NURSES' knowledge, skills and personal attributes for providing competent health education practice, and its influencing factors: A cross-sectional study

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ABSTRACT

Aim: To explore nurses' knowledge, skills and personal attributes for competent health education practice and their association with potential influencing factors.

Background: Clinical nurses are expected to perform effective health education interventions, but they do not feel competent. The self-assessment of the health education competence and its conditional factors is paramount for professional development.

Design: A cross-sectional study.

Methods: A total of 458 clinical nurses from two health specialized centers in Spain participated in this study. Data were collected using the Nurse Health Education Competence Instrument and a second self-report questionnaire from January to February 2019. Descriptive statistics, *t*-test, analysis of variance, Pearson's and Spearman's correlation and multiple linear regression were used to analyse the data. The STROBE guideline was used

Results: The mean scores of the knowledge (70.10 ± 15.11), skills (92.14 ± 15.18) and personal attributes scales (32.32 ± 5.89) were found to be low to moderate. The main influencing factors for the health education implementation were lack of education and training (71.4%), lack of time (67.5%) and high workload (67.3%). Nurses with higher educational level and perceived self-efficacy for competently providing health education, more extensive professional experience and previous training in health education rated higher in knowledge, skills and personal attributes. Age and years of experience were negatively correlated with knowledge scores, but positively with the rest of domains of the competence and self-efficacy. The regression models for the overall health education competence's domains were significant ($p < 0.001$) with R^2 values ranging from 28.0% to 49.3%. Self-efficacy, previous health education training and working in intensive care units were found to be significant in all cognitive, psychomotor and attitudinal scales.

Conclusion: Clinical nurses reported on some skills and personal attributes for health education practice, but they seem to lack health education knowledge necessary for a competent practice. This study suggested that effective education and training and supportive organizational cultures are key to enhance nurses' health education competence. Identifying nurses' educational needs on the main domains of the competence and its intrinsic/extrinsic influential factors may assist in both planning and organizing tailored training strategies and in promoting appropriate environments to support a high-quality health education practice

Tweetable abstract: Nurses' knowledge, skills and attitudes about health education competence are low to moderate. Training and organizational support are key.

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1. Introduction

Worldwide, it is recognized that nurses have an important role in providing health education in both acute and community settings to improve positive health outcomes (Pueyo-Garrigues et al., 2019; Weiss et al., 2021) and the overall effectiveness of health care delivery (Hwang et al., 2018; Pellet et al., 2020; Shi et al., 2021). In particular, hospital nurses have a notable role in daily health educational practice as they are in close contact with patients and the most accessible health professionals in this setting (See et al., 2020). Importantly, hospitalization provides a "window of opportunity" to advocate lifestyle modifications through the multiple teachable moments that this context offers. Moreover, studies have shown that most patients are considering changing or already want to change at least one aspect of their lifestyle during hospitalization (Khalaf et al., 2017; Pellet et al., 2020). However, hospital nurses may not feel competent in providing effective health education and they have been found to report difficulties in the day-to-day performance of health education interventions (Hwang and Kuo, 2018; Pueyo-Garrigues et al., 2019). Even further, educating patients is one of the three most neglected aspects of the nursing care process (Lelorain et al., 2019; See et al., 2020).

Health education practice is challenging, as changing a person's behavior is a complex task (Ghorbani et al., 2014; Kang et al., 2020). Especially in hospitals, where excessive workloads, a physician-oriented atmosphere, short patient stays and a lack of clear protocols for developing competency in health education practice prevail, there is little value placed on nurses performing health education interventions (Hwang and Kuo, 2018; Hwang et al., 2018; Kang et al., 2020; See et al., 2020). In addition, a lack of skills, knowledge, motivation and self-confidence may adversely affect the quality of education provided by nurses (Khalaf et al., 2017; Lelorain et al., 2019), as these elements are basic requirements for competent health education practice (Garshasbi et al., 2014). In line with the above, Hwang and Kuo (2018) and Weiss et al. (2021) highlight that professional competency in health education practice has not received the attention it deserves. Indeed, most clinical nurses recognize the need for training in health education (Fereidouni et al., 2019; Hwang et al., 2018).

