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**Abstract**

**Background:** Despite the growing awareness on pain management, mild and severe pain is still common among hospitalized patients. Inadequate treatment has been mostly linked to health care workers' failure to assess patients' pain and to intervene appropriately.

**Objective:** To determine the pain management knowledge and attitudes of the nurses working in training and research hospital in Turkey and their relationship to demographic and educational factors.

**Methods:** Descriptive and cross-sectional study design was used. The Nurses' Knowledge and Attitudes Survey Regarding Pain (NKASRP) was used to determine the pain-related knowledge and attitude of the nurses.

**Results:** A total of 246 nurses were included in the study. The percentage working at a surgical unit was 48.8% and 77.2% were staff nurses. Only 11.8% had taken a pain management course and 31.7% had read a book or journal on pain. The rate of correct responses to the NKASRP scale was 39.65% while the mean number of correct answers to all questions was  $15.86 \pm 7.33$  with a range of 0 to 37. A statistically significant difference was found regarding education level, working unit, whether a pain management course had been taken, whether a book or journal on pain had been read, and the evaluation of the nurse's efficacy regarding pain ( $p < 0.05$ ).

**Conclusion:** We found that the nurses did not have adequate knowledge and the positive attitude for pain management although it is a very important part of patient care. We suggest that results be taken into account when the content of graduate and postgraduate training programs is determined and guidelines are prepared.

**Key Words:** Attitudes, Education, Knowledge, Nurses, Pain Management, Turkey

## Introduction

Despite the growing awareness on pain management, patients still suffer from unnecessary pain in many hospitals with the resultant negative effect on physical, emotional and spiritual health and quality of life (Lui So & Fong 2008, Kankkunen et al. 2009<sup>a</sup>, Kankkunen et al. 2009<sup>b</sup>). Pain management is an important aspect of patient care and nurses play a significant role in the acute care setting in providing pain assessment and treatment (Coulling 2005, Courtenay & Carey 2008, Lui So & Fong 2008). In this regard, nurses' role includes patient and health care professionals' education, attending courses and research activities on pain management (Courtenay & Carey 2008).

Nurses who possess a strong foundation in pain management and who can provide individual care to the patients with the proper attitude can make an important effect in pain management. The pain-related discomfort of the patients can thus be decreased and their quality of life increased (Lui So & Fong 2008).

Studies have reported that 55% to 78.6% of inpatients experience moderate to severe pain (Salomon et al. 2002, Strohbuecker et al. 2005, Yates et al. 1998). There are still inadequacies regarding pain management despite countless training courses, application strategies and multidisciplinary pain teams (Lui So & Fong 2008).

There have been studies to determine the reasons for the inadequacies in pain management. In these studies the barriers of the healthcare staff were found to be inadequate knowledge on pain management including assessment, monitoring, and pharmacological treatment of pain especially frequently used opioids (Bernardi et al. 2007, de Rond de Wit & van Dam 2000, Howell et al. 2000, Patiraki et al. 2006, Padiaditaki et al. 2010). In addition nurses have inadequate and even incorrect knowledge regarding the use of placebo in pain management. This leads to the use of placebo in some cases (Bernardi et al. 2007). Yildirim et al.'s study indicated that the most nurses have reported the reason for their inadequate knowledge as the little emphasis placed on pain management in the nursing curriculum (Yildirim Fadillioğlu & Uyar 2008).

In Turkey there have been quite a few studies on nurses' knowledge and beliefs about pain. One of these studies focused on a particular group of nurses with relatively small sample (n=68) size and found that nurses had an inadequate knowledge and attitude regarding the management of cancer pain (Yildirim Fadillioğlu & Uyar 2008). A study by Akbas & Oztunc (2008) with all the nurses working at a university hospital investigated the knowledge level on nursing procedures that could be used for the care of patients in pain. As a result of this study, nurses had inadequate knowledge about care of patients in pain and pain control methods (Akbaş & Öztunç 2008). These studies are not adequate to reflect Turkish nurses' knowledge and attitude on pain management.

