

## Original Article

## Determination of Knowledge and Attitudes Related to Pain of Nursing Students in Turkey

**Ayse Topal Hancer, PhD**

Sivas Cumhuriyet University, Faculty of Health Sciences, Nursing Department, Sivas, Turkey

**Meryem Yilmaz, PhD**

Associate Professor, Sivas Cumhuriyet University, Faculty of Health Sciences, Nursing Department, Sivas, Turkey

**Correspondence:** Ayse Topal Hancer, PhD, Sivas Cumhuriyet University, Faculty of Health Sciences Nursing Department, Sivas, Turkey E-mail: ays-topal@hotmail.com

### Abstract

**Background:** Pain is a multifactorial and subjective experience that affects everyone regardless of age and gender and is one of the most important symptoms leading individuals to receive help from health care professionals. For effective pain management, it is necessary for the team of healthcare professionals to have the right knowledge, attitude and assessment skills.

**Aim:** this study was conducted with the aim of determining the knowledge and attitudes of nursing students regarding the concept of pain.

**Methodology:** The participants in this cross-sectional study were 440 nursing students who were studying at a nursing department in Turkey. The research data were collected the academic year 2016–2017, using student information form and the Nurses' Knowledge and Attitudes Survey Regarding Pain (NKASRP). Data were analyzed by using SPSS 22.0 software.

**Results:** Of the students who participated in the study, 50% were at the third grade, 42% were at the age of 21, and 83.2% were female. Their total mean score in the NKASRP was found to be  $19.38 \pm 3.35\%$ . In the study, it was found that the difference between gender ( $p = 0.000$ ), which is one of the demographic information of the students, and the total NKASRP score average was statistically significant.

**Conclusion:** We found that the students did not have adequate knowledge and a positive attitude for pain management even though it is a very important part of patient care. We suggest that a pain management course structured with evidence-based information be established in undergraduate education and standardized worldwide.

**Keywords:** Pain, Nursing Student, Pain Management, Knowledge and Attitude

### Introduction

Pain is a multifactorial and subjective experience that affects people regardless of age and gender (Gatchel et al., 2014; Ortiz et al., 2015; Ung et al., 2016). It is one of the most important common symptoms leading individuals to seek help from health care professionals (Keefe and Wharrad, 2012; Rafati et al., 2016).

For effective pain management, it is necessary for the team of healthcare professionals (Alzghoul and Abdullah, 2016; Lewthwaite et al., 2011) to have the right knowledge, attitude and assessment skills (Rafati et al., 2016). The nurses in this team play a key role since they

provide more time of care (24 hours) to the patient than the other members of the health team (Kulkarni, Giri and Gangwal, 2016). Therefore, nurses should have sufficient knowledge, skills, attitudes and experience regarding pain management during their undergraduate training (Al-Khawaldeh, Al-Hussami and Darawad, 2013).

However, it has been found out that nurses' knowledge concerning pain management is inadequate (Latina et al., 2015; Yava et al., 2013; Yildirim, Cicek and Uyar, 2008) and that the main reason of this inadequacy is caused by insufficient information about the subject in nursing undergraduate programs (Al-Khawaldeh,

Al-Hussami and Darawad, 2013; Dirimese, Ozdemir and Sahin, 2016; Keefe and Wharrad, 2012; Kulkarni, Giri and Gangwal, 2016; Latchman, 2014; Owens, Smith and Jonas, 2014; Plaisance and Logan, 2006; Abdalrahim et al., 2010). In a study (Rahimi-Madiseh, Tavakol and Dennick, 2010), nursing students' knowledge levels regarding pain and pain management were found to be significantly lower. One study has assessed the students' knowledge and attitudes using the same scale in Turkey. The study has determined the level of knowledge of the students about pain to be insufficient (Karaman, Vural-Dogru and Yildirim, 2019). The number of studies evaluating the knowledge and attitudes of nursing students regarding pain in Turkey is quite low. Therefore, this study (as an example of Turkey) is important in terms of providing information about the knowledge and attitudes of nursing students for pain and in terms of determining the points that need to be improved in pain management.

**Purpose of the study:** In this context, this study was conducted with the aim of determining the knowledge and attitudes of nursing students regarding the concept of pain.