Interventions aimed at increasing nurses' health education competence should be tailored to nurses' learning needs and personal characteristics and should consider contextual factors such as having organizational support (Chaghari et al., 2017; Lin and Wang, 2017; Soto et al., 2018). In fact, hospital nurses' specific needs related to their provision of health education and the factors influencing their delivery of such education have not been assessed in depth so far (Moonaghi et al., 2016; See et al., 2020). To the best of our knowledge, no study has investigated nurses' knowledge, skills and personal attributes related to promoting health education. Moreover, research comparing nurses' educational needs based on different personal and contextual variables, such as the work unit or previous training, is scarce. Additionally, the relationships of such variables with nurses' self-efficacy for a competent health education practice has not been previously explored.

In this study we first aimed to explore hospital nurses' knowledge, skills and personal attributes related to health education competence. Second, to identify what perceived factors influence on its performance. Third, to examine how nurses' socio-demographic, work characteristics and self-efficacy are associated with the different domains of the health education competence.

2. Methods

2.1. Design

A cross-sectional study was performed. The present study was the second objective of a larger project, which sought i) to develop and validate a new instrument to measure nurses' health education competence (Pueyo-Garrigues et al., 2020); ii) to map the status of this

competence to identify potential learning needs and iii) to design training programs focused on the development of the health education competence and evaluate its effectiveness. The STROBE Statement checklist was used for reporting this study (online supplemental material).

2.2. Participants

A convenience sample of 477 clinical nurses was recruited from different clinical departments: hospital ward; intensive care units; outpatient consultation; and others, such as haemodialysis and perioperative departments, from two public and private health specialized centers in Navarra, north of Spain. Nurses were eligible if they were expected to administer health education as part of their core clinical role.

Before starting the data collection, we decided to aim for more than 384 respondents, based on recommendations from Price et al. (2005), which should give an acceptable 95% confidence level, assuming a 50%/50% distribution of results in a descriptive study.

2.3. Data collection

Data were collected from January to February 2019. Potential participants were met in their clinical settings by the researcher and provided with information about the study. Those who agreed to participate were asked to sign a consent form and then to complete the survey. The researcher was present at the time the participant completed it to answer possible questions and to collect the questionnaire.

2.4. Measures

Competence assessment involves measuring knowledge, skills and attitudes and values such that the capacity to act effectively and professionally is based on these essential components. According to this, health education competence is defined as the required knowledge, skills and attitudes and values for implementing a planned teaching-learning process characterized by and equitable and negotiated 'partnership' centered in patient's needs to facilitate and empower the person in promoting lifestyle-related behavioural changes that foster positive health outcomes (Pueyo-Garrigues et al., 2020).

The Nurse Health Education Competence Instrument (in Spanish, "Instrumento Competencia de Educación para la Salud del profesional de Enfermería" — I-CEpSE) was used to measure the learning needs of nurses related to knowledge, skills and personal attributes for health education (Pueyo-Garrigues et al., 2020). The I-CEpSE consists of a multidimensional inventory with three self-reported scales:

a) The "cognitive domain scale" comprises 23 items examining specific knowledge about health and its determinants, health education and pedagogical resources and techniques. Respondents are required to score each item on a five-point Likert scale (1 =*very low* to 5 =*very high*), with a higher score indicating a greater level of knowledge. The Cronbach's alpha coefficients were 0.95 for the total scale and 0.81, 0.88 and 0.95 for each of the subscales mentioned above respectively (Pueyo-Garrigues et al., 2020).

b) The "psychomotor domain scale" includes 26 items scored on a five-point Likert-type scale (1 =*completely disagree* to 5 =*completely agree*) that explore nurses' personal social skills and educational skills. Higher scores reflect better health education practice skills. The Cronbach's alpha coefficients were 0.95 for the total scale and 0.88 and 0.95 for each respective mentioned subscale (Pueyo-Garrigues et al., 2020).

c) The "attitudinal and affective domain scale" comprises 9 items scored on a five-point Likert-type scale (1 =*completely disagree* to 5 =*completely agree*) that assess nurses' personal attributes related to health education practice, including their intention, attitudes and confidence for specific aspects of the health education practice (i.e., creating a learning atmosphere, or promoting patient's commitment to achieve

the behavior change). Higher values indicate more positive personal attributes. The Cronbach's alpha was 0.90 (Pueyo-Garrigues et al., 2020).

Additionally, a self-reported questionnaire was administered asking for demographic and work-related characteristics: age, sex, educational level, current work department, years of experience in the current department, additional training in health education received in their professional development through continuing education and self-efficacy (on a scale from 0 to 10) for a competent health education practice in their current work department. Further, a list of potential influencing factors of health education practice, where multiple answers were allowed, were added. They included personal (intrinsic) factors such as lack of education or training in health education and institutional (extrinsic) factors such as lack of time, lack of an organizational culture, lack of standardized protocols, lack of access to educational resources, lack of a position in the nursing register and high workload. These personal and institutional factors were selected based on previous nursing research (Friberg et al., 2012; Hwang and Kuo, 2018). Nurses could also add comments in an open-text field.

