Fenerbahçe Üniversitesi
Sağlık Bilimleri Dergisi
Cilt 4, Sayı 1, 38-52, 2024

Fenerbahce University
Journal of Health Sciences
Volume 4, Issue 1, 38-52, 2024

FBU-JOHS

The Knowledge and Attitudes of Nursing Students about Pain Management

Hemşirelik Öğrencilerinin Ağrı Yönetimi Konusunda Bilgi ve Tutumları

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Abstract

This descriptive study was conducted to determine nursing students' knowledge and attitudes regarding pain management. 129 second-, third-, and fourth-year nursing students at a foundation university in Istanbul made up the study's sample. Data were collected using the Student Information Form and the Knowledge and Attitudes Survey Regarding Pain - Nurse (KASRP-N) and evaluated using percentage, mean, Kruskal-Wallis, Mann-Whitney U test, and Tamhane's T2 tests. The mean score of the students' knowledge and attitudes regarding pain management was 13.48±3.60 and the rate of correct responses to the KASRP-N questions was 34.5% and evaluated as poor. There was a significant difference between the KASRP-N total scores and the variables of the grade, previous education in pain management in any course before, and the most common type of pain experienced ($p<0.05$). It was determined that the students did not have sufficient knowledge and a positive attitude about pain management. Including more structured and standardised pain management education with evidence-based information in the undergraduate nursing curriculum and using different teaching methods is recommended.

Keywords: Attitude, knowledge, nursing students, pain, pain management

Özet

Bu araştırma hemşirelik öğrencilerinin ağrı yönetimi konusunda bilgi ve tutumlarının belirlenmesi amacıyla tanımlayıcı türde yapılmıştır. İstanbul'da bir vakıf üniversitesinin ikinci, üçüncü ve dördüncü sınıflarında öğrenim gören 129 hemşirelik öğrencisi araştırmanın örneklemini oluşturmuştur. Veriler Öğrenci Tanıtım Formu, Hemşirenin Ağrı ile ilgili Bilgi ve Tutum Anketi (KASRP-N) kullanılarak toplanmış ve yüzde, ortalama, Kruskal-Wallis, Mann-Whitney U testi, ve Tamhane's T2 testleri kullanılarak değerlendirilmiştir. Öğrencilerin ağrı yönetimi konusunda bilgi ve tutum puan ortalaması 13,48±3,60 olup, ölçek sorularının doğru cevaplanma oranı %34,5 ile zayıf düzeyde olarak değerlendirilmiştir. Öğrencilerin sınıfı, daha önce herhangi bir derste ağrı yönetimi konusunda eğitim alma, en sık yaşanılan ağrı tipi değişkenleri ile KASRP-N toplam ölçek puanları arasında anlamlı bir farklılık olduğu saptanmıştır ($p<0,05$). Öğrencilerin ağrı yönetimi konusunda yeterli bilgiye ve olumlu bir tutuma sahip olmadıkları tespit edilmiştir. Lisans hemşirelik müfredatında kanıta dayalı bilgilerle yapılandırılmış ve standartlaştırılmış ağrı yönetimi eğitimine daha fazla yer verilmesinin yanı sıra farklı öğretim yöntemlerinin kullanılması önerilebilir.

Anahtar Kelimeler: Ağrı, ağrı yönetimi, bilgi, hemşirelik öğrencileri, tutum

How the cite (atıf için): Tosun, N. & Yesilyurt, T., (2023). The knowledge and attitudes of nursing students about pain management. Fenerbahce University Journal of Health Sciences,4(1), 38-52. DOI: 10.56061/fbujohs.1238378

Submission Date: 18.01.2023, Acceptance Date: 25.09.2023, Publication Date: 03.05.2024

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DOI: 10.56061/fbujohs.1238378
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1. Introduction

Pain is a universal experience that is rapidly becoming a global burden (Rice et al., 2016; Ung, Salamonson et al., 2015). Despite advances in treatment and technology, inadequate pain management decreases quality of life due to physiological and psychosocial effects, prolonged hospitality, increased morbidity and mortality, workforce losses and high healthcare costs (Lynch, 2011; Meissner et al., 2018; Werner et. al. 2022). To restore physical, psychological, and social functioning, we need efficient pain control, either eliminating or reducing pain to a manageable level (Langford, 2006; Meissner et al., 2018).