The aim of the study was to describe pain management knowledge levels and attitudes of nurses working in training and research hospital in Turkey and their relationship to demographic and educational factors.

## Method

### Design and Sample

A descriptive cross-sectional study design was used to the survey Turkish nurses' knowledge and attitudes about pain. The research population for the study was composed of all nurses working in a training and research hospital in Turkey. The research was conducted in May 2010. The inclusion criteria were: (i) having worked in the medical, surgical, emergency or intensive care units of the hospital for at least six months continuously and (ii) to voluntarily participate in the study.

### Procedure

Consent was obtained from the hospital's Institutional Ethics Committee first (approval number: 1491-856-09/1539). The authors went to each unit of the hospital and explained the study's purpose to the nurses, and all nurses who agreed to participate were asked to sign a consent form and complete the questionnaires.

The questionnaires were anonymous and the nurses were assured that their participation would be confidential. Nurses who could not immediately complete the questionnaires put their completed forms into a sealed envelope and left them in a box at each unit. The authors collected the questionnaires from each unit a few days later. There were 297 nurses who were

working the day shift at the hospital and they made up the research sample. Thirty-one nurses did not agree to participate. A total of 20 questionnaires completed by 20 nurses for the pilot application of NKASRP (see translation and validity process of the NKASRP section) were not included in the study. A total of 246 (82.8%) questionnaires were included in the final study sample. The convenience sampling method was used for the study.

### Instruments

Two questionnaires were used to collect the data: (i) nurse information form and (ii) Nurses' Knowledge and Attitudes Survey Regarding Pain.

**Nurse information form:** This form was developed by researchers and consisted of questions on the nurses' age, educational level, duration of professional experience, unit of employment, postgraduate pain training, reading books or journals on pain management, and using a pain scale at the unit and the unit's effectiveness in pain management.

**Nurses' Knowledge and Attitudes Survey Regarding Pain (NKASRP):** We used the revised Nurses Knowledge and Attitudes Survey Regarding Pain (NKASRP) developed by Ferrell and McCaffery to measure knowledge and attitudes toward pain management (Ferrel & McCaffery 2008). The NKASRP has 22 true/false, 14 multiple choice and two case studies with two questions each for a total of 38 questions. Construct validity of the NKASRP has been established by comparing scores of nurses at various levels of expertise such as students, new graduates, oncology nurses, graduate students, and senior pain experts. Internal consistency for the English-language version was reported as 0.70 and the test-retest reliability as 0.80. It is recommended that avoiding distinguishing items as measuring either knowledge or attitudes, owing to the overlap in some items, and it is also recommended to report the scoring as a percentage of correct responses (Ferrel & McCaffery 2008). Correctly scored items were assigned a score of one and incorrect or unanswered items were scored as zero. Total scores were summed and ranged from 0 to 40. Correct answer rates were calculated by dividing the total number of correctly answered items by the total number of items (Yildirim Fadilloğlu

& Uyar 2008). A minimum score of 70% was considered to be satisfactory for this study.

**Translation and validity process of the NKASRP-T:** Brislin's model of translation and back-translation was used (Brislin 1986). Two bilingual native linguists first translated the original scale into Turkish. A monolingual Turkish-speaker commented on the articulation. Another bilingual registered nurse then translated the Turkish version back into English. The two translators conducted a comparison between the original version and the back-translated version of the NKASRP-T and a monolingual English-speaking researcher assessed the result for dialect consistency.

An expert committee was set up to evaluate the translated scale and assess the translation equivalence and content relevance (content validity index-CVI) with the aim of validating the content of the Turkish translation of the scale and determining the cultural appropriateness of the tool. The expert committee consisted of two nurses, three senior lecturer nurses, and two academic persons from the university. All experts on the committee were bilingual, with experience in translation. In addition, the CVI scores of the scale were calculated as 89.5% for the current study meaning that it has acceptable content validity (Polit & Beck 2006). The pilot implementation of the scale was performed in 20 nurses (nurses were randomly selected from the hospital) who were not included in the final sample. These nurses declared that they had no trouble in completing the scale during the pilot study. Cronbach alpha value was calculated as 0.87 for the current study. Test-re-test reliability was established by repeat testing in volunteer fourth-class student nurses (N=49) and an r value of 0.83 was found.