2.5. Data analysis

Continuous variables are described as mean [standard deviation (SD)] and categorical variables as frequencies and percentages (n, %).

We performed the independent two sample *t*-test, one-way analysis of variance or Mann–Whitney *U* test to analyze the differences in the knowledge, skills and personal attributes scores and self-efficacy scores by the demographic and work-related characteristics. For this analysis, age was categorized into terciles. In addition, Pearson's and Spearman's correlation analysis were performed to examine the relationships among I-CEpSE scores, self-efficacy, age, years of experience, sex, education level, health education training and work department. Finally, multiple linear regression analyses were conducted to investigate individual and work-related characteristics as potential confounders.

In the study, the respondents who had fewer than five missing items on the I-CEpSE (10% of the items) were included. Missing data were replaced by mean imputation.

STATA (version 12) was used to perform the analysis (StataCorp, College Station, TX, USA). The statistical significance was set at 5% (p-values <0.05; based on two-tailed test).

2.6. Ethical considerations

The Research Ethics Committee of the University of Navarra approved the study (No. 2017.231). All the participants were informed about the voluntary nature of the study and signed an informed consent form.

3. Results

3.1. Participant characteristics

Of the 477 nurses invited to participate in the study, 458 completed the questionnaire (a response rate of 96.0%). There were no incomplete returns and in no case were there more than two item omissions. Table 1 describes the demographic and work-related characteristic of the participants. Of a total of 458 respondents, 248 (54.2%) worked in hospital wards. The participants' mean age was 41.1 (*SD* 10.8) years and they had worked a mean of 9.5 (*SD* 10.0) years in the current department. Most participants had a diploma in nursing (69.6%) and most had not received additional training (86.4%). The respondents' average score for self-efficacy perception of competently providing health education was 6.7 (*SD* 1.4), indicating an overall satisfactory score (Nuffic, 2019).

Table 1
Demographic and work-related characteristic of the sample.

Variables	
Age (n = 454), mean (SD)	41.1 (10.8)
Sex (n = 458), *n* (%)	
Male	18 (3.9)
Female	440 (96.1)
Education level (n = 457), *n* (%)	
Nursing diploma	318 (69.6)
Bachelor degree	84 (18.4)
Postgraduate degree	55 (12.0)
Health education training (n = 449), *n* (%)	
No	388 (86.4)
Yes	61 (13.6)
Work department (n = 458), *n* (%)	
Hospital ward	248 (54.2)
Intensive care unit	65 (14.2)
Outpatient consultation	62 (13.5)
Other department	83 (18.1)
Years working in the current department (n = 391), mean (SD)	9.5 (10.0)
Self-efficacy for a competent health education practice (n = 420), mean (SD)	6.7 (1.4)

Note. SD = standard deviation

3.2. Scores of the knowledge, skills and personal attributes scales of the I-CEpSE

The I-CEpSE mean scores for the total knowledge, skills and personal attributes scales were 70.10 (*SD* 15.11; theoretical range [TR] 23–115), 92.14 (*SD* 15.18; TR 26–130) and 32.32 (*SD* 5.89; TR 9–45), respectively. Based on the theoretical score range for the subscales, the highest mean scores were found for the dimensions "personal and social skills" (M=34.73; *SD* 4.66; TR 9–45) and "knowledge about health and its determinants" (M=18.52; *SD* 2.90; TR 5–25) and the lowest mean scores were found for "knowledge about health education" (M=24.74; *SD* 5.40; TR 8–40) and "knowledge about pedagogical resources and techniques" (M=26.95; *SD* 8.66; TR 10–50). (See Table 2 for further information).

3.3. Comparison of demographic, work-related characteristics and perceived self-efficacy by knowledge, skills and personal attributes scales

Table 2 shows the effects of demographic and work-related characteristics on the I-CEpSE scores and with self-efficacy perception. There were significant differences in the scores of knowledge, skills and personal attributes domains, as well in the scores of all dimensions, except for the "knowledge about health and its determinants" dimension, based on the departments where nurses worked. Compared with nurses who had diploma in nursing, those who had bachelor degree or above had higher knowledge scores. In addition, those who had more than two years of experience in their current department had higher scores in each of the skills dimensions and higher total skills and personal attributes scores than those who did not. The results also showed that nurses who had received health education training had higher self-rates scores on the total knowledge, skills and personal attributes domains of the I-CEpSE and their dimensions, than those who had not received such training. In addition, comparing age terciles, findings showed there were significant differences in the scores of total knowledge and skills

Table 2

The effects of demographic and work-related variables on the I-CEpSE scores and self-efficacy scale.