Effective pain management relies on a variety of intricate relationships and procedures, such as cooperative teamwork and continuity of care (Hayes & Gordon, 2015). Although pain management requires interdisciplinary teamwork, nurses are in a key position in pain management among health professionals because they are with the patient and take an active role in all stages of the treatment process (Fishman et. al., 2013; Hroch et al., 2019). With sufficient knowledge and a favorable attitude toward pain treatment, nurses can effectively manage pain. Nurse educators should provide nursing students with comprehensive knowledge about pain and pain management before the students complete their undergraduate education (Al-Khawaldeh et al., 2013; Chow & Chan, 2015; Karaman et al., 2019; Shdaifat et al., 2020). After graduating, nursing students put their newly acquired fundamental skills, attitudes, and behaviors into practice (Dağ et al., 2022; Naqib et. al., 2018). Studies that examined nursing students' attitudes and knowledge of pain revealed that students' pain management knowledge was inadequate and their attitudes were negative (Al Khalaileh & Al Qadire, 2013; Chow & Chan, 2015; Çelik et al., 2018; Dağ et al., 2022; Duke et al., 2013; Evans & Mixon, 2015; Hroch et al., 2019; Karaman et al., 2019; Keyte & Richardson, 2011; Kulkarni et al., 2016; Naqib et. al., 2018; Özveren et al., 2018; Shdaifat et al., 2020; Topal Hançer & Yılmaz, 2020; Yıldırım et al., 2008). In a systematic review of nursing students' knowledge and attitudes towards pain management, nursing students were found to have insufficient knowledge about pain management due to the undergraduate nursing curriculum's apparent inability to translate theory into practice (Cousins et al., 2022).

This study adds to the body of literature by providing the information and attitudes of nursing students about pain management. The study's findings can be used as a foundation for identifying the gaps in the nursing curriculum's coverage of pain management and developing the necessary approaches to the problem.

2. Method

2.1. Aim of Study

This study was conducted to determine the knowledge and attitudes of nursing students about pain.

2.2. Research Questions

What are the knowledge levels and attitudes of nursing students about pain?

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Is there a relationship between students' descriptive characteristics and their knowledge and attitudes towards pain management?

2.3. Population and Sample of the Research

The population of the study consisted of 237 second-, third-, and fourth-year nursing students at a foundation university in Istanbul in the 2020-2021 academic year. First-year students were excluded from the study because pain management may not have been covered in the courses yet and the students had not yet been in clinical practice. The sample consisted of 129 nursing students who agreed to take part in the study. In the power analysis, the power of the study completed with 129 participants with an effect size of 0.3 was found to be 92% at a significance level of 0.05 and the sample was found to be sufficient. Data were gathered for the academic year 2020–2021 between February and April.

2.4. Data Collection and Measurements

Student Information Form and the Knowledge and Attitudes Survey Regarding Pain - Nurse (KASRP-N) were used to collect the research data. Data collection was originally planned to be conducted with the students face-to-face but due to COVID-19 restrictions was conducted online via Google Forms and e-mail between February and April of the 2020-2021 academic year. At the beginning of the data collection form, the students were informed about the study and their consent was obtained.

2.4.1. Student Information Form:

This form was designed with seven items including questions regarding student gender, class, any comorbidity or health problem, previous pain management education in any course, pain experienced most frequently, pain relief methods utilized, and self-assessment of their current knowledge on pain management.

2.4.2. The Knowledge and Attitudes Survey Regarding Pain-Nurse (KASRP-N):

This measurement tool is a 39-item survey developed by Ferrell et al. (1993). The Turkish version of the questionnaire was conducted by Yıldırım et al. (2008) and the Cronbach Alpha score of the measurement tool was determined as 74 (Yıldırım, Çiçek and Uyar, 2008). The instrument's Cronbach Alpha score in the current study was determined to be 0.74. The KASRP-N consists of 39 items in total; the first 22 items are true/false, 13 items (questions 23-35) are multiple choice and 4 items (questions 36-39) based on 2 case studies are multiple choice questions (ANNEX-4). Each correct response is worth 1 point, whereas false or blank responses are worth 0 points. Total scores vary between 0-39. When the scores are expressed as percentages, there are three categories of assessment: poor (<50%), fair (50-75%) and good (>75%).

2.5. Ethical Considerations

Ethics Committee Permission was received (dated 10.12.2019 and numbered 2019-11/5). The ethical guidelines of the Helsinki Declaration were followed at every stage of the research.

