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Original article

Factors associated with knowledge of palliative care of nursing students

Factores asociados a conocimientos sobre cuidados paliativos de estudiantes de Enfermería

Fatores associados ao conhecimento sobre cuidados paliativos de estudantes de enfermagem

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ABSTRACT

Introduction. Gaps in palliative care (PC) care in low-middle-income countries may be related, among other factors, to insufficient training of nursing professionals. The objective of this study is to identify the factors associated with having an adequate level of knowledge about CP in undergraduate nursing students at a university in Colombia. **Methodology.** Cross-sectional study in 182 nursing students. The adequate level of knowledge in PC was considered as a dependent variable. Sociodemographic and academic variables, and perceptions in PC (measured by the Rotterdam-MOVE2PC scale) were evaluated as potentially associated factors. The population and perceptions were characterized using descriptive statistics, and multiple logistic regression was performed to identify associated factors. **Results.** 9.89% of students had an adequate level of knowledge in PC. Associated factors were identified as studying between 5-8 semester (OR=9.48, 95%CI=2.26-39.60), living with a partner (OR=5.57, 95%CI=1.04-29.79), and predominantly agree with the opinions in CP (OR=5.24, 95% CI=1.46-18.83). **Discussion.** The level of knowledge in PC identified in this study is like that reported in previous studies in Colombia. The associated factors



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Author Contributions

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Conceptualization, methodology, formal analysis, supervision, writing – original draft, writing – review and editing. **JZMA.** Conceptualization, investigation, writing – review and editing. **LAMB.** Conceptualization, investigation, writing – review and editing. **AVBB.** Conceptualization, investigation, writing – review and editing.

are consistent with those described in other contexts. In this study, being a woman and having religious beliefs were not associated with an adequate level of knowledge in PC. **Conclusions.** Less than 10% of nursing students have an adequate level of knowledge in PC. It is necessary to adjust the nursing curriculum considering students' perceptions of PC in order to adequately train them in PC, especially those between the first and fourth semester.

Keywords:

Palliative Care; Hospice Care; Knowledge; Risk Factors; Perception; Students, Nursing; Curriculum; Education, Professional.

RESUMEN

Introducción. Las brechas en la atención en cuidados paliativos (CP) en países de bajos-medianos ingresos pueden estar relacionadas, entre otros factores, con insuficiente capacitación de los profesionales de Enfermería. El objetivo de este estudio es identificar los factores asociados a tener un nivel adecuado de conocimientos sobre CP en estudiantes de Enfermería de una universidad de Colombia. **Metodología.** Corte transversal en 182 estudiantes de Enfermería. Se consideró variable dependiente el nivel adecuado de conocimientos sobre cuidados paliativos (CCP). Las variables sociodemográficas, académicas y percepciones en CP se evaluaron como factores potencialmente asociados. Se caracterizaron a la población y las percepciones con estadística descriptiva y regresión logística múltiple para identificar los factores asociados. **Resultados.** El 9.89 % de estudiantes tuvieron nivel adecuado de conocimientos en CP. Se identificaron como factores asociados cursar entre 5 y 8 semestre (OR = 9.48, IC95% = 2.26-39.60), vivir con pareja (OR = 5.57, IC95% = 1.04-29.79) y estar predominantemente de acuerdo con las opiniones en CP (OR = 5.24, IC95% = 1.46-18.83). **Discusión.** El nivel de conocimientos en CP identificado es similar al reportado en estudios previos en Colombia. Los factores asociados son consistentes con los descritos

en otros contextos. En este estudio, el sexo y las creencias religiosas no fueron asociados a un adecuado nivel de conocimientos en CP. **Conclusiones.** Menos del 10% de estudiantes de Enfermería tienen un nivel adecuado de conocimientos en CP. Es necesario ajustar el currículo de Enfermería considerando las percepciones sobre CP de los estudiantes, para capacitarlos adecuadamente en CP, especialmente a aquellos entre primer y cuarto semestre.

Palabras clave:

Cuidados Paliativos; Cuidados Paliativos al Final de la Vida; Conocimiento; Factores de Riesgo; Percepción; Estudiantes de Enfermería; Curriculum; Educación Profesional.

