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KNOWLEDGE AND ATTITUDES OF NURSING STUDENTS TOWARDS PAIN MANAGEMENT IN THE CZECH REPUBLIC: RESULTS OF A QUANTITATIVE STUDY USING THE KASRP-CZ QUESTIONNAIRE

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Abstract. Knowledge and attitudes of nursing students towards pain management in the Czech Republic: results of a quantitative study using the KASRP-CZ questionnaire. Matějková I., Ivanová K., Václavíková K. Pain management is an essential component of nursing care, yet international studies have repeatedly shown persistent gaps in nursing students' knowledge and attitudes, particularly in opioid pharmacology and clinical decision-making. This quantitative cross-sectional study aimed to assess the level of knowledge and attitudes of undergraduate general nursing students in the Czech Republic using the Czech version of the Knowledge and Attitudes Survey Regarding Pain questionnaire (KASRP-CZ) and to identify areas with the lowest success rates. The study was conducted at a faculty in the Czech Republic between April and June 2025. The sample consisted of 170 undergraduate nursing students enrolled in full-time and combined study programs. Data were collected using the KASRP-CZ questionnaire, which contains 39 items with a maximum score of 41 points. Results were expressed as percentages of correct answers. Descriptive and inferential statistics were used, including the Shapiro–Wilk test, Welch's t-test, one-way analysis of variance, and the chi-square test of independence. The level of statistical significance was set at $\alpha=0.05$. The mean total score was 53.70% (95% CI: 52.52%–54.88%; SD=7.81%), with scores ranging from 34.15% to 73.17%, indicating an acceptable but below the recommended level of knowledge and attitudes. Differences in total scores between study years were not statistically significant; however, the proportion of students achieving at least 50% increased significantly across study years. Students with healthcare work experience achieved significantly higher scores than students without such experience. The lowest success rates were identified in items related to opioid pharmacology, cancer-related pain, and clinical case scenarios. The findings indicate the need to strengthen practically oriented education in pain assessment, opioid pharmacology, and clinical decision-making. The KASRP-CZ questionnaire appears to be a suitable tool for monitoring educational outcomes and identifying areas requiring curricular improvement in nursing education.

Реферат. Знання та ставлення студентів медсестринства в Чеській Республіці щодо менеджменту болю: результати кількісного дослідження з використанням опитувальника KASRP-Cz. Матейкова І., Іванова К., Вацлавікова К. Контроль болю є невід'ємною складовою сестринської допомоги, однак міжнародні дослідження неодноразово виявляють стійкі прогалини в знаннях і ставленні студентів медсестринства, зокрема в галузі опіоїдної фармакології та клінічного ухвалення рішень. Метою цього кількісного поперечного дослідження було оцінити рівень знань і ставлення студентів бакалаврської програми загальної медсестринської освіти в Чеській Республіці з використанням чеської версії опитувальника «Опитувальник знань і ставлення щодо болю» (Knowledge and Attitudes Survey Regarding Pain, KASRP-CZ), а також визначити сфери з найнижчим рівнем успішності. Дослідження було проведено на факультеті в Чеській Республіці в період з квітня

до червня 2025 року. Вибірку становили 170 студентів бакалаврської програми медсестринства, які навчалися за денною та комбінованою формами навчання. Збір даних здійснювався за допомогою опитувальника KASRP-CZ, який містить 39 пунктів з максимальною сумарною оцінкою 41 бал. Результати були представлені у вигляді відсотка правильних відповідей. Для аналізу даних застосовувалися описова та інференційна статистика, зокрема критерій Шаніро-Вілка, *t*-тест Велча, однофакторний дисперсійний аналіз (ANOVA) та критерій хі-квадрат незалежності. Рівень статистичної значущості було встановлено на рівні $\alpha=0,05$. Середній загальний результат становив 53,70% (95% ДІ: 52,52%–54,88%; SD=7,81%), при цьому значення коливалися від 34,15% до 73,17%, що свідчить про прийнятний, але нижчий за рекомендований рівень знань і ставлення. Статистично значущих відмінностей між курсами навчання в загальному балі не виявлено; однак частка студентів, які досягли щонайменше 50%, достовірно зростала з кожним роком навчання. Студенти з досвідом роботи у сфері охорони здоров'я досягли статистично значуще вищих результатів порівняно зі студентами без такого досвіду. Найнижчі показники успішності були виявлені в завданнях, пов'язаних з опіоїдною фармакологією, болем онкологічного походження та клінічними ситуаційними задачами. Отримані результати свідчать про необхідність посилення практично орієнтованої освіти у сфері оцінювання болю, опіоїдної фармакології та клінічного ухвалення рішень. Опитувальник KASRP-CZ виявився придатним інструментом для моніторингу освітніх результатів і визначення напрямів удосконалення навчальних програм у медсестринській освіті.