The students consented to participate in the study before they started filling out the online data collection forms. On the main page of the online form, participants were informed of the purpose, scope and confidentiality of the data and it was stated that participation was voluntary; students who volunteered to participate in the study were accepted to the study if they ticked the consent option.

2.6. Limitations

The study's limitations include the non-probabilistic sample selection and the fact that it was conducted entirely online. Participants made self-reports. It was assumed that the sampled students had successfully passed the Fundamentals of Nursing course in which pain management training was given but it was not recorded whether the students attended the course on the day of the pain management training.

2.7. Data Analysis

The data were statistically analyzed using the SPSS (Statistical Package for the Social Sciences) 23.0 package program. Numbers and percentages summarized categorical measurements and continuous data were analyzed using the mean and standard deviation (median and minimum-maximum where necessary). The Shapiro-Wilk test was performed to examine whether the study's parameter distributions were normal. In paired group analyses, The Mann-Whitney U test was used for parameters without a normal distribution, and the Kruskal-Wallis test was applied in analyses involving more than two groups. One of the Post Hoc tests, Tamhane's T2 tests, was performed to ascertain whether there was a difference between more than two groups. The variables influencing the KASRP-N total score were identified using a multiple linear regression model. In each test, 0.05 was taken as the statistical significance level.

3. Results

Variables of nursing students' socio-demographic and pain-related experiences are shown in Table 1.

Table 1. Variables of nursing students' socio-demographic and pain-related experiences (n=129)

Variable	Frequency(n)	Percent (%)
Gender		
Male	23	17.8
Female	106	82.2
Comorbid disease		
No	102	79.1
Yes	27	20.9
Grade		
2nd	35	27.1
3rd	47	36.4
4th	47	36.4
Previous education in pain management in any course before		
No	23	17.8
Yes	106	82.2
The most common type of pain experienced		
Headache	39	30.2
Joint-muscle pain	40	31.0
Menstrual pain	40	31.0
Stomach pain	10	7.8

Table 1. Variables of nursing students' socio-demographic and pain-related experiences (n=129) **(continued)**

Variable	Frequency(n)	Percent (%)
Pain relief methods when you have pain		
Rest	69	53.5
Taking medicine	36	27.9
Massage	17	13.2
Applying to a health facility	7	5.4
Self-assessment of current pain knowledge		
Inadequate	14	10.9
Medium	103	79.8
Advanced	12	9.3

Table 2 shows the percentages of correct answers to the items in the instrument of nurses' knowledge and attitudes about pain, which were asked to be answered as false/true, and the percentages of correct answers to the multiple-choice questions.

Table 2. The percentages of correctly answered items in the questionnaire (n=129)

Item no	Item (correct answer)	Correct responses	
	True or false questions	n	%
1	Observable changes in vital signs must be relied upon to verify a patient's statement that he has severe pain. (False)	13	10.1
2	Because of an underdeveloped neurological system, children under 2 years of age have decreased pain sensitivity and limited memory of painful experiences. (False)	65	50.4
3	If the patient can be distracted from his pain this usually means that he does NOT have high pain intensity. (False)	58	45.0
4	Patients may sleep in spite of severe pain. (True)	50	38.8
5	Comparable stimuli in different people produce the same intensity of pain. (False)	93	72.1
6	Aspirin and other non-steroidal anti-inflammatory agents are NOT effective analgesics for bone pain caused by metastases. (False)	59	45.7
7	Non-drug interventions (e.g., heat, music, image) are very effective for mild to moderate pain control but are rarely helpful for more severe pain. (False)	11	8.5
8	Respiratory depression rarely occurs in patients who have been receiving opioids over a period of months. (True)	67	51.9
9	Aspirin 650 mg PO is approximately equal in analgesic effect to meperidine (Demerol) 50mg PO. (True)	75	58.1
10	The World Health Organization (WHO) pain ladder suggests using single analgesic agents rather than combining classes of drugs (e.g. combining an opioid with a non- steroidal agent). (False)	65	50.4
11	The usual duration of action of meperidine (Demerol) IM is 4–5h. (False)	45	34.9
12	Research shows that promethazine (Phenergan) is a reliable potentiator of opioid analgesics. (False)	41	31.8
13	Patients with a history of substance abuse should not be given opioids for pain because they are at high risk for repeated addiction. (False)	12	9.3
14	Beyond a certain dosage of morphine increases in dosage will not increase pain relief. (False)	90	69.8
15	Elderly patients cannot tolerate opioids for pain relief. (False)	56	43.4
16	The patient with pain should be encouraged to endure as much pain as possible before resorting to a pain relief measure. (False)	51	39.5
17	Children less than 11 years cannot report pain with reliability and therefore, the nurse should rely on the parents' assessment of the child's pain intensity. (False)	65	50.4