RESUMO

Introdução. As lacunas na assistência em cuidados paliativos (CP) em países de baixa e média renda podem estar relacionadas, entre outros fatores, à insuficiente capacitação dos profissionais de enfermagem. O objetivo deste estudo é identificar os fatores associados a um nível adequado de conhecimento sobre CP em estudantes de enfermagem de uma universidade da Colômbia. **Metodologia.** Estudo transversal com 182 estudantes de Enfermagem. Considerou-se como variável dependente o nível adequado de conhecimentos sobre cuidados paliativos (CCP). As variáveis sociodemográficas, acadêmicas e percepções em CP foram avaliadas como fatores potencialmente associados. A população e as percepções foram caracterizadas por meio de estatística descritiva e regressão logística múltipla para identificar os fatores associados. **Resultados.** Dos estudantes, 9.89% apresentaram um nível adequado de conhecimentos em CP. Foram identificados como fatores associados estar cursando entre o 5º e o 8º semestre (OR = 9.48, IC95% = 2.26-39.60), viver com parceiro(a) (OR = 5.57, IC95% = 1.04-29.79) e concordar predominantemente com as opiniões em CP (OR = 5.24, IC95% = 1.46-18.83). **Discussão.** O nível de conhecimento em CP identificado é semelhante ao relatado em estudos anteriores na Colômbia. Os fatores associados são consistentes com os descritos em outros contextos. Neste estudo, o sexo e as crenças religiosas não foram associados a um nível adequado de conhecimento em CP. **Conclusões.** Menos de 10% dos estudantes de Enfermagem têm um nível adequado de conhecimentos em CP. É necessário ajustar o currículo de Enfermagem considerando as percepções dos estudantes sobre CP, para capacitá-los adequadamente em CP, especialmente aqueles que se encontram entre o primeiro e o quarto semestre.

Palavras-chave:

Cuidados Paliativos; Cuidados Paliativos na Terminalidade da Vida; Conhecimento; Fatores de Risco; Percepção; Estudantes de Enfermagem; Currículo; Educação Profissionalizante.

Introduction

Palliative care (PC) is a multidisciplinary and holistic approach that seeks to address, at an early stage, the situations that occur throughout the illness of patients and their families facing life-threatening health conditions, with the aim of improving their quality of life (1). The World Health Organization (WHO) has estimated that each year, 56.8 million people worldwide need PC; however, only 14% have access to it (2,3). Some of the factors influencing these figures include living in low- and middle-income countries (3), lack of knowledge, insufficient human resources, and disintegrated care models (4,5).

It is expected that the development of health systems to provide adequate palliative care (PC) will progress across both general and specialized levels of care (6). However, it is estimated that between 2006 and 2017, there was only an 8.3% increase in the number of countries with PC services at a preliminary or advanced stage of integration into general health care services (7). According to a 2021 study, in Colombia, people have access to advanced integrated PC services (service provision >1.5 per 100,000 inhabitants and service delivery in more than 90% of the municipalities within a region) in only 2 out of the country's 33 regions, while 37.5% of the regions have the capacity to provide general PC services (8). Although by 2023 the Colombian Palliative Care Observatory reported 768 specialized PC services nationwide and 24 regions with service provision >1.5 per 100,000 inhabitants, the availability of these services remains largely concentrated in the main cities of each region (9).

The slow progression of PC service capacity reflects, among other factors, the need to train health professionals with the competencies required to provide both general and specialized PC, among whom nursing professionals play a fundamental role as key providers of direct care (1). In this regard, a systematic review including 9,749 undergraduate nursing students from Europe and Asia reported low scores in knowledge related to end-of-life care (10). The findings of this review are largely consistent with results observed in studies conducted in Latin America (11–13), revealing significant gaps in nursing students' training in areas related to PC.

Sex, older age, religious beliefs, being in higher semesters, attending PC training, attitudes toward PC, and the university attended have been identified, among others, as factors associated with higher levels of

palliative care knowledge (PCK) among undergraduate nursing students in studies conducted in Asia and Europe (14–19). However, these factors are not consistent across studies and have not been reported in Latin American contexts, where PC service development is more limited and where the conditions of educational programs and the characteristics of nursing students may differ.

The increasing prevalence of life-threatening diseases requiring PC, the gaps in PC services in low- and middle-income countries, the low levels of PC knowledge reported, and the uncertainty surrounding the factors associated with it support the need to conduct studies among nursing students in Colombia. Identifying these factors could help strengthen the design of nursing education curricula in the country and guide the development of appropriate pedagogical strategies to foster professional competencies in PC. Therefore, the aim of this study is to identify the factors associated with an adequate level of palliative care knowledge among undergraduate nursing students at a university in Colombia.

Methodology

Design

A quantitative cross-sectional study was conducted between March and May 2023.

Setting

The study was carried out at a private university located in northeastern Colombia. The nursing curriculum consists of eight academic semesters and does not include specific courses on palliative care (PC); however, it does incorporate PC-related content within some holistic nursing care courses.

Population and sample

The population consisted of undergraduate nursing students enrolled between the first and eighth semesters during the first academic semester of 2023. The sample was selected using a non-probabilistic convenience sampling method. Given the limitations in population size, it was estimated that the sample should include at least 80% of the students enrolled in each academic semester. All students with active enrollment who agreed to participate in the study by providing electronic informed consent were considered eligible. Students who did not complete the full questionnaire were excluded.

Procedures and information sources

To reach the students and invite them to participate, the study was disseminated both by email and in person. Once informed consent was accepted, students were voluntarily asked to self-complete the online questionnaire, which included sociodemographic variables, academic variables, and the Rotterdam MOVE2PC questionnaire.

