65	0.08	4.88	0.000	0.99	1.02
Nursing student tutoring	2.29	0.60	0.07	3.83	0.000	0.91	1.10
Clinical nurse specialist degree	2.92	0.91	0.06	3.21	0.001	0.96	1.04

Abbreviations: BPSO, Best Practice Spotlight Organization; Tol, tolerance; VIF, variance inflation factor.

4 | DISCUSSION

Our study relied on the high participation of nurses from the Spanish NHS, overcoming the sample size needed, globally and according to the autonomous community. This is a national study for measuring EBP competency, with the largest sample of nurses until the present (Saunders & Vehviläinen-Julkunen, 2016; Ubbink et al., 2013). The sociodemographic and professional profile of the participants coincided with the Spanish nurses who work in public health centres (Ministerio de Sanidad, 2019), and was similar to other countries (Belowska et al., 2018; Melnyk et al., 2018). It should be highlighted that the sample had a high proportion of nurses with postgraduate degrees (master's and PhD), higher than previous studies conducted in Spain and in other countries (Melnyk et al., 2018; Patelarou et al., 2017; de Pedro-Gómez et al., 2011; Solís-Muñoz, 2015). This increasing trend has been observed in the past few years in Spain (Esteban-Sepúlveda et al., 2019).

4.1 | EBP competency of Spanish nurses and associated factors

Our results, interpreted in the most common manner, according to the minimum and maximum scores, showed higher mean scores for attitude (36.89 in an 8–40 range), followed by the dimension skills (22.94 in a 6–30 range), and lower scores for knowledge (37.54 in an 11–55 range) and utilization (32.90 in a 10–50 range), which implies a global competency score of 130.28 (range between 35 and 175), with these results in agreement with other studies (Saunders et al., 2019; Solís-Muñoz, 2015). The behaviour of the dimension attitude was striking, as the results were grouped around the highest scores. This behaviour was also observed in previous studies that utilized the instruments that assess the attitude towards EBP (Upton et al., 2014). Studies about organisations have linked social desirability, defined as the tendency to provide an answer to the items just as one would answer to social pressures or norms, to a high score in the attitude

TABLE 4 Comparison of the dimensions and total EBP-COQ-Prof © according to the nurses' educational level

	n	%	Attitude				Knowledge				Skills				Utilization				Total			
			M	SD	PC	T	M	SD	PC	T	M	SD	PC	T	M	SD	PC	T	M	SD	PC	T
1 Bachelor's	1,374	46.70	36.31^{2-3-4}	3.68	40	50	33.86^{2-3-4}	8.77	40	48	22.00^{2-3-4}	3.61	40	47	32.40^{2-4}	6.02	40	49	124.58^{2-3-4}	16.98	25	43
2 Master's	1,119	38.03	37.30^{1}	3.10	40	50	39.60^{1-3-4}	8.53	60	54	23.47^{1-4}	3.45	50	50	33.11^{1-4}	6.57	50	50	133.50^{1-4}	16.53	50	51
3 CNS	261	8.87	37.45^{1}	3.18	40	50	41.08^{1-2-4}	7.48	60	54	23.67^{1-4}	3.09	60	50	33.39	6.19	50	50	135.60^{1-4}	15.10	60	53
4 PhD	188	6.40	37.91^{1}	2.99	50	53	47.30^{1-2-3}	6.10	90	62	25.54^{1-2-3}	2.94	80	58	34.57^{1-2}	6.54	60	53	145.34	14.35	80	58
Total	2,942	100.0	36.89	3.43	40	50	37.54	9.27	50	50	22.94	3.61	50	50	32.90	6.31	50	50	130.28	17.55	40	48

Note: 1, 2, 3, 4 and 5 indicates the category of nurses' educational level with which it has statistically significant differences ($p < .000$) in the pairwise analysis of the Games–Howell post hoc comparison test.

Abbreviations: CNS, clinical nurse specialist; M, mean; PC, percentile; SD, standard deviation; T, T-scores.

dimension (Salgado, 2005). The main effect of social desirability is that one tends to exaggerate the scores, and one of the strategies utilized to reduce its effects is the use of specific scales (Salgado, 2005). In this way, despite the direct scores being higher, as found for attitude, the relative position offered by the scale contextualized it with its reference group.