**Methodology : Design:** This is a cross-sectional descriptive study. This study was aimed at determining the knowledge and attitudes of nursing students regarding the concept of pain.

**Participants:** Nursing programs in Turkey are completed in four academic years. Students start their clinical practice from their first year, spring semester and continue throughout the fourth year. The research was conducted in the fall semester of the 2016-2017 academic year with the 3<sup>rd</sup> and 4<sup>th</sup> grade students at the Department of Nursing, Faculty of Health Sciences in Turkey. In the spring curriculum of this department, the concept of pain is dealt with for 2 hours as a pain and nursing approach in the "nursing principles" course in the first grade, for 4 hours as pain and postoperative pain in the "surgical diseases nursing" course in the second grade and for 3 hours under the title of the concept of pain and body image in children in the "child health and disease nursing" course. In the fourth grade, the concept of pain is not taught as a course. First and second graders were not included in the study since the concept of pain does not yet exist in the first and second grades in the fall semester. The population of the study

consisted of a total of 456 students in the 3<sup>rd</sup> (228) and 4<sup>th</sup> grades (228). 16 of the students did not want to participate in the study. For this reason, the study was completed with 440 students who agreed to participate in the research. 440 students who agreed to participate in the study and conducted the surveys seamlessly were included in the survey.

**Data Collection :** The data were collected using the student information form developed by the researchers and Nurses' Knowledge and Attitudes Survey Regarding Pain.

**Student information form:** The student information form was designed as 7 items consisting of individual characteristics of the students, class, age, gender, the frequency of encounter with painful patients and current knowledge level on pain.

**Nurses' Knowledge and Attitudes Survey Regarding Pain (NKASRP):** The NKASRP, which was developed by Ferrell et al., (1993) to assess knowledge and attitudes about cancer pain management, was performed to measure oncology nurses' pain management knowledge and attitudes. It was used as a tool to assess the pain-related knowledge and attitudes of nursing students and nurses. The NKASRP consists of 39 items aimed at assessing nurses' knowledge and attitude regarding pain and pain management, and 22 of these items contain true/false items, and 13 are multiple-choice items. The content includes aspects of pain assessment, pharmacologic and non-pharmacologic interventions and attitudes about pain management. In the last two items of the NKASRP scale, there are 2 case studies (4 items) involving the participant's assessment of the patient and determining the required dose of the drug (Ferrell, McGuire, and Donovan, 1993). One point is given for each correctly answered question, 0 point is given for items answered incorrectly or not answered, and then the total score of the scale is calculated. Construct validity of the original version was established by comparing scores of nurses at various levels of pain management expertise. Internal consistency for the English-language version was reported as 0.70, and the test-retest reliability was reported as 0.80 (Ferrell, McGuire, and Donovan, 1993). Yildirim, Cicek and Uyar, (2008) evaluated the validity and reliability of the Turkish version (Cronbach alpha 0.74). The Cronbach- $\alpha$  coefficient was found to be 0.65 in our study. In

the literature, Cronbach alpha values between  $0.60 \leq \alpha < 0.80$  are evaluated to be sufficiently or moderately reliable (Kilic, 2016; Kartal & Bardakci, 2019).

**Data analysis:** SPSS 22.0 software was used to evaluate the data. In the analysis of the data, number and percentage distributions were determined using descriptive statistical tests. Skewness and Kurtosis tests were used to determine if the data showed normal distribution. Student's t-test, a parametric test technique, was used to determine whether there was a difference between the averages of two samples that showed normal distribution. To compare the averages of two or more independent groups, one-way analysis of variance (ANOVA) was used. The Mann-Whitney U test, a non-parametric test technique, was used to determine whether there was a difference between two variables that did not show normal distribution, and the Kruskal-Wallis H test was used to test the significance of the difference between the averages of three or more groups. Significance level was accepted as  $p < 0.05$ .

**Ethical consideration:** This study was conducted in accordance with ethical principles in the Declaration of Helsinki. Before the study, the approval of the local ethics committee of the relevant university (Decision No:2016-10/13) and the written permission of the school of health was obtained to conduct the research. The purpose of the study was clarified to the students before the questionnaires were applied. The students were informed not to write their names on the data collection tools so that the data obtained from this work would only be used in the scope of the study. The questionnaire forms were applied in classroom to those who agreed to participate in the study. They were distributed to the students by the researchers. Students completed the questionnaires in 30 minutes, and the forms were collected one by one.