Instrument

For this study, an online questionnaire was developed, which was divided into two segments. The first segment included sociodemographic and academic variables to characterize the students. The second segment included the Rotterdam MOVE2PC scale, which has a Spanish version validated for Nursing students and professionals (20,21). The instrument consists of five dimensions related to perceptions of PC, addressed through 34 statements: a) opinions about PC (11), b) dilemmas in PC (5), c) breaking bad news (5), d) treatment (9), and f) end-of-life care (4). Each statement in the questionnaire is rated using a five-point Likert scale. For the opinions and dilemmas dimensions, the scale ranges from 1 (strongly disagree) to 5 (strongly agree), and for the breaking bad news, treatment, and end-of-life care dimensions, the scale ranges from 1 (not difficult at all) to 5 (very difficult).

In addition to perceptions, the instrument assesses PCK with 20 questions related to physical and psychological manifestations at the end of life, as well as the management or treatment of these manifestations. Each question offers three response options: false, true, and I don't know. The instrument has demonstrated adequate internal consistency in the contexts in which it has been validated (Cronbach's alpha > 0.8).

Variables of interest

The dependent variable in this study was having an adequate level of PCK, defined as correctly answering $\geq 50\%$ of the PCK-related questions in the scale. Based on the literature review, the factors considered for evaluation included sex, age, marital status, having religious beliefs, semester enrolled, prior training in PC, and perceptions about PC assessed in the scale.

Statistical analysis

The population and sociodemographic, academic, and discrete variables related to perceptions of PC were summarized using absolute and relative frequencies. For continuous variables, medians and interquartile ranges were calculated, given that the data showed a non-parametric distribution after assessing normality (Kolmogorov–Smirnov test).

For each participant, the mean score assigned according to the Likert scale (1–5) was estimated for all statements within each dimension of PC perceptions. Subsequently, the median and interquartile range of the average score per dimension were calculated. To assess the internal consistency of the questionnaire in the study sample, Cronbach's alpha coefficient was determined.

The absolute and relative frequency of correct answers for each participating student on the PCK-related questions in the questionnaire was calculated. Subsequently, the PCK variable was dichotomized as follows: adequate PCK (percentage of correct answers $\geq 50\%$) and low PCK (percentage of correct answers $< 50\%$).

To explore the relationship between an adequate level of PCK and the factors evaluated (sociodemographic, academic, and PC perception-related variables), their distribution was calculated and the hypothesis of no differences between groups was assessed using Fisher's exact test or the Mann–Whitney test, according to the nature of each variable (discrete and continuous, respectively).

To identify the factors independently associated with adequate PCK, the variables that obtained p-values < 0.20 in the exploratory bivariate analysis were included in a multiple logistic regression model, using a backward stepwise methodology. The process began with a model containing all potential associated factors, and the performance of the model was evaluated as factors were gradually removed, excluding at each step the variable with the lowest contribution to the model, as determined by statistical significance. The category of low PCK was used as the reference for the outcome variable; therefore, the model reflects the increase in the probability of having an adequate PCK level for each factor. In addition, sex was included as a control variable based on evidence reported in the literature. Model goodness of fit was assessed using the Hosmer–Lemeshow test. In all analyses, a two-tailed significance level of 5% was considered. The analysis was performed using Stata v12.0.

Results

Of the 242 eligible Nursing students, 182 (75.21%) participated in this study. A total of 80.77% were women, with a median age of 20.55 years (interquartile range [IQR] = 19.47–22.65). Most were enrolled in the fifth or sixth semester (31.87%); 79.67% reported having some religious belief, and 39.01% reported having received prior training in PC (Table 1).

Table 1. Sociodemographic characteristics of the study population

Characteristics of the students	Total N = 182
Women, n (%)	147 (80.77)
Age in years, median (IQR)	20.55 (19.47-22.65)
Lives with a partner, n (%)	9 (4.95)
Has a religious belief, n (%)	145 (79.67)
Socioeconomic stratum, n (%)	
1	28 (15.38)
2	45 (24.73)
3	65 (35.71)
4	37 (20.33)
5	7 (3.85)
Current semester, n (%)	
First–Second	45 (24.73)
Third–Fourth	45 (24.73)
Fifth–Sixth	58 (31.87)
Seventh–Eighth	34 (18.68)
Received prior training in palliative care, n (%)	71 (39.01)
Type of palliative care training received, n (%)	
Internet research	2 (2.82)
Symposium or conference	2 (2.82)
Research group	3 (4.23)
Extracurricular course	4 (5.63)
Classes within the curriculum courses	60 (84.51)

IQR: interquartile range.

Source: prepared by the authors.

Regarding opinions about PC, the median for the overall average of the 11 assessed opinions was 3.18 (IQR = 2.91–3.45). More than 30% of the students reported strongly disagreeing with statements such as “The goal of PC is solely pain management” (38.46%) and “PC begins in the last week of life” (39.56%). In contrast, more than half of the students reported strongly agreeing with statements such as “PC includes caring for family members/the

primary caregiver” (54.95%) and “Family visits should be allowed all day” (50.55%). The median for the overall average of the assessed dilemmas was 3.60 (IQR = 3.00–4.20). A total of 49.55% indicated that they strongly agreed with the dilemma “I would like to prepare myself and my family and friends,” and 47.80% with “I wish I could die at home” (Table 2).