### Statistical Analysis

The Statistical Program for Social Sciences version 15.0 (SPSS Inc. Chicago. IU, USA) for Windows was used for statistical analyses. Knowledge scores for each item in the NKASRP were calculated by giving "1" for correct answers and "0" for incorrect answers, adding the total, and calculating the mean scores for total pain knowledge. The percentages of correct answers for total scores received and for each item were also calculated. Comparison of the knowledge scores by demographic, educational and professional characteristics and answers to

pain management questions were with Student's t-test, the Kruskal Wallis test, ANOVA, and the Mann-Whitney U test while testing the correlation of the mean scale scores regarding how successful the nurses found pain management at their unit was with Pearson's correlation test. A p value <0.05 was considered statistically significant.

## Results

### Demographic, Educational and Professional Characteristics of the Nurses

The demographic, educational and professional characteristics of the 246 nurses included in the study are presented in Table 1.

### Nurses' Knowledge and Attitudes Regarding Pain

The nurses' average correct answer rate for the entire knowledge and attitude scale was 39.65% (range=7.7% to 80.1% for each item), indicating poor knowledge of pain management. Among the 40 pain knowledge questions assessed, the mean number of correctly answered questions was 15.86 (SD= 7.33) with a range of 3 to 37.

The correct answer rates for all items (Table 2) were grouped by the percentage of correct answers as more than 70%, between 50 and 70%, and less than 50%. Of the 40 items, the correct answer rate was more than 70% for only four items, 50-70% for nine items and less than 50% for 27 items. The highest percentages of correct answers were "Patients' spiritual beliefs may lead them to think pain and suffering are necessary" (80.1%, item 15), "The most accurate judge of the intensity of the patient's pain is the patient" (76.4%, item 31), "Benzodiazepines are not effective pain relievers unless the pain is due to muscle spasm" (72.0%, item 21), and "Which of the following describes the best approach for cultural considerations in caring for patients in pain?" (70.7%, item 32) (Table 2).

Several items received a very low percentage of correct answers. The 10 items with the lowest rate of correct answers were related especially to pharmacological information (dosage, route of

administration, drug interactions, mechanism of action, side effects, etc.) (item numbers= 7, 8, 9, 18, 20, 22, 28), two were case studies on administering two substances at the correct dose to maintain analgesia (item numbers= 37b, 38b) and one was on placebo usage (item number= 17) (Table 2).

The knowledge scores were further analyzed by nurses' characteristics (Table 1). Nurses with an educational level of master's degree or higher and those with baccalaureate training had a statistically significantly higher knowledge score than nurses with an associate degree ( $p=0.001$ ). The difference between nurses according to the unit they worked in was the result of the higher scores of nurses working at surgical units than those working in medical units ( $p=0.006$ ). Nurses who had taken a postgraduate course on pain management had statistically significantly higher knowledge scores than those who had not ( $p<0.001$ ). Similarly, nurses who read books or journals on pain management had significantly higher knowledge scores than those who did not ( $p<0.001$ ) (Table 1).

We did not find any significant differences in nurses' pain knowledge among subgroups for variables such as nurses' age groups, nursing experience years, ranks, and whether pain assessment tools were used ( $p>0.05$ ) (Table 1). Comparison of knowledge scores by the nurses' effectiveness in pain management showed a statistically significant difference between those who found nurses effective regarding pain management and those who did not ( $p<0.001$ ) (Table 1).

There was a negative weak correlation between the knowledge scores and the mean scale scores where nurses had marked the scale as to how effective they found nurses regarding pain management in units ( $r=-0.171$ ,  $p=0.007$ ). In other words, the nurses stated to feel that the implications for pain in their unit were inadequate as their knowledge on pain increased (Table 1).