Pain represents a complex and multidimensional phenomenon that affects an individual physically, psychologically, and socially. According to the International Association for the Study of Pain [1], pain is defined as an “unpleasant sensory and emotional experience associated with actual or potential tissue damage or resembling that experience”. This conceptualisation of pain was also previously adopted by the American Pain Society [2]. Both institutions emphasise that pain is always a subjective experience, and its perception is influenced by biological, psychological, and social factors.

Pain is one of the most common reasons for seeking healthcare, and the role of nurses in this area is indispensable. Although pain management has significantly advanced over recent decades, international research repeatedly highlights persistent deficiencies in the assessment and management of pain in clinical practice. These gaps are related to individual healthcare providers' knowledge and attitudes [3].

Undergraduate education plays a crucial role: during their studies, nursing students develop the foundations of clinical reasoning and attitudes that influence the quality of subsequent care [4]. Recent review articles confirm that students' knowledge and attitudes towards pain management are globally limited; common deficiencies particularly concern opioid pharmacology, dosing, differentiation between tolerance and dependence, and the application of theoretical knowledge to clinical scenarios [5]. Comprehensive reviews indicate that students' average scores typically range around 50–60%, suggesting room for improvement [5]. Some studies also suggest that personal experience with pain – whether one's own or within the family – can positively influence students' knowledge and attitudes towards pain management [6].

The objective assessment of knowledge and attitudes is facilitated by standardised instruments; the most widely used and internationally recognized tool is the Knowledge and Attitudes Survey Regarding

Pain (KASRP). The revised 2014 version comprises 39 items, including two case vignettes, covering four domains: pain assessment, cancer-related pain, pharmacology, and substance abuse/physical dependence [4]. According to a systematic review [7], KASRP is the most frequently utilised instrument of its kind. The questionnaire has been translated and validated in several languages, including Chinese, Danish, and Thai, demonstrating its suitability for both educational and research purposes within nursing [8, 9, 10].

In the Czech context, there has been a lack of data from extensive quantitative studies using a standardised tool to assess nursing students' knowledge and attitudes regarding pain. This study builds on the translation and cultural adaptation of the Czech version of KASRP-CZ and presents the first results from 170 general nursing students.

The aim of this quantitative study was to assess the knowledge and attitudes of undergraduate students enrolled in a general nursing bachelor's program at a university in the Czech Republic regarding pain, using the Czech version of the standardised Knowledge and Attitudes Survey Regarding Pain (KASRP-CZ). The study aimed to identify the topics perceived by students as the most difficult and to analyze areas with the lowest success rates, particularly in relation to analgesic pharmacology and clinical case studies. Additionally, the study sought to examine differences in results based on selected respondent characteristics such as work experience, age, or mode of study.

MATERIALS AND METHODS OF RESEARCH

This quantitative cross-sectional study was conducted at a university in the Czech Republic among undergraduate students enrolled in the general nursing program, including both full-time and combined study formats. Only students who voluntarily agreed to participate anonymously were included.

For the purposes of this study, the Czech version of the *Knowledge and Attitudes Survey Regarding*

Pain (KASRP-CZ) questionnaire was used. The questionnaire was translated using back-translation methodology in accordance with ISPOR guidelines and underwent expert review. The translation and linguistic validation followed ISPOR guidelines for the translation and cultural adaptation of patient-reported outcome measures [11], and the questionnaire translation and adaptation algorithm [12].