Table 2. Students' opinions and dilemmas regarding palliative care

Opinions and dilemmas in palliative care N = 182	Strongly disagree	Disagree	Neither agree nor disagree n (%)	Agree	Strongly agree
Opinions					
The goal of PC is solely pain management.	70 (38.46)	52 (28.57)	19 (10.44)	30 (16.48)	11 (6.04)
PC begins in the last weeks of life.	72 (39.56)	42 (23.08)	23 (12.64)	35 (19.23)	10 (5.49)
PC and intensive treatment to prolong life can be combined.	17 (9.34)	22 (12.09)	35 (19.23)	67 (36.81)	41 (22.53)
PC includes spiritual care.	5 (2.75)	11 (6.04)	16 (8.79)	64 (35.16)	86 (47.25)
PC includes care for family members/the primary caregiver.	5 (2.75)	6 (3.30)	11 (6.04)	60 (32.97)	100 (54.95)
The acute care unit is an appropriate place to die.	60 (32.97)	35 (19.23)	53 (29.12)	24 (13.19)	10 (5.59)
Organizing any type of hospice or end-of-life care deprives the patient of all hope.	45 (24.73)	45 (24.73)	48 (26.37)	30 (16.48)	14 (7.69)
Family visits should be allowed throughout the day.	7 (3.85)	3 (1.65)	30 (16.48)	50 (27.47)	92 (50.55)
Patients should be clearly informed of their imminent death.	11 (6.04)	8 (4.40)	33 (18.13)	57 (31.32)	73 (40.11)
Patients with a prognosis of a few days should not be transferred home.	67 (36.81)	31 (17.03)	36 (19.78)	26 (14.29)	22 (12.09)
Life-prolonging treatment in the hospital is usually continued for too long.	26 (14.29)	28 (15.38)	68 (37.36)	38 (20.88)	22 (12.09)
Dilemmas					
I wish the nurse would not start a conversation about my approaching death with me, but would respond when I initiate it.	26 (14.29)	17 (9.34)	43 (23.63)	53 (29.12)	43 (23.63)
I do not want to anticipate my death.	26 (14.29)	32 (17.58)	48 (26.37)	42 (23.08)	34 (18.68)
I prefer that the nurse refer me to a spiritual advisor (e.g., a priest) or a social worker.	31 (17.03)	26 (14.29)	59 (32.42)	44 (24.18)	22 (12.09)
I would like to prepare myself, my family, and my friends.	8 (4.40)	10 (5.49)	20 (10.99)	54 (29.67)	90 (49.45)
I wish I could die at home.	14 (7.69)	6 (3.30)	34 (18.68)	41 (22.53)	87 (47.80)

PC: Palliative care

Source: prepared by the authors.

More than 40% of the students perceived breaking bad news as difficult or very difficult situations in PC (median of the overall average for the 5 bad-news items = 3.80, IQR = 3.40–4.40). A total of 54.40% rated as

very difficult a situation in which “The patient feels very sad because they have to say goodbye to their young children” (Table 3).

Table 3. Students’ perceptions of potentially difficult cases in palliative care

Cases N = 182	Not difficult	Slightly difficult	Somewhat difficult n (%)	Difficult	Very difficult
Case 1: Breaking bad news					
You enter the patient’s room and find them upset due to the meeting with the physician.	7 (3.85)	27 (14.84)	66 (36.26)	63 (34.62)	19 (10.44)
After two days, the patient asks: “I’m going to get better, right?”	4 (2.20)	16 (8.79)	48 (26.37)	59 (32.42)	55 (30.22)
The patient feels very sad because they have to say goodbye to their young children.	5 (2.75)	9 (4.95)	16 (8.79)	53 (29.12)	99 (54.40)
The patient’s family is upset with everyone, and in their opinion, no one is doing things right.	6 (3.30)	16 (8.79)	42 (23.08)	62 (34.07)	56 (30.77)
The patient and their spouse want to talk to you about the end of life.	13 (7.14)	24 (13.19)	42 (23.08)	53 (29.12)	50 (27.47)
Case 2: Treatment – yes or no?					
The patient no longer wants any type of treatment, as long as their symptoms can be well managed.	21 (11.54)	39 (21.43)	55 (30.22)	42 (23.08)	25 (13.74)
The family definitely does not want the poor prognosis to be discussed with the patient.	12 (6.59)	21 (11.54)	37 (20.33)	60 (32.97)	52 (28.57)
The prescribed antibiotics are no longer effective. The medication must be stopped and the infusion pump removed.	16 (8.79)	23 (12.64)	46 (25.27)	57 (31.32)	40 (21.98)
The patient experiences cardiac arrest and must be resuscitated because there is no CPR order.	21 (11.54)	25 (13.74)	36 (19.78)	47 (25.82)	53 (29.12)
The patient suffers from severe dyspnea. The resident physician in charge does not know how to relieve the suffering but refuses to consult a more experienced doctor.	5 (2.75)	12 (6.59)	38 (20.88)	48 (26.37)	79 (43.41)
The patient feels very anxious about what will happen and asks for help.	20 (10.99)	34 (18.68)	46 (25.27)	50 (27.47)	32 (17.58)
The physician decides to initiate tube feeding.	25 (13.74)	36 (19.78)	53 (29.12)	44 (24.18)	24 (13.19)
The patient begins to experience delirium and may suddenly become aggressive.	4 (2.20)	12 (6.59)	44 (24.18)	65 (35.71)	57 (31.32)
The physician provided instructions on how to proceed with these severe diagnoses.	27 (14.84)	37 (20.33)	58 (31.87)	39 (21.43)	21 (11.54)
Case 3: End-of-life care					
You have been assigned to care for this patient and know that they could die at any time you enter their room.	9 (4.95)	14 (7.69)	52 (28.57)	55 (30.22)	52 (28.57)
The physician has decided to withdraw tube feeding. You must remove the tube.	21 (11.54)	38 (20.88)	50 (27.47)	49 (26.92)	24 (13.19)
The family does not agree with the decision to stop tube feeding.	6 (3.30)	19 (10.44)	41 (22.53)	65 (35.71)	51 (28.02)
You have to say goodbye to the patient because palliative sedation has begun.	11 (6.04)	14 (7.69)	28 (15.38)	50 (27.47)	79 (43.41)