**Table 1: Demographic and Professional Characteristics of the Nurses and Comparisons with NKASRP-T Scores (N=246)**

Characteristics (n, %)	Mean±Sd	Test and p value
<b>Age groups, years</b> (mean: 31.73 ±5.36, range: 21-46)		
21-31 (125, 50.8)	16.79±7.86	t=2.037*
>31 (121, 49.2)	14.90±6.61	p=0.43
<b>Education level</b>		
Associate degree (127, 51.6)	14.40±6.52	X <sup>2</sup> =13.757** <b>p=0.001</b>
Baccalaureate (100, 40.7)	16.90±7.70	
MSc and Ph.D (19, 7.7)	20.10±8.16	
<b>Nursing experience, years</b> (mean: 11 ±6.48, range: 1-28)		
1-5 (58, 23.6)	17.43±7.64	F=1.252*** p= 0.291
6-10 (64, 26.0)	15.71±7.81	
11-15 (68, 27.6)	15.33±7.48	
>16 (56, 22.8)	15.03±6.05	
<b>Area of work</b>		
Surgical units (120, 48.8)	17.31±7.65	F= 5.314*** <b>p=0.006</b>
Medical units (80, 32.5)	13.97±6.84	
Intensive Care Units (46, 18.7)	15.34±6.53	
<b>Rank</b>		
Staff (190, 77.2)	15.70±7.63	X <sup>2</sup> =1.846** p= 0.605
Nursing manager (29, 11.8)	16.48±6.19	
Education nurse (13, 5.3)	16.30±7.43	
Others (14, 5.7)	16.35±5.28	
<b>Attendance at any course on pain management</b>		
Yes (29, 11.8)	29.13±7.45	Z= -7.588**** <b>p&lt;0.001</b>
No (217, 88.2)	14.08±5.17	
<b>Reading any books or journals about pain</b>		
Yes (78, 31.7)	19.02±8.85	t=4.821* <b>p&lt;0.001</b>
No (168, 68.3)	14.39±5.97	
<b>Frequency of using objective tools while assessing pain</b>		
Never (93, 37.8)	16.15±7.81	X <sup>2</sup> =3.641** p= 0.303
Seldom (94, 38.2)	16.47±8.02	
Often (45, 18.3)	14.97±4.80	
Every time (14, 5.7)	12.64±4.78	
<b>Effectiveness of the nurses on pain management (the nurses' answers)</b>		
None (9, 3.7)	16.66±5.38	X <sup>2</sup> =19.209** <b>p&lt;0.001</b>
Little (108, 43.9)	13.34±5.17	
Much (129, 52.4)	17.91±8.29	
<b>How much successful is pain management in your unit, score in 0-100 scale? (nurses' answers)</b> (mean: 65.04 ±20.5, range: 0-100)		r= - 0.171**** <b>p=0.007</b>

\*Student -t , \*\* Kruskal Wallis , \*\*\*Anova, \*\*\*\* Mann Withney U,\*\*\*\*\* Pearson's Correlation