The educational level of the nurses was one of the variables associated with EBP competency, and the analysis according to the dimensions and items of the EBP-COQ-Prof© allowed us to obtain interesting findings. In first place, as already pointed out in previous studies, the higher the postgraduate training, the greater the level of knowledge, skills and EBP utilization (Belowska et al., 2018; Melnyk et al., 2018). Our findings also allowed us to assess the behaviour at the global level, as well as according to the dimensions of EBP competency, placing the bachelor's degree nurses in lower percentiles and *T*-scores, which gradually increased following a master's, clinical nurse specialist and PhD path. The differences according to the education level were more important in the knowledge and skills dimensions, where the nurses with a PhD were placed in the 90th and 80th percentiles, respectively, decreasing in the dimension utilization to the 60th percentile.

The analysis of the items provides an answer for this discrepancy. Independently of the level of education of the nurses, differences in the mean score of some items related to the dimension utilization were not found. These items were related to the use of EBP at work, meaning, in the context where the care was provided. The context is a determining factor in the different models found for the implementation of knowledge (Clavijo-Chamorro et al., 2020; Nilsen, 2015). And it has already been documented that a conducive environment for EBP favours its application by health professionals (Melnyk, 2014; Skela-Savič et al., 2016). It should be asked, then, whether having nurses who are highly prepared for EBP in environments that are not conducive to its application blocks their capacity and competency, with the result that the excellence in care provided is not reached. It is necessary to generate debate and to place the focus of attention on the improvement of work environments for the implementation of EBP, and on the development of policies that favour the success of the EBP implementation programmes.

This idea is supported by another novel finding from our study, namely the positive influence on the EBP competency of the nurses working in centres who participate in the BPSO® programme. These centres work on the implementation of Clinical Practice Guidelines through a systematic method, where barriers and facilitators are analysed, and where implementation strategies adapted to the context are provided (Ortuño-Soriano et al., 2020).

Our findings showed other factors that have an influence on the EBP competency of nurses. It was observed that there was a positive relationship with the frequency of reading of scientific articles, with this relationship being negative with the number of years after the completion of the bachelor's in nursing degree, coinciding with previous research studies (Pérez-Campos et al., 2014; Pericas-Beltran et al., 2014). Also, as previous studies have shown (Upton et al., 2014) EBP training was revealed to be a positive factor, although the