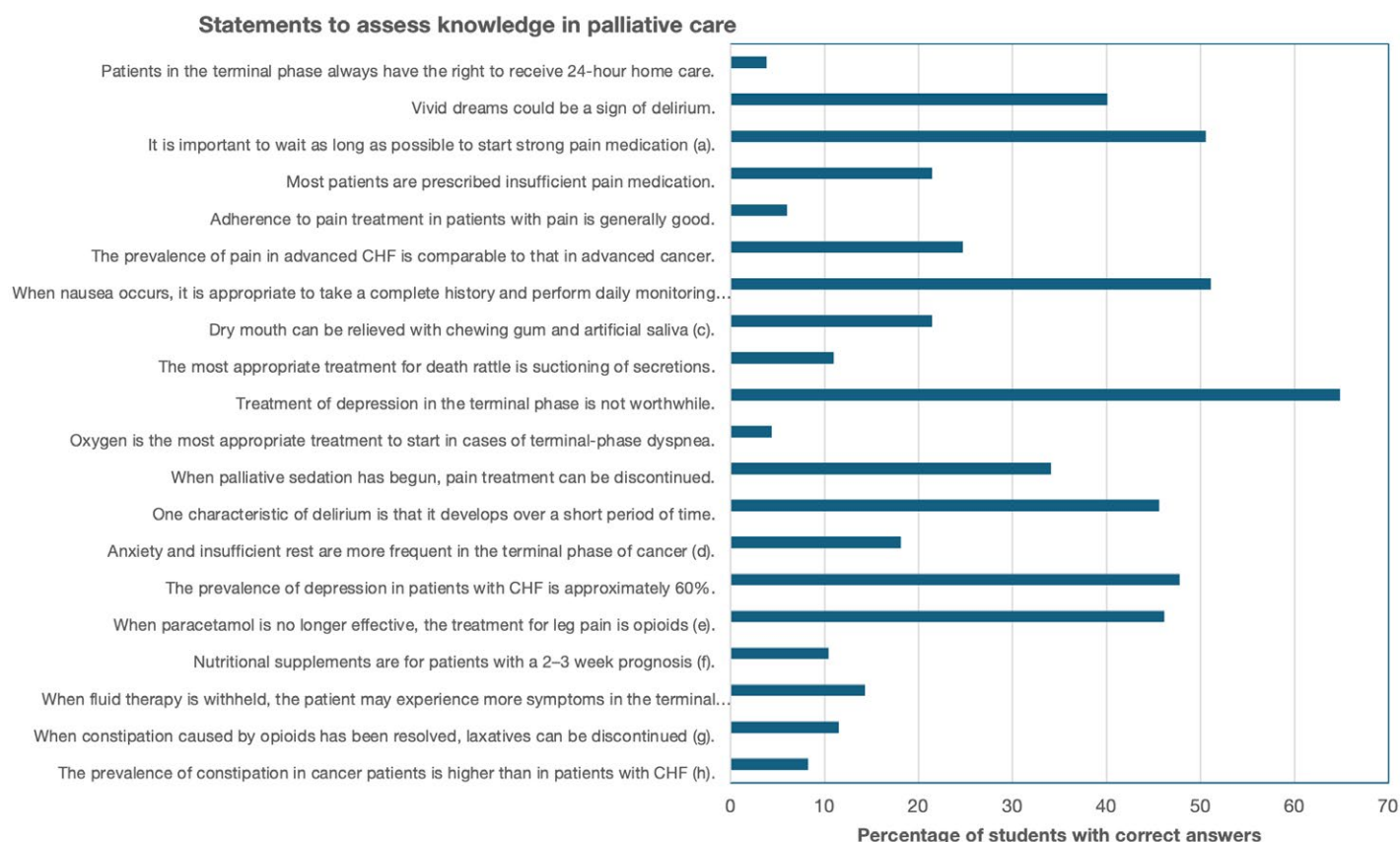
CPR: cardiopulmonary resuscitation.