**Table 2: Correctly Answered Items in the Questionnaire**

Rank	Item No	Item content (correct answer)	Correct responses	
			N	%
<b>Items receiving more than 70% correct response rate</b>				
1	15	Patients' spiritual beliefs may lead them to think pain and suffering are necessary (True)	197	80.1
2	31	The most accurate judge of the intensity of the patient's pain is (the patient)	188	76.4
3	21	Benzodiazepines are not effective pain relievers unless the pain is due to muscle spasm. (True)	177	72.0
4	32	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)	174	70.7
<b>Items receiving between 50%-70% correct response rate</b>				
5	27	Analgesics for post-operative pain should initially be given (around the clock on a fixed schedule)	168	68.3
5	34	The time to peak effect for morphine given IV is (15 min)	168	68.3
6	14	Children less than 11 years old cannot reliably report pain so nurses should rely solely on the parent's assessment of the child's pain intensity. (False)	156	63.4
6	29	The most likely reason a patient with pain would request increased doses of pain medication is (The patient is experiencing increased pain)	156	63.4
7	13	Patients should be encouraged to endure as much pain as possible before using an opioid. (False)	153	62.2
8	23	The recommended route of administration of opioid analgesics for patients with persistent cancer-related pain is (oral)	148	60.2
9	12	Elderly patients cannot tolerate opioids for pain relief. (False)	143	58.1
10	30	Which of the following is useful for treatment of cancer pain? A. Ibuprofen (Motrin) b. Hydromorphone (Dilaudid) c. Gabapentin (Neurontin) d. All of the above (d)	139	56.5
11	35	The time to peak effect for morphine given orally is (1-2 hours)	133	54.1
<b>Items receiving less than 50% correct response rate</b>				
12	6	Respiratory depression rarely occurs in patients who have been receiving stable doses of opioids over a period of months. (True)	122	49.6
13	10	Opioids should not be used in patients with a history of substance abuse. (False)	110	44.7
14	38.a	<b>Case study:</b> 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	106	43.1
15	25	Which of the following analgesic medications is considered the drug of choice for the treatment of prolonged moderate to severe pain for cancer	100	40.7

		patients? (morphine)		
15	26	Which of the following IV doses of morphine administered over a 4 hour period would be equivalent to 30 mg of oral morphine given q 4 hours? (morphine 10 mg IV)	100	40.7
16	11	Morphine has a dose ceiling (i.e., a dose above which no greater pain relief can be obtained). (False)	98	39.8
17	2	Because their nervous system is underdeveloped, children under two years of age have decreased pain sensitivity and limited memory of painful experiences. (False)	91	37.0
18	36	Following abrupt discontinuation of an opioid, physical dependence is manifested by the following: (sweating, yawning, diarrhea and agitation with patients when the opioid is abruptly discontinued)	89	36.2
19	5	Aspirin and other nonsteroidal anti-inflammatory agents are NOT effective analgesics for painful bone metastases. (False)	86	35.0
20	24	The recommended route administration of opioid analgesics for patients with brief, severe pain of sudden onset such as trauma or postoperative pain is (intravenous)	80	32.5
21	33	How likely is it that patient who develops pain already have an alcohol and/or drug abuse problem? (5 – 15%)	72	29.3
22	1	Vital signs are always reliable indicators of the intensity of a patient's pain. (False)	70	28.5
23	4	Patients may sleep in spite of severe pain. (True)	69	28.0
24	3	Patients who can be distracted from pain usually do not have severe pain. (False)	67	27.2
25	16	After an initial dose of opioid analgesic is given, subsequent doses should be adjusted in accordance with the individual patient's response. (True)	66	26.8
26	19	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. (False)	62	25.5
27	37.a	<b>Case study:</b> 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)	55	22.4
28	7	Combining analgesics that work by different mechanisms (e.g., combining an opioid with an NSAID) may result in better pain control with fewer side effects than using a single analgesic agent. (True)	54	22.0
29	9	Research shows that promethazine (Phenergan) and hydroxyzine (Vistaril) are reliable potentiators of opioid analgesics. (False)	52	21.1
30	22	Narcotic/opioid addiction is defined as a chronic neurobiologic disease, characterized by behaviors that include one or more of the following: impaired control over drug use, compulsive use, continued use despite harm, and craving. (True)	48	19.5
31	38.b	<b>Case study:</b> (Patient B) Your assessment, above, is made two hours 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 2/10 as an acceptable level of pain relief. His physician's order for analgesia is "morphine IV 1-3 mg q1h PRN pain relief." Check the action you will take at this time: (administer morphine 3 mg IV now)	47	19.1
32	20	Anticonvulsant drugs such as gabapentin (Neurontin) produce optimal pain	38	15.4