FIGURE 1 EBP-COQ Prof© items scores by educational level [Colour figure can be viewed at wileyonlinelibrary.com]
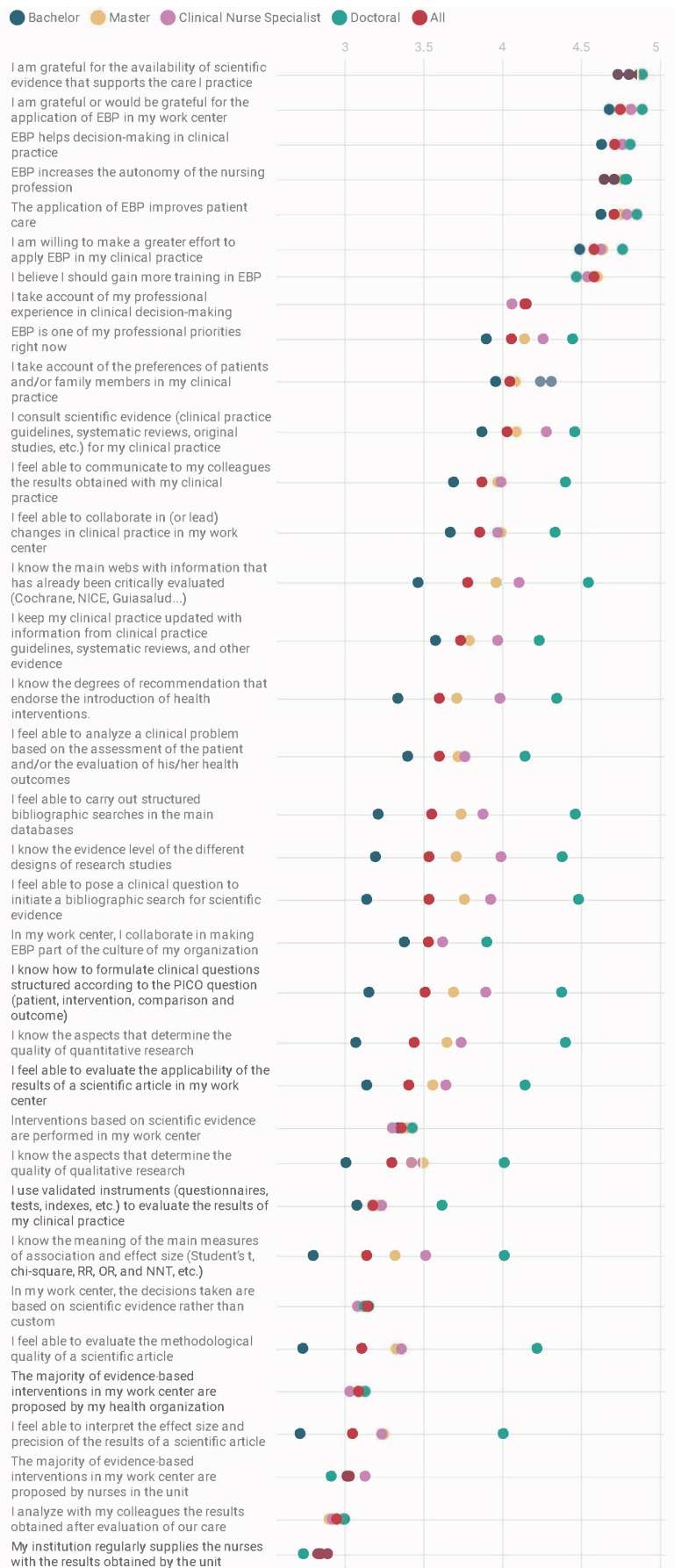
influence of EBP training programmes on the improvement of the levels of the real application of EBP in clinical practice is not entirely clear (Ramos-Morcillo et al., 2015). Another novel finding was the relationship of being a tutor in the practical training of undergraduate nursing students with the level of EBP competency, perhaps because we are dealing with health professionals who are affiliated to university health centres and who are involved in the academic and research training of health professionals. Also, the nursing students could be a source of pressure for the tutor, as they could be helping their tutors to question specific practices and to find and analyse research results, as shown in other studies (Stone & Rowles, 2007).

4.2 | Standardization of the EBP-COQ-Prof© scale

The EBP-COQ-Prof© is a robust instrument, based on theoretical assumptions, with good psychometric properties and validated in a Spanish health care environment (Ruzafa-Martínez et al., 2020). Its application to an important, homogeneous and representative sample of Spanish nurses has allowed us to propose a scaling system for each of the dimensions and the questionnaire as a whole. This scaling, conducted for the first time in an instrument that assesses the EBP of nurses (Leung et al., 2018; Saunders & Vehviläinen-Julkunen, 2018), allows us, through the use of the EBP-COQ-Prof©, to make inferences with respect to the scores found, and facilitates the interpretation of the questionnaire results through the use of percentiles and *T*-scores. Therefore, it helps with objectivizing the level of EBP competency of an individual or the group of nurses who were studied with respect to the competency of Spanish nurses as a whole, and not only through the use of the mean score. Thus, this instrument can be utilized for the evaluation of professional competencies of the nurses, a fundamental component of the processes of quality improvement in a given health organisation (Numminen et al., 2013).

In future research studies, the EBP-COQ-Prof© and its scale could be used for diagnosing the EBP competency at the individual and group levels, the development of interventions according to the areas of improvement identified in the diagnostic phase, the comparison of competency according to the level of postgraduate training, or monitoring the changes in competency after training interventions.

4.3 | Limitations

The main limitation of the study is the manner in which the participants were selected, as a randomized sampling method could not be utilized, and the administration of the questionnaire was performed online. This could condition the profiles of the health professionals who participated. However, these aspects were tried to be minimized through the stratification according to the autonomous communities and the use of multiple strategies for the selection of the participants, by inviting them to participate through different electronic means to reach the maximum number of nurses possible.