Source: prepared by the authors.

Regarding treatment-decision situations in PC, the median of the overall average for the assessed situations was 3.44 (IQR = 3.00–4.00). More than 20% of the students considered most of these situations not difficult or only slightly difficult. The main situations perceived this way were “The physician gave instructions on how to proceed with these severe diagnoses” (35.17%) and “The physician decides to initiate tube feeding” (33.52%). In contrast, more than 50% perceived three of the four situations related to end-of-life care as difficult or very difficult. The situation with the highest perceived difficulty was: “You have to say goodbye to the patient because palliative sedation has begun” (70.88%). The median of the overall average for the five end-of-life care cases was 3.75 (IQR = 3.00–4.25). The internal consistency of the items comprising the scale

across the five perception dimensions on PC and knowledge among the participating students was good (Cronbach’s alpha coefficient = 0.88).

Overall, more than 50% of the students answered incorrectly on 17 of the 20 PCK questions assessed. The items with the highest percentage of correct responses were “Treating depression in the terminal phase is not worthwhile” (64.84%) and “When nausea is a problem in the palliative phase, it is appropriate to take a full history and provide daily monitoring” (51.10%) (Figure 1). Overall, the median number of correct answers was 6 (interquartile range = 3–8). After dichotomizing the knowledge variable, 9.89% (n = 18) of the students achieved an adequate level of PCK.



The complete statements are as follows:

- (a) It is important to wait as long as possible to start strong pain medication and expect the pain to worsen.
- (b) When nausea is a problem in the palliative phase, it is appropriate to take a complete history and perform daily monitoring.
- (c) The problem of dry mouth due to reduced saliva production in the palliative stage can be managed with sugar-free chewing gum as well as artificial saliva.
- (d) Anxiety and insufficient rest are more frequent in the terminal phase of cancer than in other terminal chronic diseases.
- (e) When paracetamol is no longer effective, the best treatment for leg pain in patients with congestive heart failure (CHF) is opioids.
- (f) Prescribing nutritional supplements is advisable for patients with a 2–3 week prognosis when nutrient intake is insufficient.
- (g) When constipation caused by opioids (e.g., morphine) has been resolved, laxatives can be discontinued.
- (h) The prevalence of constipation in patients with cancer in the palliative phase is higher than in patients in the terminal phase of CHF.

Figure 1. Percentage of students with correct answers on PCK questions

CHF: congestive heart failure; PCK: palliative care knowledge.

Source: ppprepared by the authors.

No statistically significant differences were observed in the sex distribution between the groups of students with adequate PCK compared with those with low PCK ($p = 0.204$). Statistically significant differences were found between the groups in the characteristics of living with a partner (16.67% adequate PCK versus 3.66% low PCK,

$p = 0.047$), being enrolled between the fifth and eighth semesters (83.33% adequate PCK versus 46.95% low PCK, $p = 0.005$), and having received prior training in PC (72.22% adequate PCK versus 35.37% low PCK, $p = 0.004$) (Table 4).

Table 4. Students' characteristics, opinions, and perceptions regarding palliative care according to PCC level

Characteristics	PCK level		p
	Adequate n = 18	Low n = 164	
Women, n (%)	17 (94.44)	130 (79.27)	0.204
Age in years, median (IQR)	21.88 (20.23- 25.39)	20.51 (19.30- 22.50)	0.025*
Lives with a partner, n (%)	3 (16.67)	6 (3.66)	0.047
Has a religious belief, n (%)	13 (72.22)	132 (80.49)	0.372
Socioeconomic stratum, n (%)			0.249
1-3	16 (88.89)	122 (79.39)	
4-5	2 (11.11)	42 (25.61)	
Current semester, n (%)			0.005
First to Fourth	3 (16.67)	87 (53.05)	
Fifth to Eight	15 (83.33)	77 (46.95)	
Received prior training in palliative care, n (%)	13 (72.22)	58 (35.37)	0.004
Average rating of opinions on palliative care, median (IQR)	3.27 (3.18- 3.63)	3.18 (2.82- 3.45)	0.079*
Average rating of dilemmas in palliative care, median (IQR)	4.00 (3.00- 4.60)	3.60 (3.00- 4.00)	0.120*
Average rating of perception of cases involving breaking bad news, median (IQR)	3.90 (3.40- 4.80)	3.80 (3.40- 4.40)	0.250*
Average rating of perception of cases involving treatment, median (IQR)	3.77 (3.33- 4.22)	3.33 (2.88- 4.00)	0.054*
Average rating of perception of cases involving end-of-life care, median (IQR)	4.00 (3.50- 4.50)	3.50 (3.00- 4.25)	0.121*

*Mann Whitney test.

PCK: Palliative care knowledge; IQR: Interquartile range.

Source: prepared by the authors.