The adaptation process involved three translators, ten expert evaluators, and eight undergraduate nursing students. Consultations with two physicians, one palliative care specialist, one pharmacist, and one clinical pharmacist ensured the clinical and pharmacological accuracy of the translation. The KASRP-CZ questionnaire demonstrated good content validity (I-CVI = 0.9-1; κ = 0.899-1). In the pilot phase of the study (March 2025), the comprehensibility and suitability of the instrument for the target group of students in the Czech context were confirmed. Results validated the instrument's appropriateness for further research and educational use [13]. Permission for its use in the Czech setting was granted by the tool's author, Dr. Betty Ferrell, in 2021, with confirmation received via email communication in April 2025. After the pilot, the research sample was expanded to include all academic years for comparative purposes.

The KASRP questionnaire contains 39 items (true/false questions, multiple-choice questions, and two case studies). Each correct answer was scored as one point, while incorrect or unanswered items scored zero. Since more than one point could be earned from the case studies, the maximum total score is 41 points. Results were expressed as the percentage of correct answers and interpreted according to the recommended criteria: a score below 50% indicates insufficient knowledge, 50-74% denotes acceptable knowledge, and 75% or higher represents good knowledge and attitudes [4]. According to the authors' tool [4], most questionnaire items assess both knowledge and attitudes simultaneously, and therefore, separate subscales are not created. This approach is also supported by previous review literature [7].

Data collection took place in April, May, and June 2025 using paper questionnaires administered in the presence of an academic staff member. Participation was voluntary and anonymous.

Data were analyzed using descriptive and inferential statistics. Descriptive statistics included means with 95% confidence intervals, standard deviations, frequencies, and percentages.

No qualitative data were collected in this study. Normality of data distribution was assessed using the Shapiro-Wilk test.

Differences between groups were analyzed using Welch's t-test and one-way analysis of variance (ANOVA). The chi-square test of independence was used to assess associations between categorical variables.

The level of statistical significance was set at α = 0.05. Statistical analyses were performed using Statistica version 14.0 under an institutional Ultimate Academic licence.

Statistical methods were applied in accordance with standard biostatistical approaches [14].

Ethical considerations were ensured in accordance with the internal regulations of the collaborating institutions. The research project was approved by the faculty leadership where the study was conducted on January 9, 2024, and subsequently by the second collaborating university on March 1, 2025. The study was reviewed by the ethical committees of both institutions, which issued favourable opinions on January 7, 2025, and February 17, 2025, respectively.

Demographic characteristics (gender, age, field and year of study) were collected using a structured questionnaire.

RESULTS AND DISCUSSION

A total of 170 respondents participated in the KASRP questionnaire survey. Their demographic data are summarised in Table 1.

Table 1

Demographic data

Demographic data		N	%
Gender	Female	161	94.7
	Male	9	5.3
Age (SD)		23.3 (6.1)	
Field of study	General nursing – full-time study	129	75.9
	General nursing – combined study	41	24.1
Year of study	1st year	52	30.6
	2nd year	49	28.8
	3rd year	69	40.6

The questionnaire survey included 161 women (94.7%) and 9 men (5.3%), of whom 129 respondents (75.9%) are enrolled in full-time study and 41 respondents (24.1%) are enrolled in combined study. The study involved students from all years of the bachelor's program. The average age of respondents is 23.3 years with a standard deviation of 6.1 years. The youngest respondents are 19 years old, and the oldest respondents are 48 years old.

A total of 106 respondents (62.4%) reported healthcare experience beyond their student practice. The average length of healthcare experience is 4.8 years with a standard deviation of 5.5 years. The average length of healthcare experience excluding outliers is 3.4 years with a standard deviation of 1.9 years. The length of healthcare experience in the current job position is 2.1 years with a standard deviation of 1.3 years. The shortest healthcare experience duration is 6 months, whereas the longest is 29 years.

Eighty-one respondents (76.4%) work as practical nurses, 17 respondents (16.0%) work as general nurses, and a few respondents work as orderlies, caregivers, and operating room assistants.

The most common department where respondents work is internal medicine, with 30 respondents (28.3%), followed by 21 respondents (19.8%) working in the surgery department, and 10 respondents

(9.4%) in the intensive care unit (ICU). Other departments include urology, orthopaedics, long-term care facilities, paediatric ward, geriatrics, a special regime nursing home, and a senior home, each represented by a smaller number of respondents.

In the KASRP questionnaire, correct answers are scored with one point, while incorrect or unanswered items are scored zero (total score ranges from 0 to 41). The total score of respondents is expressed as a percentage of correct answers. Data normality was verified using the Shapiro-Wilk test (p -value = 0.161), indicating no statistically significant deviation from normality.