5 | CONCLUSIONS

The Spanish nurses have a level of EBP competency with high scores on attitude, moderate ones on skills and lower ones on knowledge and utilization of the EBP. The factors that influenced EBP competency were linked to the individual: frequency of reading of scientific articles, training in EBP, level of education and number of years after the end of the nursing degree, and the context: tutoring of undergraduate students and working in a BPSO® centre. The nurses with higher levels of education showed high levels of competency in knowledge and skills, and lower levels in the utilization of EBP. The scale proposed for the EBP-COQ-Prof© could be used to facilitate the diagnosis of EBP competency in specific collectives of Spanish nurses, and to monitor and plan individual and collective strategies to improve this competency.

6 | IMPLICATIONS FOR NURSING MANAGEMENT

The evaluation of the EBP competency of front-line nurses is a fundamental element for improving clinical practice. The use of tools that measure the level of EBP competency along with national scales will facilitate the nurse managers and human resource departments in the health services' ability to diagnose and monitor this competency in a robust, simple and contextualized manner. Thus, this will allow nursing management to better direct the focus of the interventions for improving the competency of nurses, as they will understand in which EBP dimension we find a greater number of deficiencies.

Furthermore, the health services that aspire to increase the EBP competency of the nurses can rely on strategic elements such as the hiring of nurses with high levels of academic training, the implementation of continuous training programmes that are specific to EBP and the development of strategies to increase the frequency of reading scientific articles. Besides, the nurses who have a PhD had the greatest EBP competencies, and therefore, they are the ideal health professionals for dealing with aspects related to the management and implementation of the EBP. Also important are measures that favour changes in the work environment and the participation in systematic implementation programmes of evidence, and the collaboration with universities through the tutoring of nursing students.

CONFLICT OF INTEREST
None.

ETHICAL APPROVAL
The study was approved by the Ethics Committee of the University of Murcia (ID: 2540/2019).

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REFERENCES

Belowska, J., Panczyk, M., Zarzeka, A., Iwanow, L., Cieślak, I., & Gotlib, J. (2018). Promoting evidence-based practice–perceived knowledge, behaviours and attitudes of Polish nurses: A cross-sectional validation study. *International Journal of Occupational Safety and Ergonomics*, *26*(2), 397–405. https://doi.org/10.1080/10803548.2018.1489993

Clavijo-Chamorro, M. Z., Sanz-Martos, S., Gómez-Luque, A., Romero-Zarallo, G., & López-Medina, I. M. (2020). Context as a facilitator of the implementation of evidence-based nursing: A meta-synthesis. *Western Journal of Nursing Research*, *43*(1), 60–72. https://doi.org/10.1177/0193945920914397

Coster, S., Watkins, M., & Norman, I. (2018). What is the impact of professional nursing on patients' outcomes globally? An overview of research evidence. *International Journal of Nursing Studies*, *78*, 76–83. https://doi.org/10.1016/J.IJNURSTU.2017.10.009

de Pedro-Gómez, J., Morales-Asencio, J. M., Abad, A. S., Veny, M. B., Vives, G. A., & Campaner, C. P. (2011). Entorno de práctica de los profesionales de enfermería y competencia para la incorporación de la evidencia a las decisiones: Situación en las Islas Baleares. *Gaceta Sanitaria*, *25*(3), 191–197. https://doi.org/10.1016/J.GACETA.2010.11.007

Doležel, J., Zeleníková, R., Mecugni, D., Finotto, J., Patelarou, A., Panczyk, M., Ruzafa-Martínez, M., Ramos-Morcillo, A. R., Skela-Savič, B., Gotlib, J., Patelarou, E., Smodiš, M., & Jarošová, D. (2021). Core evidence-based practice competencies and learning outcomes for European nurses: Consensus statements. *Worldviews on Evidence-Based Nursing*.