## Results

**Characteristics of nursing students:** A total of 440 students completed the survey. Table 1 shows data regarding the students' socio-demographic characteristics and their personal knowledge of pain. It was determined that, of the students who participated in the study, 50% were at the third grade, 42% were at the age of 21, 83.2% were female, 68.2% frequently encountered with the patient with pain, and

81.8% evaluated their knowledge on pain at moderate level.

The relationships between the mean scores of the NKASRP and some characteristics are presented in Table 1. In the study, it was found that the difference between gender ( $p = 0.000$ ) and the total NKASRP score average was statistically significant but that it was insignificant among other characteristics ( $p > 0.05$ ).

**The knowledge and attitudes of nursing students regarding pain:** Of the 39 pain knowledge items assessed, the mean number of correctly answered items was 19.38 (SD=3.35), the minimum score was 10, the maximum score was 31, and the range was 21.

Tables 2, 3 and 4 show the percentages of correct and wrong answers for each item on the survey. The correct answer rates for all items were grouped by the percentage of correct answers as more than 70% (Table 2), between 50 and 70% (Table 3), and less than 50% (Table 4). Of the 39 items, the correct answer rate was above 70% for only 11 items, 50-70% for eight items and less than 50% for 20 items.

It can be seen that the highest percentages of correct initial four answers were "The most accurate judge of the intensity of the patient's pain is the patient" (96.1%, item 32) "After the initial recommended dose of opioid analgesic, subsequent doses are adjusted in accordance with the individual patient's response" (89.8%, item 19), "Comparable stimuli in different people produce the same intensity of pain" (81.1%, item 5), and "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 nonsteroidal agent" (80.9%, item 10) (Table 2). As shown in Table 3, 65% of the students correctly answered the question "The patient should be advised to use nondrug techniques alone rather than concurrently with pain medications" (item 20), which contains non-pharmacological information. Several items received a very low percentage of correct answers. The lowest rate of correct answers were related especially to pharmacological information (dosage, route of administration, drug interactions, mechanism of action, side effects, placebo injection etc.) (item numbers= 21,23,26,28,35), and two were case studies on administering two substances at the correct dose to maintain analgesia (item numbers= 37, 39) (Table 4).

**Table 1. Characteristics of students and NASRP scores (N=440).**

		n	%	NASRP		Test	p
				Mean	SD		
Class	Third-class	220	50	19.61	3.60	1.425	0.155
	Fourth-class	220	50	19.15	3.08		
Gender	Female	366	83.2	19.70	3.29	4.481	0.000
	Male	74	16.8	17.82	3.20		
Age	20 age and under	97	22.1	19.10	3.44	F=1.897	0.128
	21 years	185	42.0	19.21	3.39		
	22 years	119	27.0	19.82	3.53		
	23 years and over	39	8.9	19.82	3.53		
Frequency of encounter with painful patients	Often	300	68.2	19.41	3.352	t=0.258	0.796
	Seldom	140	31.8	19.32	3.36		
Current knowledge level on pain	Advanced	46	10.5	19.24	4.06	KW=4.900	0.179
	Intermediate	360	81.8	19.29	3.12		
	Unsufficient	34	7.8	20.68	3.74		