	Knowledge (total score)	Knowledge about health	Knowledge about health education	Knowledge about techniques	Skills (total score)	Personal social skills	Educational skills	Personal attributes	Self-efficacy
M (SD) Total	70.10 (15.11)	18.52 (2.90)	24.74 (5.40)	26.95 (8.66)	92.14 (15.18)	34.73 (4.66)	57.41 (11.65)	32.32 (5.89)	6.72 (1.44)
Work department									
Hospital ward	70.29 (14.35)	18.46 (2.82)	24.72 (5.13)	27.11 (8.61)	93.08 (14.77)	35.03 (4.29)	58.05 (11.48)	32.63 (5.74)	6.71 (1.47)
Intensive care unit	64.88 (14.46)	17.95 (3.28)	23.06 (5.10)	23.86 (7.87)	85.38 (14.88)	32.88 (5.24)	52.51 (10.90)	29.42 (5.16)	6.26 (1.41)
Outpatient consultation	71.18 (16.58)	18.73 (2.93)	24.83 (5.73)	27.61 (9.02)	90.13 (14.69)	33.77 (4.63)	56.36 (11.62)	32.05 (5.80)	6.76 (1.26)
Other departments	73.37 (15.74)	19.05 (2.65)	25.69 (6.07)	28.63 (8.54)	98.13 (15.02)	36.74 (4.57)	61.39 (11.47)	34.48 (5.23)	7.24 (1.41)
p value	0.011	0.165	0.044	0.010	<0.001	<0.001	<0.001	<0.001	0.005
Education level									
Nursing diploma	68.39 (14.98)	18.42 (2.88)	24.12 (5.48)	25.86 (8.63)	92.57 (15.71)	34.84 (4.70)	57.73 (12.09)	32.37 (5.97)	6.73 (1.44)
Bachelor degree	73.50 (13.60)	18.54 (2.82)	25.35 (4.91)	29.62 (7.24)	90.60 (13.48)	34.30 (4.22)	56.30 (10.39)	32.36 (5.92)	6.77 (1.27)
Postgraduate degree	75.02 (16.39)	19.13 (3.10)	26.60 (5.21)	29.29 (9.57)	92.05 (14.67)	34.78 (5.13)	57.27 (11.05)	32.07 (5.46)	6.56 (1.68)
p value	0.001	0.244	0.003	<0.001	0.571	0.634	0.606	0.941	0.777
Years in current department									
< 2 years	71.27 (14.24)	18.63 (2.81)	24.67 (5.22)	27.96 (7.86)	89.63 (13.79)	34.01 (4.5)	55.63 (10.65)	31.26 (5.58)	6.46 (1.47)
> 2 years	69.71 (15.55)	18.57 (3.00)	24.59 (5.60)	26.56 (8.90)	93.18 (15.96)	35.05 (4.9)	58.14 (12.15)	32.82 (6.04)	6.86 (1.41)
p value	0.343	0.838	0.885	0.131	0.033	0.047	0.047	0.014	0.013
Previous training									
Yes	76.15 (14.75)	19.05 (2.83)	26.96 (4.65)	30.12 (8.66)	97.98 (13.94)	35.88 (4.34)	62.10 (10.45)	35.25 (5.58)	7.31 (1.36)
No	67.53 (14.55)	18.30 (2.90)	23.64 (5.41)	25.67 (8.32)	89.71 (14.95)	34.25 (4.69)	55.47 (11.53)	31.12 (5.59)	6.45 (1.39)
p value	<0.001	0.013	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001
Age									
22–36 years (T1)	73.24 (13.38)	18.72 (2.70)	25.16 (5.26)	29.35 (7.35)	90.16 (14.13)	34.01 (4.45)	56.15 (10.96)	31.69 (5.33)	6.60 (1.36)
37–47 years (T2)	69.39 (15.58)	18.25 (3.08)	24.54 (5.18)	26.60 (8.90)	91.78 (14.74)	34.88 (4.51)	56.90 (11.47)	32.41 (5.88)	6.68 (1.45)
48–63 years (T3)	67.10 (15.67)	18.56 (2.92)	24.06 (5.77)	24.48 (8.99)	94.50 (16.58)	35.33 (4.98)	59.18 (12.50)	32.89 (6.46)	6.88 (1.52)
p value	0.002	0.358	0.209	<0.001	0.046	0.045	0.068	0.212	0.276
Sex									
Female	69.87 (14.97)	18.47 (2.89)	24.65 (5.35)	26.75 (8.56)	92.34 (15.10)	34.78 (4.62)	57.56 (11.61)	32.37 (5.89)	6.72 (1.45)
Male	75.78 (17.95)	19.83 (2.81)	24.22 (6.66)	31.72 (9.95)	87.22 (16.64)	33.50 (5.57)	53.72 (12.21)	31.17 (5.90)	6.60 (1.18)
p value	0.186	0.058	0.975	0.041	0.231	0.457	0.205	0.304	0.477

