Original Research Article

Saudi Arabian Nurses' Knowledge and Attitudes Regarding Pain Management: Survey Results Using the KASRP

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ABSTRACT

Objectives: This descriptive study's aim was to examine the knowledge and attitudes of nurses in five Saudi Arabian (Hail region) hospitals regarding pain management using the KASRP tool.
Design: Five hundred copies of the KASRP were distributed to the total estimated population of nurses working within five hospitals. A survey return rate of 60 % (N = 303) was achieved. Data are analysed using descriptive statistics, measures of variability and inferential statistics,
Results: In this study, the average correct response rate to the various questions was 41.75 per cent, with rates ranging from 5–87 per cent. The findings indicate inadequate knowledge regarding pain, pain assessment, pain management and pain medications. The study findings indicated that nurses irrespective of being local or expatriate recorded a major deficiency in their knowledge regarding assessment and management of pain. The nurses also held incorrect attitudes towards pain assessment and lacked knowledge regarding pharmacological and non-pharmacological interventions.
Conclusions: Nurses require more knowledge regarding pharmacological and non-pharmacological interventions, as well as training to adequately care for patients with different cultural backgrounds. Hospitals have not been promoting interventions, methods and routines to encourage pain assessment, nor communication between nurses and patients, and non-pharmacological interventions to reduce pain. From the management's perspective, the main reason for this is the shortage of staff, and the same opinion is given by nurses when questioned about time issues, such as the ability to adequately communicate with patients to assess pain. This study recommends increased education regarding pain management, as well as an annual assessment of skills for all clinical nurses. The expertise gained in training programs could be enhanced through workshops and courses that are conducted on a regular basis in order to keep nurses' knowledge up to date.

Keywords: Pain, KASRP, Saudi Arabia, Nursing Knowledge, Nursing Assessment, Nursing Attitudes

What is already known about the topic?

- Pain is a common occurrence in health care settings and assessment needs to take into account factors such as
- Nurses are the primary clinicians who assess patient pain, advocate for pain relief, administer and monitor effect of medication or alternative therapies.
- The KASRP is a valid instrument to measure nurses knowledge and attitude concerning patient pain management with a required minimal score of 80%.

What this paper adds

- Pain management is challenging and can be much more complicated by cultural differences and language barriers between patients and providers.
Nurses need to be aware of the

- Individual patients' spiritual and cultural beliefs when assessing pain as pain may be seen as a challenge to faith or to masculinity.

- Non pharmacological interventions are available for nurses to use but if nurses hold negative attitudes to these they will not be implemented to benefit the patient.

INTRODUCTION

This study has explored nurses' knowledge and attitude regarding pain management practices in Hail Region Hospitals in Saudi Arabia. Pain is a common phenomenon of human existence and can be experienced by people of all ages, social status, and of diverse cultures (Gregory & Haigh, 2008). It can significantly impact not only on the sufferer's life, but also on the lives of family and friends. Pain is the main reason for people seeking health care (Lewis, Heitkemper, & Dirksen, 2004; Polomano et al., 2008), either in a medical clinic or in the hospital setting (McLean et al., 2004). Despite the development of new techniques and new guidelines for adequate pain management, many patients continue to suffer from pain (Schechter, Berde, & Yaster, 2003; Sloman, et al, 2005; Sloman, et al., 2006; Pasero & McCaffery, 2007, Horgas & Yoon, 2008, Layzell, 2008). Pain has often been poorly assessed and inadequately managed and the under-treatment of pain has been reported for many decades as a major and persistent clinical problem (Brown, Bowman, & Eason, 1999; Fosnocht, Swanson, & Barton, 2005; McCaffery & Ferrell, 1997; McCaffery & Pasero, 1999; Schafheutle, Cantrill, & Noyce, 2001, Duignan & Dunn, 2009).

Pain assessment and management is the most fundamental aspect of a nurse's responsibility when attending to a patient complaining of pain (Innis, Bikaunieks, Petryshen, Zellermeyer & Ciccarelli, 2004; Rejeh, Ahmadi, Mohammadi, Kazemnejad & Anoosheh, 2009). However, the task could be highly influenced by the nurses' knowledge, perceptions and attitudes towards pain. Jones et al., (2004) identified that nurses, far too often, have knowledge deficits and incorrect beliefs about pain assessment and management. These misconceptions and deficits can lead to inappropriate, incorrect, and inadequate pain management practices (McCaffery & Ferrell, 1996; McCaffery & Pasero, 1999; Mezey, 2005; Twycross, 2002). Lack of knowledge about pain and pain treatment, and misplaced beliefs about addiction to pain medications are considered to constitute a significant barrier to effective pain management. These barriers are also more complex in Saudi Arabia where a multicultural workforce exists with both language and cultural barriers.