(continued)

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DOI: 10.56061/fbujohs.1238378
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Table 2. The percentages of correctly answered items in the questionnaire (n=129) (continued)

Item no	Item (correct answer)	Correct responses	
	True or false questions	n	%
18	Based on one's religious beliefs a patient may think that pain and suffering is necessary. (True)	100	75.5
19	After the initial recommended dose of opioid analgesic, subsequent doses are adjusted in accordance with the individual patient's response. (True)	112	86.8
20	The patient should be advised to use non-drug techniques alone rather than concurrently with pain medications. (False)	68	52.7
21	Giving patients sterile water by injection (placebo) is often a useful test to determine if the pain is real. (False)	23	17.8
22	To be effective, heat and cold should only be applied to the painful area. (False)	34	26.4
	Multiple choice questions		
23	The recommended route of administration of opioid analgesics to patients with prolonged cancer-related pain is: (oral)	14	10.9
24	The recommended route of administration of opioid analgesics to patients with brief severe pain of sudden onset, e.g., trauma or postoperative pain, is: (intravenous)	67	51.9
25	Which of the following analgesic medications is considered to be the drug of choice for the treatment of prolonged moderate-to-severe pain for cancer patients? (morphine)	34	26.4
26	Which of the following IV doses of morphine administered over a 4-h period would be equivalent to 30 mg oral morphine given q 4 h? (morphine 10 mg IV)	54	41.9
27	Analgesics for postoperative pain should initially be given: (around the clock on a fixed schedule)	88	68.2
28	A patient with chronic cancer pain has been receiving daily opioid analgesics for 2 months. The dose increased during this time period. Yesterday the patient was receiving morphine 200 mg/h intravenously. Today he has been receiving 250 mg/h intravenously for 3 h. The likelihood of the patient developing clinically significant respiratory depression is: (less than 1%)	13	10.1
29	Analgesia for chronic cancer pain should be given: (around the clock on a fixed schedule)	98	76.0
30	The most likely explanation for why a patient with pain would request increased doses of pain medication is: (The patient is experiencing increased pain)	77	59.7
31	Which of the following drugs are useful for treatment of cancer pain? (all of the above)	79	61.2
32	The most accurate judge of the intensity of the patient's pain is: (the patient)	118	91.5
33	Which of the following describes the best approach for cultural considerations in caring for patients in pain: (Patients should be individually assessed to determine cultural influences on pain)	85	65.9
34	What do you think is the percentage of patients who over-report the amount of pain they have? (0)	0	0
35	Narcotic/opioid addiction is defined as psychological dependence accompanied by overwhelming concern with obtaining and using narcotics for psychic effect, not for medical reasons. It may occur with or without the physiological changes of tolerance to analgesia and physical dependence (withdrawal). Using this definition, how likely is it that opioid addiction will occur as a result if treating pain with opioid analgesics? (<1% - 5%)	25	19.4
	Case studies (with correct answers)		
36	Patient A: Andrew is 25 years old and this is his first day following abdominal surgery. As you enter his room, he smiles at you and continues talking and joking with his visitor. Your assessment reveals the following information: BP=120/80; HR=80; R=18; on a scale of 0 to 10 (0=no pain/discomfort, 10=worst pain/discomfort) he rates his pain as 8. A. On the patient's record you must mark his pain on the scale below. Circle the number that represents your assessment of Andrew's pain. (8)	51	39.5

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Table 2. The percentages of correctly answered items in the questionnaire (n=129) (continued)