Note. T = Tercile. Theoretical score ranges: Knowledge total score (23–115); Knowledge about health and its determinants (5–25); Knowledge about health education (8–40); Knowledge about techniques (10–50); Skills total score (26–130); Personal and social skills (9–45); Educational skills (17–85); Personal attributes (9–45); Self-efficacy (0–10)

domains, as well as in each of the skills dimensions. Comparisons by sex reflected male nurses scored higher for the "knowledge about pedagogical techniques" dimension.

Further, statistically significant differences were found among the nurses' self-efficacy scores by current work department, work experience and history of health education training.

3.4. Correlations among I-CEpSE scores, demographic and work-related and self-efficacy variables

Table 3 shows the correlations among the study continuous variables. The total knowledge score was negatively correlated with age ($r = -0.169$, $p < 0.001$) and years of experience in the current department ($r = -0.048$), but the latter was not significant. The total skills score was positively correlated with age ($r = 0.107$, $p = 0.020$) and years of experience ($r = 0.108$, $p = 0.030$). The total personal attributes score was positively correlated with years of experience ($r = 0.123$, $p = 0.010$) and age, but not significantly. Self-efficacy was significantly positively correlated with the three total scale scores of the I-CEPSE ($r = 0.420 \sim 0.674$, $p < 0.001$) and all their dimensions scores ($r = 0.280 \sim 0.500$, $p < 0.001$). Further, self-efficacy was found to have significant positive correlations with years of experience ($r = 0.130$, $p = 0.010$), but nonsignificant with age.

Table 4 reflects the correlations among the categorical variables. The total knowledge score was negatively correlated with sex (rho=−0.062), but positively with the current work department (rho=0.038), education level (rho=0.159, $p = 0.001$) and health education training (rho=0.259, $p < 0.001$). The total skills score was positively correlated with sex (rho=0.056), work service (rho=0.011) and attending health education training (rho=0.249, $p < 0.001$), but negatively with education level (rho=−0.048). Finally, the total personal attributes score was positively correlated with sex (rho=0.048), work department (rho=0.022) and health education training (rho=0.330, $p < 0.001$), but negatively with education level (rho=−0.016).

Table 3
The correlations among I-CEPSE scores, continuous sociodemographic and work-related variables and self-efficacy.

Independent variable	Knowledge (total)	Knowledge about health	Knowledge about education	Knowledge about resources	Skills (total)	Personal social skills	Educational skills	Personal attributes	Self-efficacy	Age	Years of experience
Knowledge (total)	1.000	0.734 **	0.894 **	0.942 **	0.447 **	0.336 **	0.448 **	0.435 **	0.420 **	-0.169 **	-0.048
Knowledge about health	–	1.000	0.615 **	0.563 **	0.258 **	0.286 **	0.221 **	0.274 **	0.280 *	-0.043	-0.010
Knowledge about education	–	–	1.000	0.731 **	0.418 **	0.325 **	0.415 **	0.454 **	0.433 **	-0.095 *	-0.007
Knowledge about resources	–	–	–	1.000	0.433 **	0.289 **	0.449 **	0.384 **	0.368 *	-0.221 **	-0077
Skills (total)	–	–	–	–	1.000	0.823 **	0.974 **	0.710 **	0.512 **	0.107 *	0.108 *
Personal and social skills	–	–	–	–	–	1.000	0.672 **	0.596 **	0.433 **	0.101 *	0.101 *
Educational skills	–	–	–	–	–	–	1.000	0.687 **	0.500 **	0.100 *	0.100 *
Personal attributes	–	–	–	–	–	–	–	1.000	0.674 **	0.079	0.123 *
Self-efficacy	–	–	–	–	–	–	–	–	1.000	0.087	0.130 *
Age	–	–	–	–	–	–	–	–	–	1.000	0.413 **
Years of experience in the department	–	–	–	–	–	–	–	–	–	–	1.000

Note: Pearson correlation coefficient analysis was used.*Correlation is significant at the 0.05 level (two-tailed).* *Correlation is significant at the 0.001 level (two-tailed).

