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Knowledge and Attitudes Toward Pain Management Among Final-Year Nursing and Medical Students

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Abstract

Pain continues to represent a major challenge for healthcare systems because of its high prevalence and the negative consequences associated with inadequate treatment. Previous studies have identified deficiencies in pain-related education among healthcare professionals and students, raising concerns about preparedness for clinical practice. To examine pain-management knowledge and attitudes among final-year nursing and medical students at a Spanish university. An observational cross-sectional study was carried out during the 2025–2026 academic year. Participants completed the Spanish version of the Knowledge and Attitudes Survey Regarding Pain (KASRP). Questionnaire scores were summarized using descriptive statistics. Comparisons between academic programs were performed using the Mann–Whitney U test, and relationships between variables were explored using Spearman's rank correlation coefficient. The study included 108 students, of whom 65 were enrolled in nursing and 43 in medicine. Mean KASRP performance reached 65.78% among nursing students and 63.23% among medical students, with no statistically significant differences between groups ($p = 0.340$). Performance varied considerably across questionnaire items. Knowledge deficits were particularly evident in topics related to opioid pharmacology, equianalgesic dosing, and clinical decision-making, whereas higher levels of correct responses were observed for fundamental concepts of pain assessment. In both groups, overall scores remained below the 80% threshold commonly considered indicative of adequate knowledge and attitudes regarding pain management. Graduating nursing and medical students demonstrated important gaps in pain-management competencies despite having received undergraduate training on the subject. The results highlight opportunities to strengthen pain education before entry into professional practice and support ongoing efforts to improve patient care and safety.

Keywords: pain management; students; medical; students; nursing; knowledge; attitudes

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1. Introduction

Pain is currently regarded as one of the most prevalent and challenging health conditions worldwide. According to the International Association for the Study of Pain (IASP), pain is "an unpleasant sensory and emotional experience that may arise from actual or

potential tissue damage or resemble such experiences" [1]. Epidemiological evidence indicates that pain affects a substantial proportion of the population, with estimates ranging from approximately 30% globally [2] to between 20% and 30% in European countries [3]. Beyond its high frequency, pain is associated with reduced physical functioning, impaired quality of life, and considerable consumption of healthcare resources, thereby representing a significant burden for both individuals and healthcare systems.

Over recent decades, pain management has become a central component of quality healthcare delivery. Providing adequate pain relief is not only a clinical objective but also an ethical responsibility linked to the principles of beneficence and respect for patients' dignity [4]. Conversely, insufficient pain control has been associated with adverse clinical outcomes, including a higher incidence of in-hospital complications, delirium, prolonged hospitalization, and increased mortality risk [5,6].

Although effective strategies for pain assessment and treatment are available, deficiencies in pain management continue to be reported across different healthcare settings. These shortcomings are often related to inadequate knowledge, misconceptions about analgesic therapies, and negative attitudes toward pain treatment, collectively contributing to the phenomenon commonly referred to as oligoanalgesia. Misunderstandings regarding opioid use, concerns about adverse effects, and limited familiarity with pain assessment instruments remain important barriers to optimal care [7]. Given the complex biological, psychological, and social dimensions of pain, healthcare professionals require a broad set of competencies that includes evidence-based assessment, pharmacological decision-making, and person-centred care approaches [8].

The acquisition of these competencies begins during undergraduate education. Medical and nursing students represent the future healthcare workforce and will play a key role in pain assessment and treatment across diverse clinical environments. Nevertheless, educational approaches to pain may differ between disciplines. Medical curricula have traditionally focused on diagnostic reasoning and therapeutic interventions, whereas nursing programs often place greater emphasis on holistic assessment and continuity of care. Assessing knowledge and attitudes before graduation is therefore essential to identify educational gaps that may later influence clinical practice and patient outcomes. Despite repeated recommendations advocating dedicated pain education within health sciences programs [9], pain-related content is frequently distributed across multiple subjects and taught without a unified framework, potentially limiting students' preparedness to manage complex pain-related situations effectively [10,11].

In light of these considerations, the present study aimed to evaluate knowledge and attitudes regarding pain management among final-year nursing and medical students.

2. Materials and Methods

2.1. Study Design and Sample

This cross-sectional investigation was conducted among final-year nursing and medical students attending a Spanish university during the 2025–2026 academic year. Participants were invited to take part at the start of the academic period and were provided with detailed information regarding the study aims. Participation was entirely voluntary, and data were collected anonymously.