Item no	Item (correct answer)	Correct responses	
	True or false questions	n	%
37	Your assessment, above, is made 2 h after he received morphine 2 mg IV. Half hourly pain ratings following the injection ranged from 6 to 8 and he had no clinically significant respiratory depression, sedation, or other untoward side effects. He has identified 2 as an acceptable level of pain relief. His physician's order for analgesia is ''morphine IV 1–3mg q1 h PRN pain relief''. Check the action you will take at this time. (Administer morphine 3mg IV now) (This item will be answered according to the case in item 36)	7	5.4
38	Patient B: Robert is 25 years old and this is his first day following abdominal surgery. As you enter his room, he is lying quietly in bed and grimaces as he turns in bed. Your assessment reveals the following information: BP= 120/80; HR= 80; R= 18; on a scale of 0 to 10 (0= no pain/discomfort, 10= worst pain/discomfort) he rates his pain as 8. A. On the patient's record you must mark his pain on the scale below. Circle the number that represents your assessment of Robert's pain: (8)	72	55.8
39	Your assessment, above, is made two hours after he received morphine 2mg IV. Half hourly pain ratings following the injection ranged from 6 to 8 and he had no clinically significant respiratory depression, sedation, or other untoward side effects. He has identified 2 as an acceptable level of pain relief. His physician's order for analgesia is ''morphine IV 1–3mg q1 h PRN pain relief''. Check the action you will take at this time: (Administer morphine 3mg IV now) (This item will be answered according to the case in item 38)	15	11.6

The mean score of the students' knowledge and attitudes about pain management was 13.48±3.60 and the rate of correct responses to the KASRP-N items was found to be poor at 34.5% (Table 3).

Table 3. The mean score of KASRP-N

	Mean±SD	Median(min-max)
KASRP-N (39 item)	13,48±3,60	14 (3-31)

min- max= minimum-maximum, SD= Standart deviation

Table 4 shows that there was no significant difference between the KASRP-N total score and the variables of gender, existence of comorbid disease or health problem and pain relief, and the seif-assessment of current pain knowledge (p=0.125) (p>0.05); KASRP-N total score was higher (p<0.05) in the variables of previous education in pain management in any course before (p=0.020), the grade (p=0.028), the most common type of pain experienced (p=0.035). When the source of the significant difference between the groups was examined, it was determined that the KASRP-N total scores were higher in the 3rd-year students than the 2nd-year students (p=0.028); and in menstrual pain respondents compared to headache respondents (p=0.042) (Table 4).

Table 4. The comparison of KASRP-N scores according to student socio-demographic and pain-related experiences variables (n=129)

Variable	Mean±SD/ Median (min-max)	Test	p
Gender			
Male	17 (6-21)	u=-0,479	0.632
Female	17 (9-36)		

(continued)

Table 4. The comparison of KASRP-N scores according to student socio-demographic and pain-related experiences variables (n=129) (continued)

Variable	Mean±SD/ Median (min-max)	Test	p
Comorbid disease			
No	17 (6-36)	u=-1.131	0.258
Yes	18 (12-24)		
Previous education in pain management in any course before			
No	15 (6-19)	u=-2.321	**0.020***
Yes	17 (9-36)		
Grade			
2nd (a)	15 (6-22)		**0.028***
3rd (b)	17 (9-23)	X^2= 7.132	**b-a;**
4th (c)	17 (10-36)		**p=0.021**
The most common type of pain experienced			
Headache (a)	15 (9-21)		**0.035***
Joint-muscle pain (b)	17 (6-36)	X^2= 8.612	
Menstrual pain (c)	17.5 (9-24)		**c-a;**
Stomach pain (d)	15.5 (10-21)		**p=0.042**
Pain relief methods when you have pain			
Rest	17 (9-23)		
Taking medicine	16 (6-36)	X^2= 0.632	0.889
Massage	17 (11-20)		
Applying to a health facility	17 (12-19)		
Self-assessment of current pain knowledge			
Inadequate	15 (6-20)		
Medium	17 (9-36)	X^2= 4.152	0.125
Advanced	17.5 (12-21)		

min- max: minimum-maximum, SD= Standart deviation
X^2: Kruskal-Wallis H testi, u: Mann Whitney U Test, Post Hoc test: Tamhane's T2
**p<0,05*

4. Discussion

Nurses, who are with the patient at all stages of the treatment process, play a crucial part in pain management (Fishman et. al., 2013; Hroch et al., 2019). The basic knowledge, skills and attitudes that nursing students acquire about pain during their education are then transformed into nursing practices. Therefore, nursing students need training on pain and its management before starting professional practice (Karaman et al., 2019; Shdaifat et al., 2020). This study examines the knowledge and attitudes of nursing students on pain management under the headings Evaluation of KASRP-N score and items; and the relationship between students' descriptive characteristics and the KASRP-N mean score.