Esteban-Sepúlveda, S., Moreno-Casbas, M. T., Fuentelsaz-Gallego, C., & Ruzafa-Martinez, M. (2019). The nurse work environment in Spanish nurses following an economic recession: From 2009 to 2014. *Journal of Nursing Management*, *27*(6), 1294–1303. https://doi.org/10.1111/jonm.12811

Kendall, P. C., Marrs-Garcia, A., Nath, S. R., & Sheldrick, R. C. (1999). Normative comparisons for the evaluation of clinical significance. *Journal of Consulting and Clinical Psychology*, *67*(3), 285–299. https://doi.org/10.1037/0022-006X.67.3.285

Leung, K., Trevena, L., & Waters, D. (2014). Systematic review of instruments for measuring nurses' knowledge, skills and attitudes for evidence-based practice. *Journal of Advanced Nursing*, *70*(10), 2181–2195. https://doi.org/10.1111/jan.12454

Leung, K., Trevena, L., & Waters, D. (2018). Content validation of the evidence-based nursing practice assessment tool. *Nurse Researcher*, *26*(1), 33–40. https://doi.org/10.7748/nr.2018.e1544

McClellan, M. B., McGinnis, M., Nabel, E. G., & Olsen, L. M. (2008). Evidence-based medicine and the changing nature of health care: 2007 IOM annual meeting summary. In *Evidence-based medicine and the changing nature of health care*. The National Academies Press. https://doi.org/10.17226/12041

Melnyk, B. (2014). Building cultures and environments that facilitate clinician behavior change to evidence-based practice: What works? *Worldviews on Evidence-Based Nursing*, *11*(2), 79–80. https://doi.org/10.1111/wvn.12032

Melnyk, B., Gallagher-Ford, L., Long, L., & Fineout-Overholt, E. (2014). The establishment of evidence-based practice competencies for practicing registered nurses and advanced practice nurses in real-world clinical settings: Proficiencies to improve healthcare quality, reliability, patient outcomes, and costs. *Worldviews on Evidence-Based Nursing*, *11*(1), 5–15. https://doi.org/10.1111/wvn.12021

Melnyk, B., Gallagher-Ford, L., Troseth, M., & Wyngarden, K. (2014). *A national survey & forum for nurse executives: Leveraging evidence-based practice to enhance healthcare quality, reliability, patient outcomes and cost containment advisory report in association with*.

Melnyk, B., Gallagher-Ford, L., Zellefrow, C., Tucker, S., Bindu, T., Sinnott, L., & Tan, A. (2018). The first U.S. study on nurses' evidence-based practice competencies indicates major deficits that threaten healthcare quality, safety, and patient outcomes. *Worldviews on Evidence-Based Nursing*, *15*(1), 16–25. https://doi.org/10.1111/wvn.12269

Ministerio de Sanidad, Consumo y Bienestar Social (2019). *Recursos Asistenciales. Informe Anual del Sistema Nacional de Salud 2017*. Retrieved from https://www.mscbs.gob.es/estadEstudios/estadisticas/sisInfSanSNS/tablasEstadisticas/InfSNS2017.htm

Nilsen, P. (2015). Making sense of implementation theories, models and frameworks. *Implementation Science*, *10*(1), https://doi.org/10.1186/s13012-015-0242-0

Numminen, O., Meretoja, R., Isoaho, H., & Leino-Kilpi, H. (2013). Professional competence of practising nurses. *Journal of Clinical Nursing*, *22*(9–10), 1411–1423. https://doi.org/10.1111/j.1365-2702.2012.04334.x

Ortuño-Soriano, I., Muñoz-Jiménez, D., Moreno-Casbas, T., Albornos-Muñoz, L., & González-María, E. (2020). Evaluación de estrategias de implantación del Proyecto Centros Comprometidos con la Excelencia en Cuidados en España. *Enfermería Clínica*, *30*(3), 222–230. https://doi.org/10.1016/j.enfcli.2019.10.027

Patelarou, A. E., Laliotis, A., Brokalaki, H., Petrakis, J., Dafermos, V., & Koukia, E. (2017). Readiness for and predictors of evidence base practice in Greek healthcare settings. *Applied Nursing Research*, *35*, 64–70. https://doi.org/10.1016/j.apnr.2017.02.003

Pérez-Campos, M. A., Sánchez-García, I., & Pancorbo-Hidalgo, P. L. (2014). Knowledge, attitude and use of evidence-based practice among nurses active on the Internet. *Investigacion y Educacion en Enfermeria*, *32*(3), 451–460. https://doi.org/10.17533/udea.iee.v32n3a10