Table 4
The correlations among I-CEPSE scores, categorical sociodemographic and work-related variables and self-efficacy.

Independent variable	Knowledge (total)	Knowledge about health	Knowledge about education	Knowledge about resources	Skills (total)	Personal social skills	Educational skills	Personal attributes	Self-efficacy
Sex	-0.062	-0.088	-0.002	-0.096 *	0.056	0.035	0.059	0.048	0.035
Educational level	0.159 **	0.065	0.156 **	0.178 **	-0.048	-0.030	-0.050	-0.016	-0.002
Health education training	0.259 **	0.119 *	0.272 **	0.242 **	0.249 **	0.161 **	0.260 **	0.330 **	0.287 **
Working unit	0.038	0.071	0.013	0.031	0.011	0.017	0.009	0.022	0.058

Note: Spearman correlation coefficient analysis was used.*Correlation is significant at the 0.05 level (two-tailed).* *Correlation is significant at the 0.001 level (two-tailed).

Table 5
Multiple linear regressions.

Independent variables	Dependent variables							
	Knowledge (total)	Knowledge about health	Knowledge about education	Knowledge about resources	Skills (total)	Personal social skills	Educational skills	Personal attributes
Sex	-2.224	-0.971	1.819	-3.073	8.436 *	1.715	6.721 *	1.138
Age	-0.299 *	-0.009	-0.059	-0.232 **	-0.035	-0.009	-0.026	-0.030
Self-efficacy	3.677 **	0.542 **	1.368 **	1.766 **	4.717 **	1.291 **	3.426 **	2.523 **
Health education training	6.369 **	0.404	2.452 **	3.512 **	4.674 *	0.696	3.978 **	1.815 *
Years in current department	0.543	-0.108	0.243	0.408	2.098	0.636	1.462	0.627
Education level								
Bachelor degree	0.361	-0.318	0.301	0.378	-1.883	-0.506	-1.377	-0.434
Postgraduate degree	4.774 *	0.667	2.196 *	1.911	1.279	0.302	0.976	-0.312
Work department								
Intensive care unit	-4.185 *	-0.437	-0.901	-2.846 *	-6.917 **	-2.214 **	-4.703 *	-2.576 **
Outpatient consultation	4.083	0.387	0.822	2.873 *	2.109	1.203	0.907	0.500
Other departments	3.817 *	0.511	1.152	2.154 *	-1.827	-1.146	-0.681	-0.198
R^2	0.280	0.108	0.265	0.272	0.325	0.258	0.296	0.493

Note: reference variables: male (sex), none (health education training), < 2 years (years in current department), nursing diploma (education level), hospital ward (work department).
*Coefficient is significant at the 0.05 level.
* *Coefficient is significant at the 0.001 level.

3.5. Multiple regression analysis to test relationship between I-CEpSE scores and demographic, work-related and self-efficacy

Table 5 summarizes the results of the multiple linear regressions, with the I-CEpSE scores as the outcome variables. The regression models for the overall health education competence's domains showed R^2 ranged from 28.0% to 49.3%. Being trained in health education and higher self-perceived efficacy was shown to have an increased association with the overall health education competence, whereas working in intensive unite care was negatively associated with all its domains. Further age was also negatively associated with the cognitive domain ($\beta = -0.299$; $p = 0.001$). This means that an increase in age of 1 point results in a decrease in knowledge by -0.299 points of the mean score.

3.6. Reported influencing factors of health education practice

Among the personal (intrinsic) factors, nurses chiefly identified the lack of education and training during their professional development as the one that most influenced their practice. Among the institutional (extrinsic) factors, heavy workload, lack of time, lack of supportive organizational culture and lack of access to educational resources at work placement to perform this competence were the most reported. Additional issues noted in the open-text field included lack of comfortable physical spaces where education could be provided, lack of continuity due to nurses' shifts and the acute condition of patients. Results are presented in the supplemental material Table 1.

4. Discussion

This is the first study to map knowledge, skills and personal attributes of clinical nurses in relation to the health education competence, facilitating the detection of potential learning needs which constitutes a fundamental step in professional development (Fukada, 2018; Sharghi et al., 2015). In addition, this study identifies what factors influence the level of competence in health education.