NASRP: Nurses' Knowledge and Attitudes Survey Regarding Pain

**Table 2. Distribution of correct answers percentages given by students (N=440).**

No	NKASRP items receiving less than 50% correct response rate (20 items)	%
1.	Observable changes in vital signs must be relied upon to verify a patient's statement that he has severe pain. (False)	15.7
2.	Because of an underdeveloped neurologic system, children under 2 years of age have decreased pain sensitivity and limited memory of painful experiences. (False)	38.9
4.	Patients may sleep in spite of severe pain. (True)	49.8
7.	Nondrug interventions (e.g., heat, music, images) are very effective for mild to moderate pain control but are rarely helpful for more severe pain. (False)	12.7
8.	Respiratory depression rarely occurs in patients who have been receiving opioids over a period of months. (True)	47.7
11.	The usual duration of action of meperidine (Demerol) IM is 4-5 h. (False)	34.3
12.	Research shows that promethazine (Phenergan) is a reliable potentiator of opioid analgesics. (False)	45.5
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)	24.8
15.	Elderly patients cannot tolerate opioids for pain relief. (False)	46.8
16.	The patient with pain should be encouraged to endure as much pain as possible before resorting to a pain relief measure. (False)	48.2
21.	Giving patients sterile water by injection (placebo) is often a useful test to determine if the pain is real. (False)	32.3
22.	To be effective, heat and cold should be applied only to the painful area. (False)	29.8
23.	The recommended route of administration of opioid analgesics to patients with prolonged cancer-related pain is: (oral)	14.5
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)	41.8
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)	37.7
No	NKASRP items receiving less than 50% correct response rate (20 items)	%
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%)	13.4
34.	What do you think is the percentage of patients who over-report the amount of pain they have? (0)	0.7
35.	Narcotic/opioid addiction is defined as psychologic dependence accompanied by overwhelming	

	concern with obtaining and using narcotics for psychic effect, not for medical reasons. It may occur with or without the physiologic 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%)	<b>8.2</b>
37.	Case studies 1 b Your assessment, above, is made 2 h after he received morphine 2 mg IV. Half-hourly pain ratings after 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 1–3 mg q 1 h PRN pain relief.". Check the action you will take at this time. (Administer morphine 3 mg IV now)	<b>10.7</b>
39.	Case studies 2 b Your assessment, above, is made 2 h after he received morphine 2 mg IV. Half-hourly pain ratings after 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 1–3 mg q 1 h PRN pain relief.". Check the action you will take at this time: (Administer morphine 3 mg IV now)	<b>34.5</b>

**Table 3.** Distribution of correct answers percentages given by students (N=440).

No	NKASRP items receiving between 50%-70% correct response rate (8 items)	%
3.	If the patient can be distracted from his pain this usually means that he does NOT have high pain intensity. (False)	<b>61.6</b>
6.	Aspirin and other nonsteroidal anti-inflammatory agents are NOT effective analgesics for bone pain caused by metastases. (False)	<b>58.6</b>
9.	Aspirin 650 mg PO is approximately equal in analgesic effect to meperidine (Demerol) 50 mg PO. (True)	<b>54.3</b>
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)	<b>59.5</b>
20.	The patient should be advised to use nondrug techniques alone rather than concurrently with pain medications. (False)	<b>65.0</b>
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)	<b>58.0</b>
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)	<b>67.3</b>
36.	Case studies 1a: Patient A: Andrew is 25 years old, and this is his first day after 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 and 10 worst pain/discomfort), he rates his pain as 8. 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)	<b>59.5</b>

**Table 4.** Distribution of correct answers percentages given by students (N=440).

No	NKASRP items receiving more than 70% correct response rate (11 items)	%
5.	Comparable stimuli in different people produce the same intensity of pain. (False)	<b>81.1</b>
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 nonsteroidal agent). (False)	<b>80.9</b>
14.	Beyond a certain dosage of morphine, increases in dosage will not increase pain relief. (False).	<b>71.6</b>
18.	Based on his or her religious beliefs, a patient may think that pain and suffering is necessary. (True)	<b>77.3</b>
19.	After the initial recommended dose of opioid analgesic, subsequent doses are adjusted in accordance with the individual patient's response. (True)	<b>89.8</b>
27.	Analgesics for postoperative pain should initially be given: (around the clock on a fixed schedule)	<b>71.1</b>
29.	Analgesia for chronic cancer pain should be given: (around the clock on a fixed schedule)	<b>77.0</b>
30.	The most likely explanation of why a patient with pain would request increased doses of pain	<b>72.7</b>

---

	medication is: (the patient is experiencing increased pain)	
31.	Which of the following drugs are useful for treatment of cancer pain? (all of the above)	<b>70.9</b>
32.	The most accurate judge of the intensity of the patient's pain is: (the patient)	<b>96.1</b>
38.	Case studies 2a Patient B: Robert is 25 years old, and this is his first day after 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 and 10 worst pain/discomfort), he rates his pain as 8. 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)	<b>77.7</b>