4.1. Evaluation of KASRP-N score and items

The mean correct response rate of the students participating in the study to the KASRP-N was found to be 34.5%, and the level of knowledge and attitude of the students about pain management is considered poor (<50%). When we look at the correct response rates or KASRP-N scores in other studies conducted with the same instrument in different countries around the world, similar findings were found in many studies (Al Khalaileh and Al Qadire, 2013; Al-Khawaldeh et al., 2013; Chan and Hamamura, 2016; Dağ et al., 2022; Karaman et al., 2019; Rahimi-Madiseh et al., 2020; Topal Hançer

& Yılmaz, 2020). Unlike our study, correct response rates were found to be at an intermediate level (50-75%) as 66.7% in the Hroch et al. study (2019), 70.4% in the study by Chan and Hamamura (2016), and 63% in the Duke et al. study (2013). Differences are thought to be due to factors such as the characteristics of the sample in which the study was conducted and curriculum differences. The findings in this study suggest students do not have enough knowledge to manage pain adequately. It is stated that inadequacies in the pain management process reflect inadequate pain knowledge (Wilson, 2007). This finding may be related to the fact that educational activities were carried out by distance education during the COVID-19 pandemic. It also suggests that the theoretical education content may be insufficient, as well as the fact that students may not have gained adequate knowledge and skills regarding pain management in clinical practice.

Examining the items that students most frequently answered correctly in the KASRP-N shows 91.5% of the students chose «the patient» for the item «The most accurate judge of the intensity of the patient's pain is:», 86.8% of the students gave true answer for the item «After the initial recommended dose of the opioid analgesic, subsequent doses are adjusted in accordance with the individual patient's response», 75.5% of the students gave true answer for the item «Based on one's religious beliefs a patient may think that pain and suffering is necessary», 76.0% of the students chose «around the clock on a fixed schedule» option for the item «Analgesia for chronic cancer pain should be given», 72.1% of the students gave true answer for the item «Similar stimuli in different individuals produce the same pain intensity». The correct response rates of the items above were similar to the studies (Duke et. al., 2013; Karaman et al., 2019; Topal Hançer & Yılmaz, 2020; Voshall et al., 2013). Given these results, it can be said that nursing students know that pain level can best be expressed by the patient, opioid analgesic drug dose adjustment should be adjusted based on the patient's response, analgesics should be administered within a certain program in chronic cancer pain and pain is subjective and varies from person to person. These findings are important in showing that students know that pain is subjective (Schofield, 2018). In the study, most students stated that the patient was the best indicator of pain severity but their replies to the case study revealed that their attitudes were at odds with their knowledge. The instrument offers two case studies of people reporting pain of the same intensity but with apparently different pain expressions; most students (36.5%, 94.6%) gave the patient who was smiling a lower pain score than the patient who was grimacing and gave the patient who was smiling a lower dose of analgesia. The students stated that they acted according to the pain behaviour, not according to the patient's expression. These results of our study were consistent with many previous studies (Al-Khalaileh & Al-Qadire, 2013; Karaman et al., 2019; Topal Hançer & Yılmaz, 2020). In Chuk's (2002) study, 59.2% of the students stated that they did not consider the patient's pain expression as data. In Coulling's (2005) study, nurses conducted their own assessments of the patient's level of discomfort rather than depending on the patient's report of pain. In Yüceer's (2008) study, the pain score of the patient whose vital signs were within normal limits and who appeared comfortable was stated as 7 according to the 0-10 pain scale, but approximately half of the students stated that the patient's pain score was not as high as 7. The findings of this study and other studies suggest that students may be more influenced by the patient's outward behaviors than the patient's pain expression when considering the patient's pain level. Each person may have a distinct pain