The primary responsibility of health care professionals, including nurses, is to relieve pain and suffering. It is a moral and ethical responsibility and a fundamental human right for patients (Cousins, Brennan, Carr, 2004). Although pain can, in most instances, be effectively treated and relieved, under-treatment of pain remains a significant clinical problem and it continues to be an area of concern among health professionals, patients, and healthcare organisations. Even in hospital settings where pain should be treated effectively, research evidence shows that pain is managed inadequately and there are a large number of patients who still suffer from unrelieved pain (Huang, Ma, Zhang, Zhang & Lu. 2001; Dolin, Cashman & Bland, 2002).

Unrelieved pain can negatively affect the patient's sleep, function, mood and can have a significant economic impact on the patients and their families (Schopflocher & Jovey, 2010). Absenteeism in schools

among children and in work among adults due to pain-related causes has a significant negative effect on their productivity and consequently on the economy of a country (Phillips & Schopflocher, 2008). The consequences of pain mismanagement result in both human suffering and economic costs (Brennan et al., 2007; Innis et al., 2004; Maclaren & Cohen 2005).

In Saudi Arabia, the situation is not clear since there is a paucity of published studies identifying the prevalence of pain in health care settings nor is there evidence concerning the level of nurses' knowledge regarding pain. A single study was conducted by Kaki, Daghistani and Msabeh (2009) to assess nurses' knowledge about acute pain management in a tertiary hospital in Jeddah. The results show deficient in many aspects of pain such as physical dependence, tolerance, addiction, self-report and pharmacological knowledge.

Numerous studies indicate that nurses are not managing pain properly due to deficits in their knowledge and beliefs (Jones et al., 2004; Mezey, 2005; Twycross, 2002). These studies have identified notable knowledge deficits and incorrect beliefs among nurses about pain assessment and its treatment. Furthermore, lack of knowledge about pain and its treatment has been identified as a significant obstacle to effective pain management (Jones et al., 2004). Regarding the use of pain medication, a number of studies have found that one reason for inadequate treatment by nurses is their inappropriate concerns about the possibility of addiction and consequently nurses underestimate patients' pain (McCaffery & Ferrell, 1996; Schafheutle, Cantrill & Noyce, 2001). Many studies reveal that some nurses are reluctant to administer opioids based on such negative attitudes (Drayer, Henderson, & Reidenberg, 1999; McCaffery & Ferrell, 1996; Yates et al, 1998). Twycross (2002) found that nurses may aim to reduce pain rather than totally relieve it. In spite of numerous studies identifying general pain management knowledge deficit, the problem

of patients suffering from unnecessary pain continues (Schechter, Berde, & Yaster, 2003; Sloman, et al, 2005; Sloman, et al., 2006; Pasero & McCaffery, 2007).

Use of the KASRP

A search of the literature reveals studies who have used the KASRP to identify nurses knowledge and attitudes concerning pain. It is a simple tool that is essential a test and results in a percentage score rating. The KASRP can be used as an initial assessment and later for annual core skill assessment. The literature reports a score of 80% or above indicates appropriate levels of knowledge for clinicians.

Lewthwaite et al. (2011) conducted a study in a large, Canadian urban tertiary hospital to explore registered nurses' knowledge and attitudes regarding pain using the KASRP tool. The sample included 761 nurses from a variety of clinical units. The study found that 49% of participants scored 80% or more on the KASRP with a mean score of 79.0%.

Lai et al. (2003) examined the knowledge of 1,797 nurses randomly drawn from 9 hospitals across Taiwan. An overall correct response to the questions was found to be 50.5%, indicating a substandard level of knowledge. In a similar study by Tsai et al. (2007), nurse participants (N = 249) were recruited from nine hospitals chosen by stratified sampling across Taiwan. Data were collected using the Nurses' Knowledge and Attitudes Survey-Taiwanese version, a scale to assess perceived barriers to pain management and a background information form. The overall average correct response rate for the knowledge scale was 49.2%, with a range of 4.8-89.2% for each survey question. In yet another survey in Taiwan, Wang and Tsai (2010) examined the knowledge of 370 intensive care unit nurses, using this same tool. An overall correct response score of 53.4% demonstrated a poor knowledge of pain management, which was in accordance with the findings of the previous reports, indicating also that the situation has not changed over time.