---

## Discussion

In current study, the students' knowledge and attitudes regarding pain were found to be at moderate level (mean=19.38; SD=3.35). In a study conducted by Kulkarni et al., (2016) it was determined that, in parallel with the result of this study, the pain-related information of most nursing students was at moderate level. In other studies using NKASRP scale, the average scores of the students were found to be 15.85±3.25 (Karaman, Vural-Dogru and Yildirim, 2019), 16±5.1 (Al Khalailah and Al Qadire, 2013) and 22.41±3.20 (Duke et al., 2013). The reason why the students' knowledge about pain is moderate in the present study and other studies may be due to the fact that nursing schools do not have specific standards for the length and content of courses related to pain and pain management, and the concept is not handled gradually in all grades. Reorganization of the curriculum, reinforcement of knowledge and the use of different educational techniques may be effective to increase the knowledge, skills and attitudes of students regarding pain. In a study, for example, the average of the NKASRP scores of the students who received simulation training was found to be higher (Evans and Mixon, 2015). According to the results of this study and the others, it may be useful to restructure the concept of pain in nursing education in accordance with the recommendations of the World Health Organization (WHO) and the American Academy of Pain.

In present study, it was determined that the students gave the correct answer of "patient" at the high rate (96.1%) to the question "Who ideally expresses the severity of the patient's pain". In other studies, it was also found out that most students answered this question correctly. The correct response rates of other studies were 43.1% (Al Khalailah and Al Qadire, 2013) , 50.4% (Al-Khawaldeh, Al-Hussami and Darawad, 2013), 77.33% (Kulkarni, Giri and

Gangwal, 2016), 79.7% (Chan and Hamamura, 2016), 80.5% (Karaman, Vural-Dogru and Yildirim, 2019) 96.9% (Voshall, Dunn and Shelestak, 2013), 97.2% (Duke et al., 2013), and 99.1% in the study of simulation training (Evans and Mixon, 2015). In this study, most students stated that the best source for determining the pain level was patient's expression, but it was seen that their responses to the case study contradicted their attitudes (Tables 2 and 3). In the scale, there are two case studies that state the same severe pain, but those have different pain expressions on the appearance (smiling patient [case 1a] and grimacing patient [case 2a]). In the case 1a, 59.5% of the students answered correctly. In other studies, the percentages of correct answers of the students to the same question were 14.6% (Al Khalailah and Al Qadire, 2013), 20% (Al-Khawaldeh, Al-Hussami and Darawad, 2013), 37.9% (Karaman, Vural-Dogru and Yildirim, 2019), 42.4% (Chan and Hamamura, 2016), 93.8% (Voshall, Dunn and Shelestak, 2013), and 97.4% after simulation training (Evans and Mixon, 2015). In the case 2a, 77.7% of the students gave the correct answer. The percentages of correct answers to this question in other studies were 29.9% (Al Khalailah and Al Qadire, 2013), 35% (Al-Khawaldeh, Al-Hussami and Darawad, 2013), 55.3% (Karaman, Vural-Dogru and Yildirim, 2019), 61% (Chan and Hamamura, 2016) and 96.9% (Voshall, Dunn and Shelestak, 2013). Pain is a subjective experience and is influenced by many factors. For this reason, each person's pain threshold, pain perception and physiological and emotional responses to the pain may be different. Therefore, non-reflection of the pain experienced by the patient does not mean that the patient is not suffering pain. However, the results of the present study and other studies show that when the students decide on the pain level of the patient, they can be more affected by the behavior and pain expression of the patient on the external appearance rather than their pain expression.

However, in pain management, the first step is to correctly determine the pain. American Pain Society (2016) Guidelines recommends the use of a validated pain assessment tool to track responses to pain treatments and to adjust treatment plans accordingly (strong recommendation, low quality evidence) (Chou et al., 2016). It can be suggested that students should be aware of this gap between knowledge and attitude and organize trainings based on evidence-based knowledge.