The study revealed that nurses generally had some overall skills and personal attributes related to health education, while their knowledge necessary for its competent practice lagged behind. Specifically, nurses reported higher scores in personal and social skills (i.e. active listening, or empathetic understanding) and knowledge about health and its determinants (i.e. health as a positive concept, or the personal and socio-environmental factors). According to previous studies, clinical nurses have favorable health-related content knowledge, interpersonal abilities and personal attributes (i.e., recognise health education as a responsibility) since these are essential elements in nursing and such competence is identified as an integral part of nursing care (Melo et al., 2011; Pueyo-Garrigues et al., 2019). In contrast, our study reveals clinical nurses have lower scores in educational skills (i.e. identify/create a teaching-learning opportunity) and specific knowledge about health education (i.e. the teaching-learning process, or dimensions addressed when health education is provided) and about pedagogical techniques and resources (i.e. types of behavior change interventions, or existing teaching material to support patient's learning). This might be explained by the lack of priority of health education in nursing formal curriculums (Gormley and Melby, 2020; Ruano-Casado and Ballestar-Tarín, 2015; Soto et al., 2018; Weiss et al., 2021), being further necessary to reorient the curricula to a more positive health paradigm (Pueyo-Garrigues et al., 2019). These findings are consistent with other studies on related competences, such as patient education or health literacy (Cafiero, 2013; Eloranta et al., 2016; Ghorbani et al., 2014; Nesari et al., 2019; Svavarsdóttir et al., 2016; Weiss et al., 2021).

In addition to the above, importantly, health professionals' levels of knowledge and skills are not parallel to their attitudes; although having favorable personal attributes for health education is crucial, it is not in itself sufficient to deliver competent health education into clinical practice (Cafiero, 2013; Garshasbi et al., 2014; Pueyo-Garrigues et al., 2019). A reason for this could be that nurses' top priorities are more acute tasks and care planning activities to reduce patient risks, not health education, or that there is a lack of facilities for health education practice (Ghorbani et al., 2014; See et al., 2020). Hence, the implementation of health education requires a combination of a wide range of knowledge, skills and personal attributes, in addition to organizational support (Eloranta et al., 2016; Fukada, 2018).

Our study results demonstrated that lack of education and training was the main reported influencing factors. Therefore, educational programs focused on improving knowledge, skills and personal attributes could be essential, as supported by other studies (Cafiero, 2013; Moonaghi et al., 2016; Pellet et al., 2020; Soto et al., 2018; Torkshavand et al., 2020). Specifically, interventions based on cognitive, psychomotor and attitudinal and affective levels are crucial for the acquisition of the core elements for competent practice (Coleman et al., 2013; World Health Organization, 2016). In line with this, the findings from this study could guide the design of such programs and the establishment of learning objectives, in both nursing curriculums and continuing education to further the development of nurses in health education competency (Lin and Wang, 2017).

Other influencing factors such as high workload and scarcity of time, normalized protocols and pedagogical resources are related to the absence of an organizational culture that promotes the integration/implementation of health promotion in hospital settings. An organizational culture embracing health education practices and policies could encourage nurses to consider health education activities as planned and formal tasks and necessary for the fulfillment of nurses' educational role (Fereidouni et al., 2019; Ghorbani et al., 2014; Kang et al., 2020). These results have also been verified by other studies that highlighted the key position of nursing managers in promoting a more proficient culture for proactive health education implementation (Hwang and Kuo, 2018; Menichetti et al., 2019). Additional barriers identified by nurses in this study were having patients in acute conditions, a lack of comfortable spaces and appraisal files for documentation, a lack of continuity of care and time shortages, consistent with other researches (Hwang et al., 2018; Moonaghi et al., 2016).

Regarding variables associated with the competence's domains, the results demonstrated a significant difference in knowledge scores among respondents with different educational levels: those with a bachelor or postgraduate degree had higher scores on the I-CEpSE cognitive domain scale, as in Friberg et al. (2012). Usually, undergraduate nursing education places more emphasis on professional knowledge and less on training for the implementation of such knowledge for the cultivation of skills and favorable personal attributes (Hwang et al., 2018; Soto et al., 2018; Torkshavand et al., 2020). This is in line with our findings from age tercile comparison, where younger nurses scored higher in the cognitive domain.