The frequency and percentage distribution of total scores, including mean values with 95% confidence intervals, are clearly presented in Table 2. The average total percentage of correct answers among respondents was 53.70% (95% CI: 52.52%-54.88%; SD = 7.81%). The lowest score was 34.15%, and the highest score reached 73.17%.

Differences in the total KASRP questionnaire scores between individual academic years were not statistically significant, as confirmed by analysis of variance (p -value = 0.366).

However, a statistically significant difference in the total KASRP score was found between students with healthcare experience and those without (Welch's test p -value = 0.008).

Table 2

Respondent frequencies and percentage representation of total score

	Total		1st year		2nd year		3rd year	
	N	mean % (95% CI)	N	mean % (95% CI)	N	mean % (95% CI)	N	mean % (95% CI)
Total KASRP score	170	53.70 (52.5-54.9)	52	52.39 (49.9-54.9)	49	54.06 (51.6-56.6)	69	54.44 (53.0-55.9)
Healthcare experience								
Yes	106	55.02 (53.7-56.3)	25	53.37 (50.1-56.6)	27	56.28 (53.4-59.2)	54	55.15 (53.6-56.7)
No	64	51.52 (49.3-53.8)	27	51.49 (47.6-55.4)	22	51.33 (47.1-55.6)	15	51.87 (48.2-55.6)

Of the 52 first-year university respondents, 39 (75%) had successfully completed secondary healthcare education, while 13 (25%) had completed other types of secondary education. The average score among graduates from secondary healthcare schools was 52.41%, while non-healthcare graduates achieved an average score of 52.35%. This indicates that previous secondary education does not affect the attitudes or knowledge of respondents in the first year.

In the first year, 42 respondents were enrolled in the full-time study format; their average KASRP questionnaire score was 51.22%. Another 10 respondents were in the combined study format, with an average KASRP score of 57.32%. The significant difference in total score (test p -value = 0.049) may be mainly influenced by the age of respondents and their work experience. The average age of full-time students was 19.9 years, while the average age of

part-time students was 26.4 years; additionally, 8 out of 10 part-time students reported healthcare experience beyond mandatory student training (average duration 4.6 years), whereas only 17 full-time students (40.48%) reported healthcare experience (average duration 1.6 years).

In the second year, 39 respondents were enrolled in the full-time format, with an average KASRP score of 53.66%, and 10 in the part-time format, with an average score of 60.98%. Again, the significant score difference (test p -value 0.004) may be influenced by the age and work experience of respondents. The average age of full-time students was 21.0 years, while part-time students averaged 32.2 years; 9 out of 10 part-time students reported healthcare experience beyond mandatory training (average duration 11.3 years), compared to only 18 full-time students (46.15%) with healthcare experience (average 2.5 years).

In the third year, 48 respondents studied full-time and their average KASRP score was 54.62%, while

21 studied part-time with an average score of 54.01%. The difference in total score is negligible (p -value = 0.695), indicating that by the final year, age and work experience may no longer significantly affect the final score. The average age of full-time students was 21.81 years, compared to 31.86 years for part-time students; 20 out of 21 part-time students reported healthcare experience beyond mandatory training (average 7.8 years), while 34 full-time students (70.83%) reported such experience (average 3.9 years).

A score below 50% is rated as poor knowledge, a score from 50% up to but not including 75% is considered acceptable, and a score of 75% or higher is classified as good knowledge.

In total, 125 respondents (73.53%) achieved an overall score more than 50% (but less than 75%), which can be classified as acceptable knowledge and attitudes, while 45 respondents (26.47%) scored below 50%, indicating poor knowledge and attitudes.

Table 3

Ratio of knowledge and attitudes

	Total		1st year		2nd year		3rd year	
	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Score 50% to 75%	125	73.53 (66.8–80.2)	31	59.62 (45.8–73.4)	32	65.31 (51.5–79.1)	62	89.86 (82.6–97.1)
Score <50%	45	26.47 (19.8–33.2)	21	40.38 (26.6–54.2)	17	34.69 (20.9–48.5)	7	10.14 (2.8–17.5)

From Table 3, which shows the ratio of knowledge and attitudes, it is evident that the proportion of respondents with acceptable and poor knowledge and attitudes improves during the course of study, and the effect of academic year is statistically significant (independence chi-square test p -value < 0.001, value of test statistic = 16.32). In the first year, only 59.62% of respondents demonstrated acceptable knowledge and attitudes, compared to 89.86% in the final year.