		relief after a single dose. (False)		
33	18	Vicodin (hydrocodone 5 mg + acetaminophen 500 mg) PO is approximately equal to 5-10 mg of morphine PO. (True)	27	11.0
34	28	A patient with persistent cancer pain has been receiving daily opioid analgesics for 2 months. Yesterday the patient was receiving morphine 200 mg/hour intravenously. Today he has been receiving 250 mg/hour intravenously. The likelihood of the patient developing clinically significant respiratory depression in the absence of new comorbidity is (less than 1%)	26	10.6
35	17	Giving patients sterile water by injection (placebo) is a useful test to determine if the pain is real. (False)	25	10.2
36	37.b	<b>Case study:</b> (Patient A) Your assessment, above, is made two hours 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 2/10 as an acceptable level of pain relief. His physician's order for analgesia is "morphine IV 1-3 mg q1h PRN pain relief." Check the action you will take at this time. (administer morphine 3 mg IV now)	22	8.9
37	8	The usual duration of analgesia of 1-2 mg morphine IV is 4-5 hours. (False)	19	7.7

## Discussion

The results revealed that nurses' knowledge about pain management in Turkey was far from optimal. The correct answer rate in a study by Yildirim Fadillioğlu and Uyar (2008) in Turkey was 35.41% (correct item score 13.81) and similar to our study results although somewhat lower (Yildirim Fadillioğlu & Uyar 2008). We can see that our results are quite low when compared with a study on 1797 Taiwanese nurses from various specialties which was reported a mean correct answer rate of 50.5% (Lai et al. 2003). Studies with special groups of nurses have also yielded results higher than ours (Bernardi et al. 2007, Lui et al. 2008, Tsai et al. 2007, Wang and Tsai. 2010). In this study inadequate pain knowledge of the nurses may be the lack of emphasis on pain management in formal nursing education in Turkey. There are no standards for the duration and content of pain management courses in Turkish nursing schools (Akbaş & Öztunç 2008). The "National Core Curriculum Program for Nursing Education Standardization Commission" has made "pain management" an "essential" part of the nursing curriculum (HUÇEP 2003). However, the trainers need to be experts in pain management and the training subjects should be of adequate duration with content that is appropriate for the pain management applications encountered in the unit (Lai et al. 2003). In addition these evaluations indicate an urgent need for review of nursing education and curriculum, and restructuring the lectures according to the pain management recommendations of the World

Health Organization and the American Pain Society.

The item with the highest correct answer rate in the study was "Patients' spiritual beliefs may lead them to think pain and suffering are necessary". The percentage of nurses answering this question correctly in a rate of 81.5% was reported for Italian nurses (Bernardi et al. 2007) and the study on oncology nurses was 60.3% (Yildirim Fadillioğlu & Uyar 2008). The question on cultural approaches had the fourth highest correct answer rate. Culture, values and spiritual beliefs are known to influence people's responses to pain and disease, the patient-nurse relationship and the attitudes and behavior of the nurses regarding pain and the patient in pain (Wang & Tsai 2010). Nurses are individuals of the communities they live in and the cultural attitude affects coping with pain and the approach (Eti Aslan 2010). It is important for the nurses to know the cultural and spiritual features of the community to increase the quality of nursing care.

The item "The most accurate judge of the intensity of the patient's pain is the patient" was answered correctly by a large percentage of the nurses in our study. This item was also the item with the highest percentage of correct answers in other studies (Bernardi et al. 2007, Lui et al. 2008, Tsai et al. 2007, Wang and Tsai 2010). Although the nurses believed that the best judge in evaluating pain was the patient, their attitude conflicts with their responses to the case studies in the scale in the current study (Table 2). The

pain intensity expressed by the patients was the same but the patients' pain attitudes were different in these two cases. This indicates that the nurses were more influenced by the patient's behavior and the way of expressing the pain than the expressed amount of pain. Similarly, other studies have reported that most nurses were focused on the patient's behavior when evaluating pain and not his/her statements (Bernardi et al. 2007, Yildirim Fadillioğlu & Uyar 2008). This may lead to the patient receiving less medication than required and varying approaches being used to patients suffering from the same degree of pain (for example evaluating the patient's pain less frequently, not seeing any need for nonpharmacological procedures), and result in inadequate treatment of the pain (Aslan & Badir 2005). The patients' own statements are accepted as the single most reliable indicator of the presence and intensity of pain (McCaffery & Beebe 1989). It must therefore be emphasized that the patient's statements (not the behavior) should be taken into account when evaluating pain. Future studies on the reasons of such attitudes by the nurses and possible solutions are needed.