Another study conducted in the Australian state of Tasmania by Van-Niekerk and Martin (2001) explored the knowledge of pain management practice among the state's nursing population. Based on the responses to a 29-item survey by 1,015 nurses, the authors concluded the knowledge level was poor.

Tse and Chan (2004) determined the knowledge level and attitudes of nurses in pain management among 678 registered nurses working in three different hospitals in Hong Kong. The KASRP questionnaire was used translated into Chinese. The overall correct response averaged 44%.

Another recent study conducted in Lebanon by Abdul Rahman, Abu-Saad and Noureddine (2013) assessed nurses' knowledge and attitudes regarding pain using the KASRP. The total sample was small (N = 88) assessing nurses working in a tertiary medical centre. The results show that the mean score was 56.15% and only 3.4% of the nurses obtained the passing scores (80%). The results indicated a poor knowledge regarding pain assessment and management.

A study in the USA examined both the knowledge of nurses in pain management as well the barriers to optimal pain management (Tapp & Kropp, 2005). It was based on the responses to a survey by 23 registered nurses at an urban teaching hospital in the State of Ohio, USA. Here too the average performance was below what it should be, with an overall score of 69.4%. Although these nurses showed better knowledge regarding general pain assessment and management, their scores were severely reduced by their weak knowledge in the areas of analgesics and their usage. However, positive score results have emerged from a few recent studies conducted in hospitals in the USA. In a survey by Moceri and Drevdahl (2012) using the KASRP tool on 91 nurses in the emergency departments of 5 hospitals in North-western America, the knowledge level (average correct score = 76%) among the nurses was comparatively higher than those of other similar studies. Similarly, Al-Shaer, Hill and Anderson (2011) surveyed 129 registered nurses from 10 separate nursing units in a United States midwestern metropolitan hospital. Data were collected using the KASRP. In this survey, the nurses scored relatively high (average = 81.2%, SD = 8.1). Another US study that examined the same parameters in relation to children's pain was reported by Vincent and Denyes (2004). The survey of 67 nurses yielded an average correct response of 77%. With regard to attitude, 55% of nurses believed that 20% of children generally over-reported their pain. On their ability to detect pain and its severity, 82% of the nurses did well when the child's report was coupled with behavioural manifestations. However, in the absence of behavioural clues, only 49% detected pain accurately.

In many of the above listed studies, the nurses were found to be particularly deficient in certain knowledge areas, such as pharmacology, addiction, under-estimation of pain, medication withdrawal, substance abuse, and cancer-related pain. Chronic conditions are viewed by nurses as conditions with lesser pain, compared with those of acute conditions. This assumption is detrimental to older patients with chronic conditions such as diabetes or renal diseases.

MATERIALS AND METHODS

This study was conducted in five hospitals in the Hail region, which is located in the northern region of Saudi Arabia. Hospital A (King Khalid Hospital) is the largest hospital in the region, with a capacity of 210 beds. Hospital B (Hail General Hospital) is the second largest and has 200 beds. Hospital C (Bagaa General Hospital) is a peripheral hospital with 30 beds. Hospital D (Al Ghazala Hospital) is a peripheral hospital with 50 beds. Hospital E (Alshamli Hospital) is a peripheral hospital with 30 beds. All of these government hospitals are administered by the MOH.

A convenience sampling method was employed to sample local and

expatriate nurses working in the Hail Region Hospitals. Ethics approval was obtained from RMIT University HREC and approval from the Sauidi Ministry of Health. The sample involved a distribution of 500 surveys "Knowledge and Attitudes Survey Regarding Pain" (KASRP) to the nurses in the five hospitals of the Hail region. Surveys and plain language statements were distributed to wards via the Nursing Education Department. The data collection period lasted one month from July 2011 to August 2011. Surveys could be returned to a sealed box placed on each ward and survey return implied consent to participate in the study. These boxes were collected after three weeks. No individual participant identifying information was on each survey and data was grouped once placed in SPSS. A survey returns rate of 60% (N = 303) was achieved.