Ten items (Q1, Q2, Q10, Q11, Q12, Q13, Q14, Q20, Q22, Q31) out of a total of 41 had a correct response rate above 75%, and another eleven items had a correct response rate above 50% but below 75% (Q7, Q18, Q19, Q21, Q24, Q25, Q29, Q32, Q33, Q34, Q35). Six items had a correct response rate of 25% or less (Q4, Q16, Q23, Q28, Q38B, Q39B).

The KASRP questionnaire covers four domains: Pain assessment (Q1, Q2, Q3, Q4, Q12, Q31, Q32, Q38A, Q39A), cancer-related pain (Q5, Q23, Q25, Q28, Q30), pharmacology (Q6, Q7, Q8, Q9, Q10,

Q11, Q13, Q14, Q15, Q16, Q17, Q18, Q19, Q21, Q24, Q26, Q27, Q29, Q34, Q35, Q37, Q38B, Q39B), and substance abuse and physical dependence (Q20, Q22, Q33, Q36).

Frequencies and percentages of correct answers for each domain are clearly presented in Tables 4 to 7.

Table 4 shows the frequencies and percentages of correct answers and their 95% confidence intervals for 170 respondents on questions concerning pain assessment. Most respondents (95.88%) correctly answered that children under the age of 11 are capable of reliably reporting pain (Q12), and 80.59% correctly stated that a patient is the most accurate judge of their own pain intensity. However, questions related to assessing patient pain intensity in case studies (Q39A, Q38A) were answered correctly in only 37.06% and 29.41% of cases, respectively. Additionally, only 21.18% of respondents correctly indicated that patients may sleep despite experiencing severe pain (Q4).

Table 4

Pain assessment

Pain assessment		Correct answers out of 170 respondents	
		N	% (95% CI)
12	Children less than 11 years old cannot reliably report pain so clinicians should rely solely on the parent's assessment of the child's pain intensity	163	95.88 (92.9–98.9)
31	The most accurate judge of the intensity of the patients' pain (the patient)	137	80.59 (74.6–86.6)
1	Vital signs are always reliable indicators of the intensity of patients' pain (F)	131	77.06 (70.7–83.4)
2	Because their nervous system is underdeveloped, children under two years of age have decreased pain sensitivity and limited memory of painful experiences (F)	128	75.29 (68.7–81.8)
32	The best approach for cultural considerations in caring for patients in pain (Patients should be individually assessed to determine cultural influences)	107	62.94 (55.6–70.3)
3	Patients who can be distracted from pain usually do not have severe pain (F)	83	48.82 (41.2–56.4)
39A	Patient B: Robert is 25 years old and this is his first day following abdominal surgery	63	37.06 (29.7–44.4)
38A	Patient A: Andrew is 25 years old and this is his first day following abdominal surgery	50	29.41 (22.5–36.3)
4	Patients may sleep in spite of severe pain (T)	36	21.18 (15.0–27.4)

Table 5 presents the frequencies and percentages and their 95% confidence intervals of correct answers to questions related to cancer-related pain. The results show that most respondents (55.88%) correctly identified the drug of choice for the treatment of persistent

moderate to severe pain in patients with malignant diseases (Q25). Additionally, 41.76% of respondents correctly answered the question concerning the effectiveness of aspirin and other nonsteroidal anti-inflammatory drugs for painful bone metastases (Q5).

Table 5

Cancer-related pain

Cancer-related pain		Correct answers out of 170 respondents	
		N	% (95% CI)
25	Analgesic medications are considered for the treatment of prolonged moderate to severe pain for cancer patients (morphine)	95	55.88 (48.3–63.4)
5	Aspirin and other non-steroidal anti-inflammatory agents are NOT effective analgesics for painful bone metastases (F)	71	41.76 (34.3–49.3)
30	Useful for treatment of cancer pain (All of the above)	52	30.59 (23.6–37.6)
23	The recommended route of administration of opioid analgesics for patients with persistent cancer-related pain (oral)	29	17.06 (11.4–22.8)
28	A patient with persistent pain has been receiving daily opioid analgesics for 2 months. Yesterday the patient was receiving morphine 200 mg/hour intravenously. Today the patient was receiving morphine 250 mg/hour intravenously. The likelihood of the patient developing clinically significant respiratory depression in the absence of new comorbidity (less than 1%)	23	13.53 (8.4–18.7)

A lower percentage of correct responses was observed for questions about the recommended method of administering opioid analgesics in patients with persistent cancer pain (17.06%, Q23) and the assessment of respiratory depression risk in patients with persistent cancer pain (13.53%, Q28).