threshold, perception of pain, and physiological and emotional reactions to pain. Just because a patient does not reflect pain experienced does not mean there is no experience of pain. The administration of proper analgesics may be hampered and individuals with the same level of pain may receive inadequate treatment if the pain level is determined based on the patient's appearance rather than their expression (Meissner et al., 2018; Werner et. al., 2022). Furthermore, no one has chosen «0» as the correct answer to the question «What do you think is the percentage of patients who over-report the amount of pain they have?». All students stated that different percentages of patients overreported their pain. Since pain is a subjective experience that cannot be quantified objectively, the patient's self-report of their pain should be regarded as the most accurate and trustworthy indicator of their level of pain (Meissner et al., 2018; Schofield, 2018). Accurate pain assessment forms the foundation of the approach to pain in terms of selecting adequate treatment, monitoring progress and assessing the need to continue or change treatment, and inadequate assessment and lack of appropriate intervention are reported to lead to inadequate pain control (Werner et. al., 2022). Tools for measuring pain offer objective ways to evaluate various aspects of the pain experience. A validated pain assessment instrument should be used, according to the American Pain Society's (2016) guidance, to track how well pain treatments are working and modify treatment plans as necessary (Chou et al., 2016). In this study, the low rate of students who accepted the patient's/individual's pain complaint as data to diagnose pain, and the high rate of students who stated that patients over-reported their pain are alarming; they prevent the students from taking into account the pain complaint and making the necessary interventions. Organized trainings based on evidence-based knowledge may help close this gap between students' knowledge and attitudes. A study conducted with students after simulation training in Evans and Mixon's study found the correct response rate of the questions related to the first case (items 36 and 37) to be very high (97.4% and 96.6%); this result was associated with simulation training being an effective, safe and innovative method on students' pain management success (Evans & Mixon, 2015). Instructors should use effective educational methods where learning is provided by experiencing with real patients for students to gain competence and improve their competence in pain management in clinical practice environments.

When the items that students answered correctly at the lowest rate in the KASRP-N were examined, it was found that only 10.1% of the students correctly answered the item «Observable changes in vital signs must be relied upon to verify a patient’s statement that he has severe pain» in the KASRP-N. Similarly, a low correct response rate of 15.7% was found in the study of Topal Hançer and Yılmaz (2020) and 20.5% in the study of Karaman et al. (2019). In the study of Voshall et al. (2013), it was observed that the correct answer rate of this question was quite high (97.9%). They may have thought that this statement was true based on the knowledge that pain is a source of stress for the body and that the life findings of the individual experiencing pain will change due to the physiological mechanism of stress. It is understood that the knowledge that physiological symptoms (changes in vital signs) in acute pain may be short-lived and may not always be seen in all patients (Marco et. al, 2006) and is not well understood by undergraduate nursing students.

It was found that 8.5% of the students correctly answered the question «Non-pharmacological interventions (e.g., heat, music, images) are very effective for mild to moderate pain control but are

rarely useful for more severe pain». Similar findings were obtained in some studies using the same instrument and the correct response percentages were found to be 12.7% (Topal Hançer & Yılmaz, 2020) and 12.1% (Karaman et al., 2019). These results show that students think non-pharmacological pain management techniques to be ineffective for treating severe pain and may not have sufficient knowledge of what non-pharmacological approaches are and their effects. Studies have shown that in the management of pain, regardless of the degree of pain, the application of non-pharmacological methods alone or in combination with pharmacological methods is effective in relieving pain or reducing its severity (items used to assess Chou et al., 2016).

This study found knowledge of pharmacologic properties of opioid analgesics such as addiction (9.3%) and side effects and complications (10.1%), routes of drug administration (10.9%) and determination of appropriate drug dose (5.4-11.6%) to be quite low. Similarly, it was discovered that students lacked adequate information regarding the effects of analgesics, side effects, tolerance, and addiction connected with the therapeutic use of analgesic drugs in research conducted in other countries (Al-Khawaldeh et al., 2013, Duke et. al., 2013; Karaman et al., 2019; Topal Hançer & Yılmaz, 2020; Voshall et al., 2013). In the studies of Chan and Hamamura (2016) and Voshall et al. (2013), whose sample consisted of graduate students, these rates were found to be 78% and 80.2%, respectively. This study raised concerns about the lack of knowledge in fundamental areas of pharmacological therapy. It can be said that these rates are related to the educational level of the sample group. These findings suggest cancer pain management and opioid analgesics in undergraduate education are not given sufficient time or not fully understood.

3.2. The relationship between students' descriptive characteristics and KASRP-N score

There was no significant difference between the gender variable and the KASRP-N score of the students participating in our study, and this result was compatible with other earlier research published in the literature (Al-Khawaldeh et al., 2013, Duke et al., 2013; Karaman et al., 2019). In some studies, it was shown that female students scored higher on the KASRP-N than male students (Shdaifat et al., 2020; Topal Hançer & Yılmaz, 2020). This finding was interpreted as that female student being more empathic regarding the behavioral dimension of pain assessment and may exhibit a more careful attitude towards pain management (Ouzouni & Nakakis, 2012). In this study, the fact that there were no gender differences in pain management knowledge and attitudes can be viewed as positive in terms of nursing education and profession.