Instrumentation: The KASRP

Items for the KASRP were developed in 1987 by Betty Ferrell and Margo McCaffery and have been widely used since then. The questionnaire consists of 22 true or false items, 13 multiple choice items, and 2 case studies with 2 multiple choice items each. The KASRP has been used widely and designed to measure the knowledge and attitudes of healthcare professionals regarding pain. The content of the tool was extracted from current standards of pain management formulated by the World Health Organization, the American Pain Society, and the Agency for Health Care Policy and Research. The tool was identified as discriminating between levels of expertise. Test–retest reliability was established by repeat testing in a continuing education class of staff nurses ($r > 0.80$). Internal consistency reliability was established (alpha $r > 0.70$) with items reflecting both knowledge and attitude domains (Ferrell & McCaffery, 2008).

Although the instrument had already been validated by the original author and other pain experts, the researcher also subjected the instrument to validity and reliability testing. The Kuder–Richardson Formula was used to measure the internal consistency coefficient and aided by other measures of central tendency and variability based on the actual scores of the nurses in the pain management questionnaire. The reliability estimate of the questionnaire used for this study was not that far from the reliability estimate conducted by the previous researcher. The computed Kuder–Richardson internal consistency coefficient of 0.79 fell within the range of reliability estimates of 0.60–0.90.

Data Analysis

The proportion (%) of participants (N = 303) who responded with correct answers for each of the 40 questions was computed, and ranked in order of magnitude, from the highest to the lowest. The questions which received the highest percentage of correct answers and the lowest percentage of correct answers were identified and compared. Data are analysed using descriptive statistics, measures of variability and inferential statistics,

RESULTS

Demographic data collected in this present study consisted of Gender, Age, Nationality, Education level, Religion, Work Experience, Position, Department, Hospital and whether they had followed any pain management courses or not. The majority of the participants were female (n = 281, 93%). More than half of the participants (n = 177, 59.8%) were aged between 21-30 years old. Participants originated from various nationalities. Participants from India were the largest group represented in this sample (n = 124, 41.2%) followed by Filipino (n = 112, 37.2%) and Saudi participants were only (n = 57, 18.9%). Almost half of participants held a Bachelor's degree (n = 159, 52.6%) and a large proportion (n = 138, 45.7%) were found to have achieved a basic Diploma level qualifications. Only five participants had a Master's Degree. The majority of the participants were Christian (n = 193, 63.9%) followed by Muslim (n = 97, 32.1%). The majority of participants had

work experience that ranged from 1-5 years (n = 117, 38.6%). Almost 90% of the participants in this study were staff nurses (n = 268) and the rest were head nurses, nursing managers and clinical instructors. Twenty per cent of the participants were working in the Emergency department and 20% were working in Medical departments.

Those attached to hospital A comprised the largest group (n = 116, 38.3%) followed by hospital B (n = 66, 21.8%). Three quarters of participants indicated that they had never attended any formal pain management courses (n = 228, 75%) and 19% had enrolled in a pain course (n = 57).

Table 1: Demographics Profile of Participants

Socio-Demographic Profile	Frequency	Percent
Gender		
Male	21	6.93
Female	281	92.74
Missing	1	0.33
Total	**303**	**100.0**
Age Group		
21-30	177	58.42
31-40	87	28.71
41-50	19	6.27
51-60	13	4.4
Missing	7	2.31
Total	**303**	**100.0**
Nationality		
Saudi	57	18.81
Filipino	112	36.96
Indian	124	40.93
Chinese	2	0.66
Indonesian	6	1.98
Missing	2	0.66
Total	**303**	**100.0**
Educational Attainment		
Diploma	138	45.54
Bachelor	159	52.48
Master	5	1.65
Missing	1	0.33
Total	**303**	**100.0**
Religious Affiliation		
Muslim	97	32.01
Christian	193	63.70
Hindu	11	3.63
None (Atheist)	1	0.33
Missing	1	0.33
Total	**303**	**100.0**
Work Experience		
6-12 months	7	2.31
1-5 years	117	38.61
5-10 years	96	31.68
10-15 years	41	13.53
15-20 years	14	4.62
20+ years	21	6.93
Missing	7	2.31
Total	**303**	**100.0**
Position		
Staff Nurse	268	88.45
Head Nurse	23	7.59
Nursing manager	9	2.97
Clinical Instructor	2	0.66
Missing	1	0.33
Total	**303**	**100.0**
Department/Ward Assigned		
Surgical Department	23	7.59
Medical Department	59	19.47
Emergency Department	62	20.24
ICU (Intinsive Care Unit)	16	5.28
Burn Unit	7	2.31
Pedia Department	18	5.94
NICU (Neonatal Intensive Care Unit)	6	1.98