Table 6 shows the frequencies and percentages and their 95% confidence intervals of correct

answers to questions regarding pharmacology, specifically opioids and analgesics. The results indicate that most respondents (95.29%) correctly answered that elderly patients tolerate opioids for pain relief (Q10), and 94.12% correctly stated that after the initial dose of an opioid analgesic, subsequent doses should be adjusted according to the patient's individual response (Q14).

Some questions were answered correctly in only a low percentage of cases. For example, only 27.65% of respondents correctly answered the question about the usual duration of analgesia after administering 1-2 mg of intravenous morphine (Q8), and only 23.53% correctly answered a question about the effect of Zaldiar (Q16).

Within two case studies, respondents were asked to decide whether to administer intravenous morphine

and, if so, what dose should be given for persistent pain two hours after the previous dose. In the first case study (Q38B), 12.35% of respondents made the correct decision, and the second case study (Q39B) was answered correctly by 20% of respondents.

The results suggest that respondents possess good knowledge in some pharmacology areas but have gaps concerning the specific aspects of opioid therapy and analgesics.

Table 6

Pharmacology		Correct answers out of 170 respondents	
Pharmacology		N	% (95% CI)
10	Elderly patients cannot tolerate opioids for pain relief (F)	162	95.29 (92.1-98.5)
14	After an initial dose of opioid analgesic is given, subsequent doses should be adjusted in accordance with the individual patients' response (T)	160	94.12 (90.5-97.7)
13	Patients' spiritual beliefs may lead them to think pain and suffering are necessary (T)	159	93.53 (89.8-97.3)
11	Patients should be encouraged to endure as much pain as possible before using an opioid (F)	135	79.41 (73.3-85.6)
7	Combining analgesics that work by different mechanisms (e.g. combining an NSAID with an opioid) may result in better pain control with fewer side effects than using a single analgesic agent (T)	125	73.53 (66.8-80.2)
29	The most likely reason a patient with pain would request increased doses of pain medication (The patient is experiencing increased pain): (a)	125	73.53 (66.8-80.2)
18	Anticonvulsant drugs such as gabapentin (Neurontin) produce optimal pain relief after a single dose (F)	123	72.35 (65.6-79.1)
34	The time to peak effect for morphine given IV is: (a)	121	71.18 (64.3-78.1)
21	The term "Equianalgesia" means approximately equal analgesia and is used when referring to the doses of various analgesics that provide approximately the same amount of pain relief (T)	119	70.00 (63.0-77.0)
19	Benzodiazepines are not effective pain relievers and are rarely recommended as part of an analgesic regimen (T)	101	59.41 (52.0-66.9)
35	The time to peak effect for morphine given orally is: (c)	99	58.24 (50.8-65.7)
24	The recommended route administration of opioid analgesics for patients with brief, severe pain of sudden onset, such as trauma or postoperative pain: (a)	97	57.06 (49.5-64.6)
26	A 30 mg dose of oral morphine is approximately equivalent to: (b)	84	49.41 (41.8-57.0)
27	Analgesics for post-operative pain should initially be given: (a)	83	48.82 (41.2-56.4)
6	Respiratory depression rarely occurs in patients who have been receiving stable doses of opioids over a period of months (T)	70	41.18 (33.7-48.7)
15	Giving patients sterile water by injection (placebo) is a useful test to determine if the pain is real (F)	63	37.06 (29.7-44.4)
9	Opioids should not be used in patients with a history of substance abuse (F)	62	36.47 (29.2-43.8)
17	If the source of the patient's pain is unknown, opioids should not be used during the pain evaluation period, as this could mask the ability to correctly diagnose the cause of pain (F)	48	28.24 (21.4-35.1)
8	The usual duration of analgesia of 1-2 mg morphine IV is 4-5 hours (F)	47	27.65 (20.9-34.4)
37	Which statement is true regarding opioid-induced respiratory depression: (b)	47	27.65 (20.9-34.4)
16	Zaldiar (tramadol 37.5 mg + paracetamol 325 mg) PO is approximately equal to 5-10 mg of morphine PO (T)	40	23.53 (17.1-30.0)
39B	Patient B: Your assessment (d)	34	20.00 (13.9-26.1)
38B	Patient A: Your assessment (d)	21	12.35 (7.4-17.4)