Finally, Table 5 presents the results of the multivariate analysis to identify factors independently associated with an adequate level of PCK. Of the nine factors that met the criteria for inclusion in the multivariate analysis, being enrolled between the fifth and eighth semesters was the most strongly and independently associated factor (OR

= 9.48, 95% CI = 2.26–39.60). Living with a partner (OR = 5.57, 95% CI = 1.04–29.79) and predominantly agreeing with opinions about PC (OR = 5.24, 95% CI = 1.46–18.83) were also identified as factors associated with adequate PCK. The other factors were not associated with the outcome evaluated.

Table 5. Factors associated with having an adequate level of PCC. Logistic regression model

Factor	Bivariate analysis OR (95% CI)	Multivariate analysis OR (95% CI)
Lives with a partner†	5.27 (0.76- 27.47)	5.57 (1.04- 29.79)
Enrolled in fifth to eighth semester*	5.65 (1.50- 31.32)	9.48 (2.26- 39.60)
Opinions on PC**	2.42 (0.68- 7.69)	5.24 (1.46- 18.83)

†Reference group: not living with a partner.

* Reference group: students in the first to fourth semesters.

**Reference group: strongly disagree, disagree, or neither agree nor disagree versus agree or strongly agree.

PCK: palliative care knowledge; PC: palliative care.

Source: prepared by the authors.

Discussion

This study found that fewer than 10% of Nursing students had an adequate level of PCK. Being enrolled between the fifth and eighth semesters of the program, living with a partner, and having predominantly agreeable opinions about PC as assessed by the Rotterdam MOVE2PC scale were independently associated with an adequate level of PCK in this population.

Previous studies conducted in Latin American universities have also reported medium-to-low levels of PCK among nursing students; however, there is considerable variability in the instruments used, which means that the aspects related to PCK may differ. For example, the study conducted by Robledo-Muñoz et al. (11) among 56 Nursing students in their eighth to tenth semesters at a university in Colombia, in which the authors applied a questionnaire they designed to measure PCK (aspects of pain and symptom management and psychosocial aspects), found that, overall, 19.64% of the students had an insufficient level of PCK (obtaining less than 39% correct answers), 76.78% had basic PCK (obtaining between 42.80% and 57% correct answers), and 3.57% had a satisfactory level (more than 57% correct answers). Specifically, in the area of pain and symptom management, the average percentage of correct responses was 50.33%, whereas in the psychosocial dimension it was 68.77% (11).

Although in the study by Robledo-Muñoz et al. (11) the proportion of students with satisfactory PCK was similar to that observed in the present study, the specific aspects of PC knowledge evaluated differ considerably. In this study, the Rotterdam MOVE2PC scale was used, which includes, within the PCK dimension, aspects related to the physical and psychological manifestations experienced by patients at the end of life; consequently, the questions are focused on identifying the frequency and likelihood of patients presenting these manifestations. In addition, the assessment includes knowledge related to the treatment of these manifestations; therefore, the questions address general aspects of managing pain, constipation, dyspnea, depression, nausea, and dry mouth.

In contrast, the questions included in the study by Robledo-Muñoz et al. (11) focus primarily on pain management, using a much more specific approach, and incorporate psychosocial aspects of end-of-life care, which in the Rotterdam MOVE2PC questionnaire are addressed within the opinions dimension. Despite these differences, both studies found that fewer than half of the students answered correctly on items related to the management or treatment of end-of-life symptoms.

Although there are differences in the content of the instruments used to assess PCK and in their psychometric

properties (22), other studies in the Latin American context that have applied various instruments (Palliative Care Quiz for Nursing [PCQN], Palliative Care Knowledge Test [PCKT]) support our findings, generally showing the limited level of PCK among Nursing students in the region (13,23).

In this study, the questions related to psychological manifestations and their management had the highest proportion of students with correct PCK. More than 60% of the students correctly identified the statement "Treating depression in the terminal phase is not worthwhile" as false, and more than 40% correctly recognized manifestations of delirium and the prevalence of depression in patients requiring PC. In contrast, the questions related to nutrition, the management of digestive symptoms, and patient rights in PC had the lowest proportion of correct responses (fewer than 15% of students answered correctly).

Although the current Nursing curriculum of the studied population does not include a specific course for developing competencies in PC, greater knowledge of psychological situations could be related to the content of two mental health courses that are part of the curriculum. However, these courses do not appear to influence students' perceptions when facing PC patient scenarios. This is reflected in the fact that more than 80% of the students reported experiencing some degree of difficulty in all cases related to breaking bad news, more than 40% in end-of-life care cases, and more than 30% in cases requiring decisions about the treatment of patients receiving PC.

This finding regarding perceived difficulty in managing PC cases is not atypical among Nursing students from other Latin American programs. In a cross-sectional study conducted with 197 students (101 Nursing and 96 Medical students) from three universities located in three capital cities in Colombia, more than half of the surveyed students reported feeling uncomfortable or very uncomfortable when delivering bad news and assisting a family member of a deceased patient, while around 40% reported feeling uncomfortable making decisions about the withdrawal of treatments involving therapeutic limitation (24). Moreover, other studies conducted in Latin America have identified that Nursing students have a high level of anxiety regarding the death of others and even their own death (13), and that they do not feel prepared to care for patients receiving PC (25).