In the present study, there were two items aiming to determine the appropriate dose of medication in the cases in the scale (Case 1b [patient expressing his pain at level 8 and smiling], Case 2b [patient expressing his pain at level 8 and grimacing]). In this study, the correct response rate for the question “Case 1b” was moderate, compared to the other studies: 1.7% (Chan and Hamamura, 2016), 3.7% (Ortiz et al., 2015), 4.2% (Karaman, Vural-Dogru and Yildirim, 2019), 6.7% (Al-Khawaldeh, Al-Hussami and Darawad, 2013) and 11.1% (Al Khalaileh and Al Qadire, 2013), 31.9% after simulation training (Evans and Mixon, 2015), 55.2% (Voshall, Dunn and Shelestak, 2013). In this study, it was determined that 34.5% of the students gave the correct answer to the question “Case 2b”. The correct response rates in other studies were 8.5% (Chan and Hamamura, 2016), 10% (Al-Khawaldeh, Al-Hussami and Darawad, 2013), 13.2% (Karaman, Vural-Dogru and Yildirim, 2019), 23.6% (Al Khalaileh and Al Qadire, 2013) and 63.5% (Voshall, Dunn and Shelestak, 2013). According to the results of this study and other studies, it is seen that the students identified the drug dose and pain level of the patients who reflect their pain by their faces and behaviors more accurately. As known, the determination of the level of pain according to the external appearance of the patient rather than the expression of the patient may prevent adequate analgesic application and may lead to inadequate treatment of patients suffering at the same level. The correct assessment of pain is as important as the correct treatment. According to these results, determining the level of pain constitutes the basis of the approach to pain and failure to make the evaluation step seem to be the basis of the error in the determination of the drug dose. These results were similar to the results of other studies in the literature. During nursing education, students were taught what kind of medication to

use at which level of pain according to the analgesic ladder system of the WHO. However, deciding the dosage of the drug appropriate to the level of pain is within the duties of the physician in Turkey. This case may be due to students' inability to use clinical decision-making powers in the field of practice.

In the present study, most students (80.9%) gave the correct answer to the question “In WHO ladder treatment, it is recommended to use drugs together (e.g. opioid and NSAID together) rather than the use of analgesic agents alone”. This result may be due to the fact that the students participating in the study were taught the WHO step in the course of surgical diseases nursing and reinforced during clinical practice. In other studies, the percentages of correct answers given to this question were lower than our study at 35.3% (Karaman, Vural-Dogru and Yildirim, 2019), 43.3% (Al-Khawaldeh, Al-Hussami and Darawad, 2013), 56.3% (Al Khalaileh and Al Qadire, 2013), 76.3% (Chan and Hamamura, 2016) and 80.8% (Rahimi-Madiseh, Tavakol and Dennick, 2010).

In this study, items attempting to determine the knowledge of pharmacological properties such as the rates of opioid analgesics dependency (24.8%, 8.2%) and of the development of respiratory depression (13.4%), ways of drug administration (14.5%) and determination of appropriate drug dose (10.7-34.5%) were found to be rather low (Table 4). Similarly, in other studies conducted in various countries in the literature, it has been determined that students had inadequate knowledge about the actions of analgesics, their side effects, tolerance and dependence related to the clinical use of analgesic drugs (Al-Khawaldeh, Al-Hussami and Darawad, 2013; Duke et al., 2013; Plaisance and Logan, 2006; Voshall, Dunn and Shelestak, 2013; Karaman, Vural-Dogru and Yildirim, 2019). Lack of knowledge in major areas regarding medication was also a concern in this research. In Turkey, opioid analgesics are kept safe in locked medicine cabinets to prevent drug abuse and are only used in necessary quantities, following many procedures when necessary. In addition, in a study conducted in Turkey by Yava et al. (2013) using NKASRP scale to determine knowledge, attitude and skills of nurses, it was found that the nurses' knowledge about the effects and side effects of opioid drugs, their doses, ways of administration, the rates of