Table 7 shows the frequencies and percentages and their 95% confidence intervals of correct answers to questions regarding substance abuse and physical dependence. The results indicate that most respondents (95.88%) correctly answered the definition of addiction to narcotics/opioids (Q20), and 84.12% correctly answered the question about recom-

mendations for assessing sedation during opioid pain management (Q22).

More than half of the respondents (51.76%) correctly answered the question concerning the likelihood that patients in pain already have issues with alcohol or drug abuse (Q33).

Table 7

Substance abuse and physical dependence

Substance abuse and physical dependence		Correct answers out of 170 respondents	
		N	% (95% CI)
20	Narcotic/opioid addiction is defined as a chronic neurobiological disease, characterised by behaviours that include one or more of the following: impaired control over drug use, compulsive use, continued use despite harm, and craving (T).	163	95.88 (92.9-98.9)
22	Sedation assessment is recommended during opioid pain management because excessive sedation precedes opioid-induced respiratory depression (T).	143	84.12 (78.6-89.7)
33	How likely is it that patients who develop pain already have an alcohol and/or drug abuse problem? (b)	88	51.76 (44.2-59.4)
36	Following abrupt discontinuation of an opioid, physical dependence is manifested by the following: (a)	56	32.94 (25.8-40.1)

The study provided valuable insights into the respondents' knowledge and attitudes regarding pain. The results show that the average percentage of correct answers on the KASRP questionnaire among 170 respondents was 53.70% (95% CI: 52.52%-54.88%; SD=7.81%), indicating that most respondents possess acceptable knowledge and attitudes, although there was considerable variability in scores, with the lowest score at 34.15% and the highest at 73.17%.

Analysis of variance did not confirm statistically significant differences in the total KASRP score among particular academic years; however, a statistically significant difference was found between students with healthcare experience and those without such experience. This finding may suggest that practical experience plays an important role in the development of respondents' knowledge and attitudes.

It is particularly noteworthy that previous secondary education did not influence the attitudes and knowledge of first-year respondents. This result may support the notion that knowledge and attitudes are more affected by practical experience and university-level study than by previous education. Although the average scores between academic years did not differ significantly ($p=0.366$), the distribution of results shows a gradual increase in the level of knowledge and attitudes during the course of study. In higher years, the proportion of students with insufficient

knowledge (<50%) decreased markedly – from 40.4% in the first year, to 34.7% in the second, and just 10.1% in the third year (χ^2 , $p<0.001$). This trend suggests that education and clinical experience during university studies result in fewer students having a low level of knowledge, even though the average level remains below the recommended threshold of 75% considered adequate preparation for clinical practice.

The majority of respondents (73.53%) achieved an overall score greater than 50%, and their knowledge and attitudes can be classified as acceptable. It was also shown that the proportion of acceptable versus poor knowledge and attitudes evolves during the course of study. In the final year of the bachelor's program, 89.86% of respondents demonstrated acceptable knowledge and attitudes.

Analysis of individual items in the KASRP questionnaire revealed that 10 items had a correct response rate above 75%, and another 11 items achieved a correct response rate between 50% and 75%. This result indicates that respondents possess good knowledge in certain areas, but there are gaps related to specific aspects of pain and pharmacology.

Considering the four domains defined in the KASRP questionnaire (pain assessment, cancer-related pain, pharmacology, and substance abuse/physical dependence), respondents showed varying levels of knowledge and attitudes in different areas. The

greatest deficiencies were found in knowledge and attitudes relating to pain, particularly in the context of cancer and pharmacology.