As expected, previous health education training and educational level was related to higher scores on all I-CEpSE scales and a higher self-efficacy score (Cafiero, 2013; Hussain, 2015). This finding pointed the necessary integration of health education competence into graduate curricula and continuing education. This could fill the gap between theory and practice, playing an essential role in fostering the implementation of health education in clinical practice (Bergh et al., 2014; Gormley and Melby, 2020; Svavarsdóttir et al., 2015; Torkshavand et al., 2020).

Further, the present study shows that clinical experience was associated with a higher score for total skills and personal attributes on the I-CEpSE scores and a higher self-efficacy score among hospital nurses. Compared with nurses with less than two years of experience in the current department, those with more experience had the confidence and abilities to carry out routine work and deal with educational situations (Jones, 2010; Svavarsdóttir et al., 2015). This is in concordance with results from age tercile comparison, where nurses with more years obtained higher scores in skills and attitude domains.

In addition, we found significant differences in knowledge, skills, personal attributes and self-efficacy among nurses from different hospital departments, with nurses from intensive care units having lower scores than those in other departments. This can be explained by the severity of patient conditions and the complexity of care in intensive care units, as well as the dominance of the biomedical paradigm, which prevents nurses from fully developing competence in health education (Menichetti et al., 2019; Pueyo-Garrigues et al., 2016).

Self-efficacy has been identified as an important factor associated with health education competent practice (Gómez, 2013; Lelorain et al., 2019). Based on our results, personal attributes had the highest association with nurse's global self-efficacy. As Cafiero (2013) and Kalua and Nyasulu (2007) noted, personal attributes, which include health professionals' attitudes, intention and self-confidence, are the first necessary element, as these attributes act as a predictor or mediator between knowledge and the implementation of health education and as a predictor of behavior. Therefore, there is a reciprocal relationship between nurses' self-efficacy and their knowledge, skills and personal attributes that support the competence.

Finally, multivariate analyses show that there were associations between the three main competence's domains and attending capacitation in health education and self-perceived efficacy, as the univariate analysis revealed. In addition, the work department was identified as an important variable, having nurses from intensive care units a significant decrease in the knowledge, skills and attitudes for a competent health education practice (Menichetti et al., 2019; Pueyo-Garrigues et al., 2016).

4.1. Limitations

This study was limited by its nonrandom sampling technique. To some extent, purposive sampling limits the representativeness of the sample, diminishing the generalizability of the findings. Nonetheless, public and private hospital institutions and various departments were enrolled and the sample size was large. In addition, female nurses mainly composed the sample and findings from contrasting groups by sex need to be interpreted with caution. Further, despite interpretability of the I-CEpSE scores could be made based on full theoretical ranges, cutoff point scores for indexing competency are not available and is an issue to be taken into account in interpreting nurses' competence. Consideration should be also given to the use of a non-validated single-item scale for measuring nurses' overall self-efficacy in implementing health education in their work department which could lead to random measurement errors (Hoeppner et al., 2011). Finally, the study was based on a self-report tool, which may have introduced reporting bias as it may lead to an over or under estimation of the construct assessed and therefore the results should be interpreted with caution (Colthart et al., 2008).

5. Conclusion

This is the first study to offer insight into hospital-based nurses' perceptions of their knowledge, skills and personal attributes needed for a competent health education practice. The findings suggest that nurses at the forefront of patient care lack overall knowledge of health education, having only some skills and personal attributes to support its practice. A lack of education and training, lack of time and high workload were pointed as the common barriers. Furthermore, nurses' competence was significantly related to the following factors: educational level, work department, history of health education training or education, years of experience, age and self-efficacy for a competent daily health education practice. Because hospital nurses are strategically positioned to lead health education efforts, more attention must be paid to their health education competence. Suitable interventions and strategies, such as providing effective education and training programs and creating a hospital-wide health promotion culture and infrastructure, should be developed and implemented to enhance their knowledge, skills and personal attributes related to health education.

CRediT authorship contribution statement

Maria Pueyo-Garrigues: Conceptualization, Methodology, Formal Analysis, Investigation, Writing Original Draft, Funding Acquisition. **Miren Idoia Pardavila-Belio:** Conceptualization, Methodology, Investigation, Supervision, Writing- Reviewing and Editing, Funding Acquisition. **Ana Canga-Armayor:** Writing- Reviewing and Editing. **Nuria Esandi:** Writing- Reviewing and Editing. Cristina **Alfaro-Díaz:** Writing-Reviewing and Editing. **Navidad Canga-Armayor:** Conceptualization, Methodology, Investigation, Supervision, Writing- Reviewing and Editing, Funding Acquisition.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.nepr.2021.103277.

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