“Benzodiazepines are not effective pain relievers unless the pain is due to muscle spasm” was answered as correct at the third highest rate among all the items (Table 2). Benzodiazepines are commonly used for sedation especially in intensive care settings in our hospital, so this result may be an indication of nurse observations regarding benzodiazepines. This item was presented only in Duke et al.'s (2010) study as the item which was rated one of the least correct answers (Duke et al. 2010). In that study their sample were consisted of student nurses. Therefore student nurses may have not enough opportunity to observe the effects of benzodiazepines in inpatient settings.

We found low rates of correct answers for items about the pharmacological features of drugs and adjustment of the proper dose. Nurses are recognized as a cornerstone of the team approaches for improving pain management (McCaffery & Ferrel 1997). In addition they are directly responsible for pain evaluation and the individual administration of drugs (Yava 2004<sup>a</sup>). Bernardi et al. (2007) reported inadequate knowledge of the nurses on the use of analgesics and especially morphine and on evaluating the

intensity of the patient's pain in their study on oncology nurses (Bernardi et al. 2007). Lui So & Fong (2008) also reported low (30.8%) correct answer rates for the questions on opioids. They state the reasons as opioids not being held in the unit as they are within the scope of dangerous drugs in Hong Kong, and the obstacle of filling in detailed documents to use them when needed by the patient (Lui So & Fong 2008). Opioids are similarly held outside the unit in Turkey only to be used at the needed amount following many procedures when required and this may have influenced our results. It is also possible that the reluctance of all healthcare professionals to use opioids due to their side effects and abuse has limited opioid usage and led to inadequate information and attitudes on this matter. Providing nurse education on the pharmacological features, drug interactions, side effects, dosage and routes of administration of analgesics and especially morphine and also nursing interventions using hand-on training of adequate duration may do much to decrease the relevant incorrect attitudes.

Most of the nurses participating in our study stated that they use pain assessment tools in their unit very low. This low incidence of using pain evaluation tools indicates that pain measurement is not included within the routine procedures of the unit or at the very least that it not used for all patients. One of the important obstacles to effective pain management is incomplete and inconsistent assessment and documentation of pain (Yava, 2004<sup>a</sup>, Young Horton & Davidhizar 2006). Evaluation and recording of patient pain regularly with pain tools is an effective method for evaluating the effectiveness of pain treatment. More effective pain management can also be provided by making sure that all the staff is informed about the pain status of the patient (Yava 2004<sup>a</sup>). Adding pain evaluation scales to the routine follow-up forms of the nurses and providing theoretical and practical in-service training showing how pain should be evaluated can be beneficial. A study from Canada has shown that nurses who have been given training on the subject use pain assessment tools to assess pain 93% of the time (Bouvette Bourbonnais & Perreault 2002). Young Horton & Davidhizar (2006) found that nurses who had received training had a positive attitude towards using pain evaluation tools (more than 90%).