The results of this quantitative study show that the level of knowledge and attitudes of general nursing students towards pain management in the Czech setting was acceptable, but below the recommended threshold of 75%, which is considered indicative of adequate preparedness for clinical practice. This finding corresponds with international studies that have long noted persistent gaps in knowledge and decision-making skills among students and nurses, especially regarding pharmacology and clinical reasoning [5].

Similar results have been described outside of Europe. In Saudi Arabia, students achieved an average success rate of only 46% [15]. European data, especially from Central and Eastern Europe, remain limited in this respect, which highlights the value of the Czech contribution – providing a new perspective from a region not previously represented in similar reviews.

A significant finding of this study is the lower success rate on questions focused on opioid pharmacology and clinical case scenarios. These results are consistent with findings from Canada and China, where studies have demonstrated uncertainty among students and nurses regarding opioid dosing, assessment of tolerance, distinguishing dependence, and making appropriate intervention decisions [9, 16]. Similar findings were also reported in a recent Japanese study using the J-KASRP, where the lowest scores were observed in cancer-related pain and opioid pharmacology [17]. Comparable results have also been reported in a Czech cross-sectional study using the KASRP among non-medical healthcare professionals in intensive care, which identified insufficient knowledge and attitudes regarding pain management, with an average score of 49.5%, and emphasized the need for systematic education in this area [18]. These deficiencies may significantly affect the quality of future pain care and highlight the need for systematic education in clinical pharmacology.

An interesting observation is the effect of work experience. Students with practical experience achieved higher scores than those without, suggesting that clinical experience supports the development of competencies in pain assessment and management. However, it is evident that practical experience alone is not sufficient without a theoretical framework. Clinical experience must be systematically integrated with education in order to lead to deeper understanding and the development of decision-making skills. This conclusion is also supported by results from Iceland, where nurses with higher education levels achieved better results, particularly in clinical case scenarios [3].

Analysis of score distribution confirmed a statistically significant increase in the proportion of successful students ($\geq 50\%$) during the course of study (χ^2 , $p < 0.001$), indicating a gradual improvement in the level of knowledge and clinical reasoning with higher years of study. This trend confirms the benefit of the educational process and clinical exposure in developing competencies in pain management, a point also demonstrated by Erol Ursavaş and Karayurt [19], who showed that targeted education leads to significant improvement in nursing students' knowledge and attitudes towards pain treatment.

The findings of this study highlight the need to strengthen pain education in the Czech nursing curriculum, especially in the areas of pharmacology, opioid dosing, and decision-making scenarios with clinical elements. It is also important to systematically develop the ability to distinguish between the concepts of tolerance, dependence, and physical dependence. A validated instrument such as the KASRP-CZ questionnaire can serve as a suitable tool for monitoring the effectiveness of educational interventions, enabling repeated measurement and objective evaluation of student progress [4].

A key strength of this study is the sample size ($n=170$), which made it possible to identify specific areas with the lowest success rates and provide suggestions for educational innovation. The results also confirm that the Czech version of the KASRP-CZ questionnaire is appropriate for use in both education and research.

A limitation of the study is that data collection took place at only one university faculty, which may restrict the generalisability of the results. Another limitation is the predominantly univariate analytical approach, which did not allow for full simultaneous control of the effects of age, form of study, and work experience. Future research should include more universities and regions and focus on evaluating the effectiveness of specific educational interventions aimed at improving students' knowledge and attitudes towards pain management.

CONCLUSION

1. The level of knowledge and attitudes of general nursing students regarding pain management was acceptable (average 53.7%) and corresponds to the results of similar international studies.

2. The proportion of successful students ($\geq 50\%$) increased significantly across study years (χ^2 , $p < 0.001$), indicating a gradual improvement in knowledge.

3. Students with healthcare work experience achieved higher results, confirming the benefit of clinical practice for the development of competencies.

4. Deficiencies remain in the areas of opioid pharmacology and clinical decision-making, highlighting the need to strengthen practically oriented education.

5. It is recommended to enhance education in opioid pharmacology, practical pain assessment skills, and the development of appropriate attitudes towards pain management, with greater emphasis on clinically oriented and case-based teaching.

6. The KASRP-CZ instrument can be used for regular assessment of students' knowledge and attitudes and for monitoring the effectiveness of educational interventions.

Contributors:

Matějková I. – conceptualization, writing – original draft, methodology, statistical analysis, resources, investigation;

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Václavíková K. – conceptualization, methodology.

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