Continued Table 1…		
CCU (Coronary Care Unit)	8	2.64
PICU (Pediatric Intensive Care Unit)	22	7.26
AKU (Artificial Kidney Unit)	30	9.90
Nursery	8	2.64
Education Department	2	0.66
Operation Room	8	2.65
OB/GYN Department	2	0.66
Nursing Office	5	1.76
OPD	12	3.96
Delivery Room	10	3.30
Missing	5	1.76
Total	**303**	**100.0**
Hospital		
Hospital A	116	38.28
Hospital B	66	21.78
Hospital C	35	11.55
Hospital D	36	11.88
Hospital E	50	16.50
Total	**303**	**100.0**
Courses		
None	228	75.25
Once	57	18.81
Twice	13	4.29
Three Times	2	0.66
Four Times +	2	0.66
Missing	1	0.33
Total	**303**	**100.0**

Table 2 presents the distribution and percentage of correct answers post the administration of the KASRP. The majority (44%) of participants belonged to those who scored in the range of 40-49% correct answers, with only 1% getting scores above 70 and 6% getting below 30. It is concerning that only 67% of the participants were able to score 40% or above, indicating 1 in every 3 nurses lacked adequate knowledge on the material included in the questionnaire.

Table 2: Distribution and percentage of correct answers to the KASRP

Percent Correct	N (%)
70 +	3 (1%)
60-69	8 (2%)
50-59	52 (17%)
40-49	136 (44%)
30-39	84 (27%)
Below 30	20 (6%)

Table 3: The 5 most Frequently Missed Items of the KASRP

Question and Correct Answer	Percentage of sample with correct answer *n* (%)
Question 23: The recommended rate of administration of opioid analgesics for patients with persistent cancer-related pain is? **Answer:** d. oral	44 (14.5%)
Question 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. Your assessment reveals the following information: BP = 120/80; HR = 80; R = 18; on a score of 0 – 10 (0 = no pain / discomfort) (10 = worse pain discomfort) he rates his pain as 8. Your assessment is made 2 hours after he received morphine 2 mg. IV. Half hourly pain ratings, following the injection ranged from 6 – 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 q/h PRN for pain relief. Check the action you will take at this time: Answer: 4. Administer morphine 3 mg IV now	38 (12.5%)
Question 37: 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 keeps talking and joking with his visitor. Your assessment reveals the following information: BP = 120/80; HR = 80; R = 18; on a score of 0 – 10 (0 = no pain / discomfort) (10 = worse 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. **Answer:** Respondent to circle 8	28 (9.2%)
Question 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. **Answer:** False	22 (7.3%)
Question 37: Patient A. Your assessment is made 2 hours after he received morphine 2 mg. IV. Half hourly pain ratings, following the injection ranged from 6 – 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 q/h PRN for pain relief. Check the action you will take at this time. **Answer:** 4. Administer morphine 3 mg IV now.	9 (3.0%)

In order to understand the specific areas of strength or weakness in knowledge, the KASRP questions were ranked, based on the percentage of correct answers obtained. Table 3 provides the correct answer scores for the five most incorrectly answered items.

These five questions include knowledge regarding pain assessment as well as the use and dose of analgesics (e.g., opioids, morphine). Generally, the questions that the nurses found most difficult to answer were those that required them to make decisions, or personal value judgements, to assess the value of a particular treatment, to determine what action should be taken in a given situation, to assess the outcome of a particular treatment, or to evaluate the severity and source of pain. In general, Twenty-five questions were answered incorrectly by more than 50% of participants.

DISCUSSION

The KASRP has been used widely and items are designed to measure the knowledge as well as assess the respondents' attitude regarding pain management. An acceptable pass score has been identified in the literature as 80% (McCaffery & Robinson, 2002; Brown, Bowman, & Eason, 1999). In this study, the overall scores, based on the correct answers provided by each participant for the 40 questions, ranged from a minimum of 5.0% to a maximum of 87.5%, with a mean score across the 303 participants of 41.76% (SD = 9.83). The majority of the participants scored between 35% and 47.5%. There were a few outliers, made up of seven participants with scores $\leq$ 20% and eleven with scores $\geq$ 60%. However, only two participants obtained a passing score of $\geq$ 80%. The average correct response rate in this study (41.76%) was very low and deviated significantly from the acceptable score of 80%.