Pericas-Beltran, J., Gonzalez-Torrente, S., De Pedro-Gomez, J., Morales-Asencio, J. M., & Bennasar-Veny, M. (2014). Perception of Spanish primary healthcare nurses about evidence-based clinical practice: A qualitative study. *International Nursing Review*, *61*(1), 90–98. https://doi.org/10.1111/inr.12075

Pétré, B., Gillain, N., Jacqmin, N., Adriaenssens, J., Vandenbosch, K., Gillet, P., Vander Stichele, R., Thienpont, G., & Guillaume, M. (2018). Perception of Belgian nurses about evidence-based clinical practice implementation: A focus group study. *Acta Clinica Belgica: International Journal of Clinical and Laboratory Medicine*, *73*(2), 110–118. https://doi.org/10.1080/17843286.2017.1355428

Ramos-Morcillo, A. J., Fernández-Salazar, S., Ruzafa-Martínez, M., & Del-Pino-Casado, R. (2015). Effectiveness of a brief, basic evidence-based practice course for clinical nurses. *Worldviews on Evidence-Based Nursing*, *12*(4), 199–207. https://doi.org/10.1111/wvn.12103

Ruzafa-Martínez, M., Fernández-Salazar, S., Leal-Costa, C., & Ramos-Morcillo, A. J. (2020). Questionnaire to evaluate the competency in evidence-based practice of registered nurses (EBP-COQ Prof©): Development and psychometric validation. *Worldviews on Evidence-Based Nursing*, *17*(5), 366–375. https://doi.org/10.1111/wvn.12464

Salgado, J. (2005). Personalidad y deseabilidad social en contextos organizacionales: implicaciones para la práctica de la psicología del trabajo y las organizaciones. *Papeles del Psicólogo*, *26*(92), 115–128.

Saunders, H., Gallagher-Ford, L., Kvist, T., & Vehviläinen-Julkunen, K. (2019). Practicing healthcare professionals' evidence-based practice competencies: An overview of systematic reviews. *Worldviews on Evidence-Based Nursing*, *16*(3), 176–185. https://doi.org/10.1111/wvn.12363

Saunders, H., & Vehviläinen-Julkunen, K. (2016). The state of readiness for evidence-based practice among nurses: An integrative review. *International Journal of Nursing Studies*, *56*, 128–140. https://doi.org/10.1016/j.ijnurstu.2015.10.018

Saunders, H., & Vehviläinen-Julkunen, K. (2018). Key considerations for selecting instruments when evaluating healthcare professionals' evidence-based practice competencies: A discussion paper. *Journal of Advanced Nursing*, *74*(10), 2301–2311. https://doi.org/10.1111/jan.13802

Skela-Savič, B., Pesjak, K., & Lobe, B. (2016). Evidence-based practice among nurses in Slovenian Hospitals: A national survey. *International Nursing Review*, *63*(1), 122–131. https://doi.org/10.1111/inr.12233

Solís-Muñoz, M. (2015). *Competencias en práctica clínica basada en la evidencia de las enfermeras en España*. Universidad Complutense de Madrid. Retrieved from http://eprints.ucm.es/34374/1/T36690.pdf

Stone, C., & Rowles, C. J. (2007). Nursing students can help support evidence-based practice on clinical nursing units. *Journal of Nursing Management*, *15*(3), 367–370. https://doi.org/10.1111/j.1365-2834.2007.00713.x

Ubbink, D. T., Guyatt, G. H., & Vermeulen, H. (2013). Framework of policy recommendations for implementation of evidence-based practice: A systematic scoping review. *British Medical Journal Open*, *3*(1), e001881. https://doi.org/10.1136/bmjopen-2012-001881

Upton, D., Upton, P., & Scurlock-Evans, L. (2014). The reach, transferability, and impact of the evidence-based practice questionnaire: A methodological and narrative literature review. *Worldviews on Evidence-Based Nursing*, *11*(1), 46–54. https://doi.org/10.1111/wvn.12019

World Health Organization. Regional Office for Europe (2015). *European strategic directions for strengthening nursing and midwifery towards Health 2020 goals*, Geneva: World Health Organization. Regional Office for Europe. Retrieved from http://www.euro.who.int/__data/assets/pdf_file/0004/274306/European-strategic-directions-strengthening-nursing-midwifery-Health2020_en-REV1.pdf?ua=1