creating dependence and respiratory depression were insufficient. For this reason, it is stated that healthcare staff limit the opioid use in the clinic. It can be said that this limits students' application of opioid analgesics in the clinical practice and observation of the effects and side effects and causes a lack of knowledge. Fear of addiction is particularly noteworthy in many studies. However, as in the literature review of 38 studies, the incidence of opioid analgesics was found to be lower than expected (8% to 12%) (Vowles et al., 2015). A vast majority of students have the belief that various non-pharmacological methods are not effective in severe pain (Item 7). These findings were similar to those of studies in the literature (Plaisance and Logan, 2006; Karaman, Vural-Dogru and Yildirim, 2019). However, it is recommended to use various pharmacological and non-pharmacological methods in pain management regardless of the pain level. Thus, American Pain Society (2016) Guidelines recommends that clinicians offer multimodal analgesia, or the use of a variety of analgesic medications and techniques combined with non-pharmacological interventions, for the treatment of pain in children and adults. So this might have additive or synergistic effects and more effective pain relief compared to single-modality interventions (strong recommendation, high-quality evidence) (Chou et al., 2016). In the current study, there was no statistically significant difference between NKASRP scale score averages and demographic characteristics such as grade, age, frequency of encounters with painful individuals and present knowledge of pain. However, it was determined that the average NKASRP scores of 3<sup>rd</sup> graders (mean=19.61, SD= 3.60) were a bit higher than those of 4<sup>th</sup> graders (19.15 ± 3.08). This may be because the acquired knowledge on the concept of pain is forgotten since it is not included in the 4<sup>th</sup> grade curriculum. In a study (Chan and Hamamura, 2016) contrary to ours, the mean score of first graders was found to be 20.40, and that of third grade students was 21.36. In the present study, the knowledge score of the female students was found to be higher. This may be because there were less male students (74) in the study than females (366).

### Conclusion

Finally, the need for pain management training is clear. In this study, it was determined that most

nursing students did not have the desired level of knowledge about pain and its treatment. The students were particularly inadequate when answering questions on pharmacological information (dosage of the drug, route of administration, drug interactions, mechanism of action, side effects, placebo injection). However, nurses play a key role in the management of acute and chronic pain to keep pain within "livable" boundaries using suitable pharmacological and non-pharmacological methods. We suggest that a pain management course structured with evidence-based information in undergraduate education be established and different education methods be used in theory and standardized worldwide. It is also believed that it may be useful to prepare current pain management guidelines that increase the efficacy of nurses in clinical practice regarding decision-making and application of drug dose.

### References

- Abdalahim, M.S., Majali, S.A., Stomberg, M.W., & Bergbom, I. (2010). The effect of postoperative pain management program on improving nurses' knowledge and attitudes toward pain. *Nurse Educ Pract.*, 11(4): 250-55.
- Al Khalaleh, M., & Al Qadire, M. (2013). Pain management in Jordan: Nursing students' knowledge and attitude. *Br J Nurs.*, 22(21): 1234-40.
- Al-Khawaldeh, O.A., Al-Hussami, M., & Darawad, M. (2013). Knowledge and attitudes regarding pain management among Jordanian nursing students. *Nurse Educ Today*, 33(4):339-45.
- Alzghoul, B.I., & Abdullah, N.A.C. (2016). Pain management practices by nurses: an application of the knowledge, attitude and practices (KAP) model. *Global Journal of Health Science*, 8(6):154-59.
- Chan, J.C., & Hamamura, T. (2016). Emotional intelligence, pain knowledge, and attitudes of nursing students in Hong Kong. *Pain Manag Nurs.*, 17(2):159-68.
- Chou, R., Gordon, D. B., de Leon-Casasola, O. A., Rosenberg, J. M., Bickler, S., Brennan, T., Carter, T., ... & Griffith, S. (2016). Management of Postoperative Pain: a clinical practice guideline from the American pain society, the American Society of Regional Anesthesia and Pain Medicine, and the American Society of Anesthesiologists' committee on regional anesthesia, executive committee, and administrative council. *The Journal of Pain*, 17(2): 131-157.
- Dirimese, E., Ozdemir, F.K. & Sahin, Z.A. (2016). Nursing students' knowledge of related to pain