In this study, the low (2 out of 303 or 0.6%) pass rate indicated that the nurses in Hail Regional hospitals have deficits in their knowledge and attitudes regarding pain. Although such an inference is made based on the stipulated standard that a score below 80% indicated a lack of competence to satisfy patients' needs in pain management, the average success rate in the present study lies within the wide range observed in other similar studies (Lewthwaite, 2011; Wang & Tsai, 2010; Rahimi-Madiseh, Tavakol, & Dennick, 2010; Yildirim, Cicek, & Uyar, 2008; Lui, So, & Fong, 2008; Bernardi, Catania, & Tridello, 2007; Matthews & Malcolm, 2007; Plaisance & Logan, 2006). For example, Matthews and Malcolm (2007) reported an average correct response rate of 73.8% for their participants. However, a similar study conducted by Yildirim and colleagues (2008) to measure the knowledge and attitudes amongst Turkish nurses using the same tools (KASRP) showed an average correct response rate of 35.4%, which was lower than that of the current study (Yildirim, Cicek, & Uyar, 2008).

Nurses' pain assessment

Regarding the assessment of pain, patient's self-report is the most reliable indicator of pain intensity and is considered the reliable standard for pain assessment (Arbour & Gelinas, 2010). While the majority (59.7%) in the present study did agree with this, evidently a certain number of the nurses (40.3%) did not always follow this simple rule. Kaki (2009) found that nurses were more likely to accept the patient reporting of pain. They take cues from the grimacing patient than from the smiling one. In the survey by Kaki (2009), 300 questionnaires were distributed in various healthcare settings at King Khalid National Guard hospital in Jeddah, Saudi Arabia. Kaki found that nearly 23% of the nurses ignored the self-report of the patient for different reasons and failed to see a difference between 8 out of 10 and 0 out of 10 on the numerical scale of pain assessment. In this case, nurses were ignoring the self-report of the patient which is crucial in assessing a patient's pain and

consequently could negatively impact on its management.

The KASRP utilised two case studies regarding pain assessment and these questions (items 37 and 38) aimed to identify the attitudes of nurses regarding pain assessment. The percentage of respondents who accurately rated the pain scores of both patient case studies correctly was less than that of other research studies conducted internationally. These results indicate defects in nurses' knowledge and inappropriate attitudes regarding pain and its management. Matthews and Malcolm (2007) suggested that 51.3% and 77% of nurse attendants were able to judge the pain of smiling and grimacing patients correctly.

Nurses' pharmacology knowledge

Pharmacology based items are vital in the management of pain, and hence have been attached substantial significance in KASRP surveys. It is absolutely necessary for health professionals to know about pharmacological approaches to managing pain. However, this proved to be another knowledge deficit area of the respondents. In the current study, participants showed poor performance on pharmacology-based questions, which is in agreement with the observations made repeatedly in many other international studies. Knowledge deficits and the lack of ability have been highlighted in many research studies that tested the basic pharmacological knowledge which includes choice of medication, drug action, routes of administration, untoward effects of opioid analgesics, equi-analgesic dosing (doses of a drug for different routes of administration that would provide equivalent analgesic effects) and selection of drug dosages. (Lewthwaite et al., 2011; Wang & Tsai, 2010; Yildirim, Cicek, & Uyar ,2008; Lui, So, & Fong, 2008; Tsai et al., 2007; Matthews & Malcolm, 2007). Many studies have indicated that nurses are particularly deficient in knowledge about the drug promethazine and its actions. Overall, the percentage of correct scores for promethazine-related questions was between 10%-30% (Yildirim, Cicek, & Uyar, 2008; Bernardi, Catania, & Tridello, 2007; Reiman & Gordon, 2007; Plaisance & Logan, 2006; Erkes et al., 2001; Brown, Bowman, & Eason, 1999).

In the current study, the percentage of correct scores for promethazine-related questions was 37% which indicated that the majority of the participants incorrectly believed that promethazine potentiates the analgesic effects of opioids. Indeed, it is known that the sedative effects, respiratory depression and hypotension effects of opioids that are increased by promethazine (McCaffery & Ferrell, 1995). However, it must also be noted that the knowledge level of the nurses on promethazine in this study is quite better than those who participated in the study by Erkes et al. (2001) where only 10% answered that item correctly. The question on the effectiveness of aspirin and NSAIDs on bone pain was answered incorrectly by the majority (66.3%) of participants in the current study. This result also agrees with those of other studies (Lewthwaite et al., 2011; Lui, So, & Fong, 2008; Tsai et al., 2007).