The knowledge scores of nurses with a master's or baccalaureate degree was higher than those with an associate degree in our study ( $p < 0.001$ ) (Table 1). Further statistical analysis also showed a difference between nurses with an associate degree and baccalaureate degree and those with an associate degree and master degree. These results are consistent with previous studies (Bernardi et al. 2007, Lai et al. 2003, Wang & Tsai, 2010) and indicate the favorable effect of baccalaureate and higher education on pain-related knowledge and attitudes. However, Lui So & Fong (2008) have found no significant difference in the knowledge and attitude scores of nurses as their education level increases (Lui So & Fong 2008). Bernardi et al. (2007) reported that educators play an important role in motivating students for participating on pain management courses (Bernardi et al. 2007). To review the pain management courses in the nursing curriculum and restructuring them according to current knowledge and developments while making sure they can be applied in hospital settings is necessary. It is also necessary to ensure that the education leads to increased knowledge and positive attitude change as teaching someone about a subject does not mean that they actually learn it (Twycross 2002).

We found a statistically significant difference between pain scores according to whether a pain management course had been attended, a book or journal on pain had been read, and the effectiveness of the nurse regarding pain ( $p < 0.05$ ). Tsai et al. (2007) and Patiraki et al. (2006) have shown a significant increase in the knowledge scores of nurses attended pain management courses. A doctorate thesis from Turkey has shown that theoretical and practical in-service training on pain significantly increased the pain-related information of nurses and also elevated the nurses' implementation rates of nonpharmacological methods to at a statistically significant level. This study has demonstrated that knowledge increased and attitude improved with education but was unable to determine the effects on long-term behavior (Yava 2004<sup>b</sup>). The pain management behaviors of nurses are only measured by documentation and real behavioral change cannot be shown. It is clear that attitude change takes longer than increasing information and requires constant support and reinforcement (Howell et al. 2000).

As the nursing experience in years increase it is expected to increase the level of knowledge (de Rond de Wit & van Dam 2000). But, we did not find a statistically significant difference between the knowledge scores according to years of nursing experience. However, Lui So & Fong (2008) and Lai et al. (2003) have reported that nurses' knowledge scores increased markedly with increased work experience. In those studies participants were from specific nursing areas such as oncology and medical nursing. These results may be due to nurses' work areas. In addition more detailed studies are needed to clarify the matter.

There was a statistically significant difference between nurses' knowledge scores and the unit they worked in ( $p < 0.05$ ). Knowledge scores were higher in nurses working at surgical units and lower in nurses working in medical units. This may indicate that nurses in surgical units require more knowledge as they are always dealing with patients suffering from continuous postoperative pain. We couldn't find study result which compared nurses NKASRP scores working medical and surgical units. Lui et al. (2008) have reported the percentage of correct scores (47.72%) with the NKASRP was low of nurses worked in medical units. They also indicated that the reason for the lack of attention on the patient's pain at medical units was the focus on the disease process and hemodynamic monitoring.

### Conclusions

The current study is important as it shows the inadequate fields in pain management for Turkish nurses. Especially the nurses were quite inadequate when answering questions on the analgesia duration provided by morphine and administration of the proper dose for analgesia maintenance, and the place of placebo use in the determination of whether the pain is real. Nurses play a key role in the management of acute and chronic pain and this role is dependent on adequate knowledge and a positive attitude. We suggest restructuring graduate and postgraduate courses accordingly and preparing current pain management guidelines that increase the effectiveness of nurses in clinical applications.

### Limitations

This study has several limitations. Firstly the study sample was recruited from only one

training and research hospital in Turkey, which limited the generalization of the results to the Turkish nursing population. Those who did not participate may have had different responses to the study instruments. In addition, the depth of questioning was limited in this study as a set of structured close-ended questions was used. Other factors that might influence nurses' knowledge and attitudes in relation to pain management, such as cultural influences and institutional or medical law in Turkey as regards using drugs or personal experience of pain were not investigated. The current study mainly focused on examining nurses' knowledge and attitudes in relation to pain management and their actual practice was not observed. Further studies of knowledge, attitudes and practice are therefore needed.

Another limitation of the study was that the frequency of providing care by the nurses to the patients was not observed. We were therefore unable to determine the effect of the frequency of providing care to the patient in pain on knowledge regarding pain. The nurses were also not queried about information on the content and duration of the postgraduate pain courses they attended. It is necessary to investigate these factors in future studies and determine their effect on pain-related knowledge.

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