Both medical and nursing students received pain-related education throughout their undergraduate curricula, although the content was integrated into different subjects rather than delivered through a dedicated pain management course. In the medical curriculum, pain-related competencies were addressed through courses in pharmacology, pathophysiology, surgery, oncology, emergency medicine, and palliative care, covering topics such as pain physiology and assessment, analgesic pharmacology, postoperative pain management,

cancer pain, and opioid use in palliative care. In the nursing curriculum, pain management content was incorporated into medical-surgical nursing, adult and geriatric nursing, and pharmacology courses, including pain assessment, pain physiology, nursing care for patients experiencing pain, postoperative pain management, and pain associated with oncological and palliative care settings. Consequently, both groups had received formal education related to pain management before graduation, although differences in curricular structure and emphasis may have influenced the development of their knowledge and attitudes toward pain management.

2.2. Procedure

Students were invited to participate by members of the research team, who were also faculty members at the institution. Participation was entirely voluntary, no academic incentives were offered, and students were informed that participation or non-participation would have no impact on their academic assessment or progression.

2.3. Instrument

Pain-related knowledge and attitudes were evaluated using the Spanish adaptation of the Knowledge and Attitudes Survey Regarding Pain (KASRP) [12,13]. The questionnaire is one of the most frequently employed instruments for assessing competencies related to pain management in healthcare education and clinical practice. It includes statements with dichotomous responses, multiple-choice items, and clinical scenarios designed to explore different domains of pain assessment and treatment.

Responses were scored according to the instrument guidelines, assigning one point to each correct answer and zero points to incorrect or missing responses. The resulting total score ranged from 0 to 41, with higher scores indicating greater knowledge and more appropriate attitudes toward pain management. Results were expressed as both raw scores and percentages of correct answers.

Although the Spanish version was initially validated in nursing students, subsequent studies have extended its application to a broad range of healthcare professionals and students, including medical trainees. However, evidence supporting its psychometric performance in Spanish medical student populations remains scarce.

The instrument's content validity was established through expert evaluation in pain management, while previous studies have reported acceptable levels of internal consistency (Cronbach's $\alpha > 0.70$). Evidence of construct validity has been demonstrated through its ability to discriminate between groups with different degrees of education, training, and clinical experience [14]. Consistent with the criteria proposed by McCaffery and Robinson [14], scores equal to or above 80% were considered indicative of satisfactory knowledge and attitudes regarding pain management.

2.4. Analysis

Statistical analysis was conducted using both descriptive and inferential approaches. Continuous variables (age and KASRP score) were summarized using mean, median, standard deviation, and range, whereas categorical variables (sex, academic program and previous health-related studies) were reported as frequencies and percentages.

Normality was assessed using the Shapiro–Wilk test, which indicated a non-normal distribution ($p < 0.05$), leading to the use of nonparametric tests. Group comparisons were performed using the Mann–Whitney U test, and associations between continuous variables were examined using Spearman's rank correlation coefficient (ρ).

Bivariate analysis explored the relationship between sociodemographic variables (sex, age and previous health-related studies) and KASRP scores, identifying significant associa-

tions in specific subgroups. Statistical significance was set at $p < 0.05$. All analyses were performed using R software (version 3.4.3).

2.5. Ethical Considerations

The research was performed in accordance with internationally accepted principles for human subjects research, including the Declaration of Helsinki, the Belmont Report, the Council for International Organizations of Medical Sciences (CIOMS) guidelines, and applicable Spanish legislation on personal data protection [15]. The study protocol received approval from the relevant regional ethics committee (Regional Research Ethics Committee; approval number 2025.321; 16 July 2025). Participation was voluntary, and the completion and electronic submission of the questionnaire were considered evidence of informed consent.

3. Results

A total of 108 participants were included, comprising 65 nursing and 43 medical students, representing a response rate of 78.31% for nursing and 30.06% for medicine. The mean age was similar between groups (24.7 years in nursing vs. 23.8 years in medicine).

Overall, the study population was predominantly female. Notably, previous health-related studies were more frequent among nursing participants compared with medical participants. The detailed distribution of sociodemographic variables is presented in Table 1.

Table 1. Sociodemographic characteristics of the study population.

	Nursing (N = 65)	**Medicine (N = 43)**
Age (SD)	24.7 (7.2)	23.8 (4)
Sex		
Male	11	8
Female	53	35
Not respond	1	
Previous health-related studies		
Yes	18	3
No	46	40
Not respond	1	

KASRP Scores

The mean KASRP score in the nursing group was 27.0 (SD = 4.4), corresponding to 65.78% correct responses, whereas in the medical group the mean score was 25.9 (SD = 3.9), with 63.23% correct responses. No statistically significant differences were observed between nursing and medical students in total questionnaire scores ($U = 1549.5$; $p = 0.340$). Tables 2–4 summarize the highest scoring items, the lowest scoring items, and the items showing the largest differences between nursing and medical students. The complete item-level comparison between nursing and medical students is presented in Supplementary Table S1.