Knowledge of Opioids

Another area where the nurses seem to hold on to many misconceptions relates to the basic pharmacology of analgesics, especially opioids. More than two-thirds of the participants in the current study (68.3%) correctly answered that morphine is the best choice in treating cancer-related pain, but only 14.5% knew the proper route of analgesia administration for cancer pain. Regarding the question on the peak effect following oral morphine, only 40.9% of the participants provided the correct answer, which is 1-2 hours. Similar findings have been reported earlier (Wang & Tsai, 2010; Yildirim, Cicek, & Uyar, 2008; Reiman & Gordon, 2007; Plaisance & Logan, 2006; Brown, Bowman, & Eason, 1999). However, concerning the knowledge about peak effect following intravenous morphine administration, the participants performed better with 76.9% of the participants understanding that it takes 15 minutes to reach its peak analgesic effectiveness.

Therefore, nurses' knowledge on the pharmacokinetics of oral morphine is a particular concern.

The present study also found vast deficit of knowledge on, and unfavourable attitudes to opioid addiction and opioid-caused respiratory depression. The study highlighted many misconceptions and mistaken ideas about the effects of opioid analgesics. Interestingly, 82.5% of the participants could correctly identify the definition of addiction, but the majority could not even distinguish between terms like addiction, tolerance and physical dependence. The risk of addiction to opioid analgesics varies between different patient populations and treatment regimens. However, it is least likely to happen when opioids are used for acute pain management and opioid addiction, in particular, is a very rare treatment complication in acute surgical pain relief (Ballantyne, 2003).

The deficiencies in the professional knowledge of nurses regarding pain management, especially in the use of opioid agents, seems to be widespread. Kaki (2009) reported on a survey which aimed to explore nurses' opinions about patient satisfaction regarding pain relief, usage of opioids, follow-up dosing after initial usage, nurses' attitudes regarding addiction to opioids as well as physical dependence. It was found that 58.6% of nurses thought that morphine addiction is a possibility, with too frequent treatment. Most of the nurses had not considered the addiction problem, particularly in situations where patient assessment was based on smiles and grimaces. As tolerance and physical dependence also decides the pain relief and management interventions, in the current study very few nurses (18.2%) had considered the issues of tolerance and physical dependence. For example, consider a situation when a patient's pain is reduced but doesn't reduce to a level sufficient to avoid physical dependence. The nurses think that the pain has not been reduced and would continue to give opioids, thus increasing the risk of addiction.

Equi-analgesic dosage

The pain management practice needs a clear knowledge of equi-analgesic dosing (Brown, Bowman, & Eason, 1999). It is a requirement for the healthcare professionals to be conversant about the pharmacology of opioid analgesic preparations and be skilled enough to compute equi-analgesic dosages when managing pain. In view of the vital role of the nurses in managing pain, a nurse must be an expert in these mathematical calculations to ensure maximum positive outcomes. Nurses must select the analgesic route and dosage of analgesia for as needed (PRN) medications. The administration of the equi-analgesic dose is a task that requires a lot of care and responsibility to ensure that the transition from one opioid preparation to another does not produce adverse effects like an increase in pain or other unwanted effects (Gordon et al., 1999). Only a third of the participants (30%) in the current study provided the correct equi-analgesic dosage when changing from intravenous (IV) to oral (PO) administration of morphine. A similar knowledge deficit was also reported by Tsai et al. (2007), who established that only 45.4% nurses of the emergency department had the knowledge to work out the correct equi-analgesic dose of morphine. This has been a frequent observation across many studies showing that the participating nurses had only a meager knowledge of equi-analgesic calculations (Lui, So & Fong, 2008; Reiman & Gordon, 2007; Brown, Bowman, & Eason, 1999). The deficits of knowledge in regard to equi-analgesic doses may lead to many problems in pain management process and could result in the negligence of patients' pain.

Rates of analgesic administration

Different routes are recommended for the administration of analgesics depending on different disease conditions, considering factors such as rapidity of action, maximum effect and patient's comfort. For example, for cancer-related pain, the oral route is the most effective option. It is an internationally accepted fact that the oral route of analgesia

administration for cancer patients is the least expensive while being the most effective medication regime (McCaffery & Ferrell 1995; Agency for Health Care Policy and Research, 1992). In a study by Matthews and Malcom (2007), only 39.8% of the nurses knew that the oral route is the preferred route of opioid administration to patients with cancer while in the current study only 14.5%.