- management, cultural awareness and competence. Gumushane University Journal of Health Sciences, 5(3):1-6.
- Duke, G., Haas, B.K., Yarbrough, S., & Northam, S. (2013). Pain management knowledge and attitudes of baccalaureate nursing students and faculty. *Pain Manag Nurs.*, 14(1): 11-19.
- Evans, C.B., & Mixon, D.K. (2015). The evaluation of undergraduate nursing students' knowledge of post-op pain management after participation in simulation. *Pain Manag Nurs.*, 16(6): 930-37.
- Gatchel, R.J., McGeary, D.D., McGeary, C.A., & Lippe, B. (2014). Interdisciplinary chronic pain management: past, present, and future. *Am Psychol.*, 69(2): 119-130.
- Ferrell, B.R., McGuire, D., & Donovan, M.I. (1993). Knowledge and beliefs regarding pain in a sample of nursing faculty. *J Prof Nurs.*, 9(2): 79-88.
- Karaman, E., Vural-Dogru, B. & Yildirim, Y. (2019). Knowledge and attitudes of nursing students about pain management. *Pain Uncorrected Proof*, 1-9.
- Keefe, G., & Wharrad, H.J. (2012). Using e-learning to enhance nursing students' pain management education. *Nurse Educ. Today*, 32(8): e66-e72.
- Kulkarni, R.S., Giri, P.A. & Gangwal, P.R. (2016). Knowledge regarding pain management among nursing students of Swatantra Senani Uttamraoji Patil Nursing College, Aurangabad, Maharashtra, India. *Int J Med Sci Public Health.*, 5(12): 2518-21.
- Latchman, J. (2014). Improving pain management at the nursing education level: evaluating knowledge and attitudes. *J Adv Prac Oncol.*, 5(1):10-16.
- Latina, R., Mauro, L., Mitello, L., D'Angelo, D., Caputo, L., De Marinis, M. G., ... & Baglio, G. (2015). Attitude and knowledge of pain management among Italian nurses in hospital settings. *Pain Management Nursing*, 16(6): 959-967.
- Lewthwaite, B.J., Jabusch, K.M., Wheeler, B.J., Schnell-Hoehn, K.N., Mills, J., Estrella- Holder, E., & Fedorowicz, A. (2011). Nurses' knowledge and attitudes regarding pain management in hospitalized adults. *J Contin Educ Nurs.*, 42(6):251-57.
- Ortiz, M.I., Ponce-Monter, H.A., Rangel-Flores, E., Castro-Gamez, B., Romero-Quezada, L.C., O'Brien, J.P., Romo-Hernández, G., & Escamilla-Acosta, M.A. (2015). Nurses' and nursing students' knowledge and attitudes regarding pediatric pain. *Nurs Res Pract*, 2015:1-8.
- Owens, D., Smith, J., & Jonas, D. (2014). Evaluating students' knowledge of child pain and its management after attending a bespoke course. *Nurs Child Young People*, 26(2): 34-40.
- Plaisance, L., & Logan, C. (2006). Nursing students' knowledge and attitudes regarding pain. *Pain Manag Nurs.*, 7(4): 167-75.
- Rafati, F., Soltaninejad, M., Aflatoonian, M.R., & Mashayekhi, F. (2016). Postoperative pain: management and documentation by Iranian nurses. *Materia Socio-Medica*, 28(1): 36- 40.
- Rahimi-Madiseh, M., Tavakol, M., & Dennick, R. (2010). A quantitative study of Iranian nursing students' knowledge and attitudes towards pain: implication for education. *Int J Nurs Pract.*, 16(5): 478-83.
- Kilic, S. (2016). Cronbach's alpha reliability coefficient. *Journal of Mood Disorders (JMood)*, 6(1): 47-8.
- Kartal, M. & Bardakci, S. (2019). *Attitude Scales*, Akademisyen Publishing House, First Edition, Ankara.
- Ung, A., Salamonson, Y., Hu, W., Gallego, G., 2016. Assessing knowledge, perceptions and attitudes to pain management among medical and nursing students: a review of the literature. *Br J Pain.*, 10(1): 8-21.
- Voshall, B., Dunn, K.S., & Shelestak, D. (2013). Knowledge and attitudes of pain management among nursing faculty. *Pain Manag Nurs*, 14(4): e226-e235.
- Vowles, K.E., McEntee, M.L., Julnes, P.S., Frohe, T., Ney, J.P., & van der Goes, D.N. (2015). Rates of opioid misuse, abuse, and addiction in chronic pain: a systematic review and data synthesis. *Pain*, 156(4): 569-76.
- Yava, A., Cicek, H., Tosun, N., Ozcan, C., Yildiz, D., & Dizer, B. (2013). Knowledge and attitudes of nurses about pain management in Turkey. *International Journal of Caring Sciences*, 6(3): 494-505.
- Yildirim, Y.K., Cicek, F., & Uyar, M. (2008). Knowledge and attitudes of Turkish oncology nurses about cancer pain management. *Pain Manag Nurs*, 9(1): 17-25.