Within the nursing student group, no statistically significant associations were found between total KASRP score and age ($\rho = -0.077$; $p = 0.551$), sex ($p = 0.114$), or having previous health-related studies ($p = 0.776$). In the medical student group, no significant differences in KASRP scores were found according to sex ($p = 0.900$) or age ($\rho = 0.236$; $p = 0.128$). However, a statistically significant association was observed with having previous health-related studies ($U = 109.5$; $p = 0.019$), with higher scores among students with prior training. The main results of the questionnaire according to sociodemographic variables are summarized in Table 5.

Table 2. Highest-scoring KASRP items among nursing and medical students.

Nursing Students	Correct (%)	Medical Students	Correct (%)
Item 13. Spiritual beliefs may influence pain perception.	96.9	Item 1. Vital signs are not always reliable indicators of pain intensity.	97.7
Item 14. Opioid doses should be adjusted according to patient response.	96.9	Item 13. Spiritual beliefs may influence pain perception.	97.7
Item 12. Children can reliably report pain.	93.8	Item 14. Opioid doses should be adjusted according to patient response.	97.7
Item 1. Vital signs are not always reliable indicators of pain intensity.	92.3	Item 20. Definition of opioid addiction.	97.7
Item 11. Patients should not endure pain before requesting opioids.	92.3	Item 21. Definition of equianalgesia.	95.4

Table 3. Lowest-scoring KASRP items among nursing and medical students.

Nursing Students	Correct (%)	Medical Students	Correct (%)
Item 8. Duration of analgesia of 1–2 mg IV morphine.	13.8	Item 28. Risk of respiratory depression in opioid-tolerant patient.	9.3
Item 16. Equivalence between Zaldiar and oral morphine.	23.1	Item 8. Duration of analgesia of 1–2 mg IV morphine.	18.6
Item 38B. Clinical case: opioid dose adjustment.	23.1	Item 36. Opioid withdrawal manifestations.	18.6
Item 39B. Clinical case: opioid dose adjustment.	23.1	Item 38B. Clinical case: opioid dose adjustment.	18.6
Item 36. Opioid withdrawal manifestations.	26.2	Item 39B. Clinical case: opioid dose adjustment.	18.6

Table 4. Largest item-level differences between nursing and medical students.

Item No	Nursing (%)	Medicine (%)
Item 2. Pain sensitivity in children <2 years	87.7	55.8
Item 15. Use of placebo to verify pain	63.1	32.6
Item 3. Distraction does not exclude severe pain	75.4	46.5
Item 24. Route for acute severe pain.	70.8	48.8
Item 16. Equivalence Zaldiar-morphine	23.1	44.2

Table 5. Associations between sociodemographic variables and KASRP scores by student group.

	Nursing (N = 65)		Medicine (N = 43)	
	KASRP Score (SD)	*p* Value	KASRP Score (SD)	*p* Value
Age	27.0 (4.4)	0.551	25.9 (3.9)	0.128
Sex				
Male	25.0 (4.0)	0.114	26.0 (3.7)	0.900
Female	27.2 (4.3)		25.9 (4.0)	
Previous health-related studies				
Yes	27.5 (4.7)	0.777	31 (1.0)	0.019
No	26.7 (4.3)		25.5 (3.8)	

SD: Standard Deviation. Age was analyzed using Spearman's rank correlation coefficient. Sex and previous healthcare training were analyzed using the Mann–Whitney U test. *p*-values correspond to the respective statistical analyses.

4. Discussion

One of the principal strengths and novel contributions of this study is the simultaneous evaluation of final-year nursing and medical students using the same validated instrument and under the same educational environment. Although pain management knowledge has been extensively studied among healthcare students, comparatively few investigations have directly compared nursing and medical students within a single study design. This approach minimizes methodological variability between studies and provides a more robust assessment of potential differences in preparedness for clinical pain management at the point of graduation. The findings therefore add valuable evidence to an area that remains relatively underexplored in the literature. In addition, all participants were students from the same university, enabling a comparison of educational programs implemented within a single institution and minimizing variability related to differences between centers.

The findings of this study indicate that knowledge of pain management among final-year nursing and medical students remains below the level considered adequate, as scores did not reach the 80% benchmark proposed by McCaffery and Robinson and commonly used for KASRP interpretation [14]. This aligns with international evidence showing consistently suboptimal levels of knowledge among both students and healthcare professionals [16–20]. Reported scores typically range between 45% and 55%, supporting the view that insufficient knowledge in pain management represents a widespread and persistent issue across different contexts.

Among students, similar patterns have been described. Studies conducted in Saudi Arabia and Malaysia report mean scores below 55%, reflecting inadequate knowledge and attitudes toward pain [17,18]. Even in more focused settings, such as pediatric pain, higher overall scores still coexist with limited advanced knowledge [21]. In our study, nursing and medical students achieved slightly higher percentages (65.78% and 63.23%, respectively); however, these values remain insufficient, reinforcing the persistence of this educational gap.