Nurses' attitudes

Around a third (32.7%) of respondents in the current study was of the wrong opinion that changes in vital signs are an accurate indication of the existence of pain. This is a misconception with regard to the pain assessment process, but is not limited to the present sample of nurses. The study by Coulling (2005) also found that 32% of respondents believed that vital signs represented a primary indicator of the intensity of pain. Other misconceptions that could be linked with nurses' beliefs with regard to physiological changes in vital signs have been observed by other researchers (Huth, Gregg, & Lin, 2010; Yildirim, Cicek, & Uyar, 2008; Bernardi, Catania, & Tridello, 2007). It is the patient's self-report regarding pain that is considered the reliable standard for pain assessment (Arbour & Gelinas, 2010).

Similar misconceptions are prevalent among nurses in relation to the patients' pain-related behaviours, coupled with associated knowledge deficits. The neuromatrix theory of pain suggests that pain is immensely influenced by psychological factors which are vital components in the perception of pain (Mandeville, 2010). Consequently, the role of non-pharmacological therapies, such as information provision, distraction and relaxation techniques and cognitive behavioural interventions have gained value in managing pain (Macintyre et al., 2010). To ascertain the attitudes of the nurses and application of non-pharmacological methods for pain management, a qualitative study was carried out by Helmrich et al. (2001) in Australia. A large proportion

(89.3%) of the nurses in this study claimed that they used non-pharmacological methods to help in the management of patients' pain. In contrast, several other studies, when patient reports were examined, ascertained that the use of such integrated (pharmacological and non-pharmacological) treatments was negligible to non-existent (Eid & Bucknall, 2008; Manias, 2003; Salantera et al., 1999; Clarke et al., 1996).

Studies have provided evidence supporting the notion that nurses should assess pain depending on non-verbal cues, behavioural manifestations, and they may include physiological changes in vital signs. According to some respondents, patients in pain are unable to sleep. Nonetheless, respondents demonstrated knowledge deficits in this area too, as indicated by a substantial proportion (35.6%) of them having a false belief that patients who can be distracted easily from pain are those who usually do not have pain of any considerable severity. The belief among nurses that patients whose sleeping habits are unchanged do not have severe pain is a common observation in other studies as well (Wang & Tsai, 2010; Yildirim, Cicek, & Uyar, 2008; Lui, So, & Fong, 2008; Bernardi, Catania, & Tridello, 2007; Tsai et al., 2007; Coulling, 2005; Lai et al., 2003). Distraction and relaxation are strategies that help in diverting the attention away from pain (Macintyre et al., 2010; Mandeville, 2010; Tse & Chan, 2004). Coulling (2005) and these techniques may help patients to feel less pain. Patients do, on their own, utilise coping strategies such as distraction techniques and sleeping to divert their attention away from pain.

Individuals' attitudes and beliefs are influenced by cultural factors that include socioeconomic, geographic, religious and ethnic factors (Curry, 2010) therefore; these aspects must be considered in pain management. The majority of the respondents (55.8%) agreed that each and every patient should be treated individually with due regard to their cultural uniqueness

or diverse ways that may influence the patients' perception of and responses to their pain experience and these ideas are supported by the literature (Wang & Tsai, 2010; Reiman & Gordon, 2007; Tsai et al., 2007; Lai et al., 2003; Van Niekerk & Martin, 2001). It is also noteworthy that individual beliefs differ concerning pain. In this present study, 69.0% of the respondents thought that a patient's spiritual beliefs could influence his/her perception of pain. Van Niekerk and Martin (2001) affirmed that 81% of the respondents in their study correctly acknowledged that certain religious beliefs may lead patients to think pain as a necessary feature in the fulfillment of life. Curry (2010) thought that nurses should be aware of the individual's distinctive cultural perspectives that may influence the pain management process and its outcomes.

Additionally, the influence of religion as an important concept impacting on pain management needs to be considered with more than 90% of respondents in survey-based research indicating that religion and associated belief systems do influence pain perception (Bernardi, Catania, & Tridello, 2007; Plaisance & Logan, 2006; Van Niekerk & Martin, 2001; Erkes et al., 2001).

CONCLUSION

The insight gained from this study, into the knowledge and attitude of nurses involved in pain care at five major hospitals in Saudi Arabia will be very valuable to health care providers, the general public and other authorities concerned with the health care system in Saudi Arabia. The findings lead to the conclusion that the nurses at these hospitals display an extensive knowledge deficit and attitudinal problems, as far as pain management is concerned. The knowledge deficiency is particularly a problem in certain aspects such as basic pharmacology in general, and the use of opioid analgesics in particular. In addition, there exists an apparent total lack of knowledge about the potential use of non-pharmacological approaches in pain management.

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