In the study, no significant relationship was found between the presence of any health problem and the KASRP-N score. This finding is compatible with the study of Karaman et al. (2019); not every disease or health problem includes pain symptoms and accordingly does not make a difference in the knowledge and attitude of the person about pain.

This study found that the KASRP-N total score was higher in those who had previously received pain management education in any course. There are studies supporting this finding (Al-Khawaldeh et al.,

2013, Dalkılıç, 2017); but unlike Al Khalaileh and Al Qadire (2013), this study found no significant relationship. Pain and its management is included in the national nursing undergraduate programmes,

and in the curriculum of the university where the data were collected, it is given in the Fundamentals of Nursing course in the first year of nursing education. In addition, nursing students reinforce their theoretical knowledge on patients experiencing pain in all clinical practice of courses such as Internal Medicine Nursing, Medical Surgical Nursing, Obstetrics and Gynecology Nursing and Child Health and Diseases Nursing taught in the 2ndand 3rd grades. Considering that students go through the same education process, it can be said that the 23 students who stated that they did not receive education did not participate in that course or were not aware of the pain education given. The fact that the pain knowledge attitude level of the students who reported receiving education was high shows the importance of associating and structuring the theoretical knowledge previously learnt with the new knowledge acquired in clinical practice. Still, the finding in this study reveals that the subject of pain and its management should be given more space and time in the courses.

A significant correlation was found between the student year and the KASRP-N score. The KASRP-N score was found to be higher in 3rd-year students than in 2nd-year students. Yet Topal Hançer and Yılmaz (2020) found no relationship between grade and attitude toward pain knowledge level. We can say that this finding of this study is an expected result because third-year students have covered the subject of pain in more courses and reinforced their knowledge with more clinical practice training experiences.

In the current study, when the relationship between most common type of pain experienced and the KASRP-N scores was examined, a significant difference was observed; those with menstrual pain had higher KASRP-N scores than those with headache. We can say that this difference is because menstrual pain is experienced more frequently and accordingly, it is necessary to define and understand the pain in detail and to investigate and use different methods for pain control. In the literature it has been noted that knowledge and the cultural background of health professionals and their own pain experiences are crucial to pain control (Brunier et al, 1995; O'Brien et al, 1996). It has also been reported that the individual pain experiences of nurses instill empathy in them, positively affecting their pain management knowledge and attitudes (Francke et al, 1997; Patiraki-Kourbani, 2004).

There was no significant difference was found between the KASRP-N score and the pain relief methods that students themselves use. Although a study supports this finding (Topal Hançer & Yılmaz, 2020), Özveren & Uçar (2009) found that students who applied both pharmacological and non-pharmacological methods had higher pain knowledge scores than other groups. Considering that all self-pain relief methods mentioned by the students in this study were taught as appropriate pain relief methods used in individual pain management in the courses, the lack of difference between the knowledge attitude levels is an expected result.

Most students participating in the study reported their current pain knowledge as moderate. The KASRP-N instrument score and the variable of self-assessment of current pain knowledge did not correlate. The subjective assessment made by the students and the objective results obtained from the study do not support each other, a result compatible with the study of Dalkılıç (2017). In Yorulmaz's (2012) study, a statistically significant relationship was found between students' perception

of their knowledge about pain and nursing students' pain physiopathology and pain control knowledge scores.

Conclusion

This study provides important information about the level of pain knowledge and attitudes of nursing students in Turkey, and the findings show that the knowledge and attitudes of Turkish nursing students regarding pain management were poor. Given these results, the undergraduate nursing curriculum must be assessed to increase the pain management knowledge of nursing students and to include more structured and standardised pain management education with evidence-based information. Teaching methods such as simulation that actively engage students can enable them to experience all processes related to pain. There is a need for further research on the subject conducted with a larger sample.

Authors Contributions

Topic selection: NT; Design: NT, TY; Planning: TY, NT; Data collection and analysis: NT; Article writing: NT, TY; Critical review: TY, NT.

Conflict of Interest

The authors declared no conflict of interest.

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DOI: 10.56061/fbujohs.1238378
ORIGINAL ARTICLE

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