No significant differences were found between nursing and medical students in overall scores. Although medical training generally places greater emphasis on pathophysiology and pharmacology, this did not translate into higher percentages of correct responses in our sample. Differences in the way pain education is delivered across curricula may represent one possible explanation; however, these factors were not directly assessed in the present study. Indeed, pain education is generally delivered in a fragmented and transversal manner rather than as a structured subject [22,23], which may limit the development of a comprehensive understanding of pain management [24].

Descriptive differences were observed in some item-level responses. Medical students showed higher percentages of correct responses in several items related to opioid pharmacology and equianalgesic concepts, whereas nursing students showed higher percentages of correct responses in some items involving opioid administration and clinical pain management decisions [25].

Although descriptive differences were observed across some questionnaire items, the present study did not perform item-level inferential analyses. Therefore, these patterns should be interpreted cautiously and may simply reflect variation in response distributions between groups. In Spain, nursing students are introduced to clinical practice early in their training, engaging actively in patient care, whereas medical training remains largely observational at the undergraduate level [26]. However, the findings suggest that clinical experience alone is insufficient without structured theoretical training. This is further supported by the higher scores observed among students with prior healthcare training. Although a statistically significant association was observed, the subgroup comprised only three participants; therefore, this finding should be regarded as exploratory and not as evidence of a meaningful or generalizable relationship.

Despite these differences, both groups demonstrated substantial deficits in key areas, particularly opioid management and analgesic dosing. Errors in dose calculation were frequent and clinically relevant, with a high proportion of students incorrectly answering items related to potentially harmful opioid doses. Similar findings have been reported in previous studies, highlighting deficiencies in fundamental pharmacological knowledge [19,20]. These gaps are especially concerning given their direct implications for patient safety, as they may lead to undertreatment, adverse effects, or serious complications [27].

The discrepancy between perceived and actual competence also warrants attention. Previous research has shown that students often report high confidence despite demonstrating limited knowledge [20], a mismatch that may increase the risk of clinical errors.

The KASRP proved to be a useful instrument for identifying these deficits, particularly through item-level analysis. Its combination of theoretical and clinical questions allows for a comprehensive assessment of both knowledge and its application, although it may not fully capture the complexity of real clinical practice.

Evidence suggests that training in pain management remains scarce across curricula, which may contribute to the observed knowledge gaps [18–20]. These findings identify persistent gaps in pain-management knowledge among final-year healthcare students. Although educational factors may contribute to these results, the present study did not directly evaluate educational exposure, curricular content, teaching methods, or other potential determinants; therefore, no causal inferences can be drawn regarding the origin of these knowledge gaps.

Importantly, previous studies indicate that this situation is potentially reversible. Targeted educational interventions have been associated with improved knowledge and performance [21], highlighting the potential impact of enhanced training strategies.

Several limitations of this study should be acknowledged. The sample was drawn from a single university, which may limit the generalizability of the findings. Educational approaches, clinical exposure, and curricular structures may vary across institutions, potentially leading to different results in broader or more diverse samples. Therefore, caution should be exercised when extrapolating these findings, and future studies including multiple institutions and larger samples are warranted to provide a more comprehensive understanding of pain management knowledge among healthcare students. Second, the response rate differed substantially between the two study groups, with medical students showing a considerably lower participation rate than nursing students. This disparity may have introduced selection bias and may limit the representativeness of the medical student sample, potentially affecting comparisons between groups. Finally, several bivariate analyses were conducted to explore associations between sociodemographic variables and KASRP scores. As no adjustment for multiple comparisons was applied, some statistically significant findings may be attributable to type I error and should therefore be interpreted as exploratory. Finally, although the Spanish version of the KASRP has demonstrated adequate validity and reliability in nursing students, its psychometric properties have not been specifically evaluated in Spanish medical student populations. Consequently, caution is warranted when interpreting and comparing scores obtained in medical students, and further validation studies in this population would be valuable.

In conclusion, this study reinforces existing evidence of a persistent and global deficit in pain management knowledge among healthcare students. Given that effective pain control is a key indicator of quality care, these findings have important clinical and ethical implications. The findings may help inform future curriculum development aimed at improving pain-management education among healthcare students.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/ime5040133/s1, Table S1: Percentage of correct responses for each KASRP item among nursing and medical students.

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Data Availability Statement: Data underlying the results reported in this article can be made available by the corresponding author to qualified researchers upon reasonable request.

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Abbreviations

The following abbreviations are used in this manuscript:

BP	Blood Pressure
HR	Heart Rate
IV	Intravenous
KASRP	Knowledge and Attitudes Survey Regarding Pain
NSAID	Nonsteroidal Anti-inflammatory Drug
PRN	Pro Re Nata (as needed)
RR	Respiratory Rate
SD	Standard Deviation

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