In this study, being enrolled between the fifth and eighth semester of the Nursing program was the factor most strongly associated with an adequate level of PCK (OR = 9.48). This association between a higher degree or level of training and better PPCs has also been reported in several studies conducted in other contexts (14,15,17,19), suggesting that greater exposure or interaction with content

and training practices related to PC addressed throughout the curriculum provides students with more opportunities to acquire PCK.

Marital status has been scarcely studied as a factor related to PCK. In the study conducted by Dimoula et al. (17) among 529 students enrolled between the second and fourth years of Nursing at two universities in Greece, marital status was not shown to be related to a better level of PCK as measured by the PCQN instrument. In contrast, in the present study, those who were living with a partner—that is, married or in a civil union—had a higher likelihood of having adequate PCK. Shared decision-making and joint responsibility in health and illness situations inherent to living with a partner may help explain the greater preparedness of students with this characteristic regarding aspects related to PC.

Moreover, being mostly in agreement with the opinions measured by the Rotterdam MOVE2PC scale was also associated with adequate PCK among the students in this study (OR = 5.24). Although the scale presents 11 statements for students to rate their perceptions of them, their stance may also reflect their understanding of the basic and philosophical principles of PC, which are considered a dimension in the assessment of PCK in instruments such as the PCQN and the PCKT (22).

For example, more than half of the students reported being “agree” or “strongly agree” with statements such as “Palliative care and intensive treatment to prolong life can be combined” and “Palliative care includes spiritual care.” Perceptions in favor of these principles suggest an understanding of the purpose and scope of PC, which may support greater acquisition of knowledge regarding the physical and psychological manifestations at the end of life and the management or treatment of these manifestations.

Sex has been inconsistently associated with PCK. In this study, sex did not show a statistically significant difference in the distribution according to PCK level ($p = 0.204$), nor was it identified as a confounding variable in the logistic regression model. In contrast, in a study conducted among 1,200 nursing students at a university in China, being female was associated with a higher level of PCK ($b = 1.872$; $p < 0.001$) (15), whereas in two studies conducted among 529 nursing students at a university in Greece and 141 students at a university in Mongolia, being male was associated with higher PCK (17,18).

Other factors such as older age (17,18) and having a religious belief (15), which have been reported in other nursing student populations as predictors of a better level of PCK, did not show an independent association with an adequate level of PCK in the students in this study.

Differences in these results may be explained by the sociodemographic conditions that influence educational environments in different contexts with respect to sex, age, and religious beliefs.

Although in this study a higher proportion of students with adequate PCK reported having received prior training compared with the group of students with low PCK, in the multivariate analysis this factor did not show an independent statistically significant association with adequate PCK (OR = 2.65; 95% CI = 0.74–9.47). Nevertheless, receiving prior training in extracurricular or curricular courses on palliative care has been reported in studies conducted in other contexts, with a larger sample size that could explain the limitation of our study in detecting this association (14,17,19).

Among the strengths of this study, it is noteworthy that it is the first conducted in the Latin American context to identify factors associated with an adequate level of PCK among Nursing students. This makes it possible to validate some of the findings reported in previous studies in other educational settings and to identify new factors to guide curricular design and the development of pedagogical strategies that strengthen the achievement of these competencies. In addition, a validated questionnaire was used, which showed adequate internal consistency in the study population, allowing for the identification of perceptions and knowledge about palliative care and the exploration of their association.

The observational nature of this study may present limitations in its findings. For example, factors related to the students’ background or experiences—such as prior experiences with family members or close individuals who required palliative care or end-of-life care, the number of patients in need of palliative care encountered during clinical training, and the students’ grade point averages—were not considered in this study. On the other hand, the sample studied comes from a single higher education institution, which may limit the applicability of the results to other institutions. Finally, it is important to consider that the development of knowledge-based competencies does not always translate into their application; that is, an adequate level of PCK does not guarantee the development of skills needed for implementing PC. Therefore, it is necessary to assess nursing students’ abilities in both aspects.

Conclusions

Less than 10% of Nursing students have an adequate level of palliative care knowledge. Being enrolled between the fifth and eighth semesters of the program, living with a partner, and being mostly in agreement with the palliative

care opinions presented in the Rotterdam MOVE2PC scale were independently associated with an adequate level of palliative care knowledge in this population. Future studies are needed to assess not only knowledge but also the skills of Nursing students for applying palliative care in clinical practice within Latin American contexts, and to validate the factors associated with these competencies. Such findings could guide adjustments to Nursing education curricula, encouraging consideration of students' perceptions of palliative care and strengthening training strategies, especially for those in the first through fourth semesters.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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Ethical Considerations

This study was conducted in accordance with current legal regulations in Colombia. It was approved by the Institutional Research Ethics Committee (CIEI) of the Universidad Autónoma de Bucaramanga, code 029-2023. All students agreed to participate by providing informed consent. To protect participating students from potential coercion due to influence, the invitation to participate was made outside class hours so that this would not affect their decision to take part.

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