ORIGINAL ARTICLE

Understanding Nurses' Knowledge of Pediatric Pain Management and Analgesic Use in Saudi Arabia

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Abstract

Background and Objective: Pain is the most common and distressing condition among patients. Irrespective of age or gender, all patients, individuals, and children are responsive to painful stimulation. Therefore, this study aimed to assess knowledge and attitudes toward Pain Management among Nurses in Riyadh, Saudi Arabia. **Materials and Methods:** A cross-sectional study was conducted from July to October 2024, among nurses working in a tertiary teaching hospital in Riyadh, Saudi Arabia. A 27-item questionnaire aimed to collect the knowledge and attitudes toward Pain Management among nurses was included. The data were analysed using the Statistical Package for the Social Science version 27 was used. **Results:** Majority of nurses were female (86.2%, *n* = 218), with more than half (56.5%, *n* = 143) aged between 25 and 28 years, and 34% (*n* = 86) having 2–5 years of experience. In terms of knowledge, most nurses recognized potential issues with analgesic use: 58.9% did not consider codeine suitable for a 10-year-old child, and 66.8% acknowledged that frequent exposure to analgesics can lead to addiction. Analgesic selection for pediatric patients was primarily guided by pain intensity (53.8%), with the child's age (33.6%) as a secondary consideration. Regarding non-pharmacological treatments for pediatric pain management, hypnosis was the most commonly cited option (37.2%, *n* = 94), followed by music therapy (12.3%, *n* = 31) and physical therapy (2.8%, *n* = 7). **Conclusion:** The findings concluded that variation exists in the knowledge of nurses toward pain management. Additional education on pain management is warranted.

Key words: Analgesic, contraindication, dosage, nurses, pain management, pediatrics

INTRODUCTION

Pain is a common and distressing condition affecting patients of all ages and genders.[1] According to the International Association for the Study of Pain, pain is an unpleasant emotional or sensory experience associated with either confirmed or suspected tissue damage.[2] Although pain in Pediatrics is challenging and requires more attention in detecting, diagnosing, and treating, and considered one of the most common hospital visits and complains in the emergency department.[3] Furthermore, 78% of the emergency department visits were attributed to Pediatric Pain.[3] It is worth noting that every 1 in 5 children and adolescents experience chronic pain, and the prevalence varies by pain type.[4] According to a recent systematic review, the overall prevalence of chronic pain in children was 20.8%.[4] In Canada, the prevalence of pediatric pain ranged from 75% to 88%, and moderate to severe pain was 78%.[1]

Since children do not exhibit pain-related symptoms, one of the most pressing challenges in pediatric pain management is recognition. It is the responsibility of the healthcare professional to find an alternate method of recognizing pain symptoms by keeping an eye out for any physiological or chemical changes in the body. The lack of pain-related symptoms could be better explained by the development of nervous systems and the underdeveloped ability to express their pain. In addition, despite the various roles of nurses in delivering healthcare and patient counseling, nurses also deal with pain management among pediatric and other patients through assessment, intervention, and patient advocacy.[5] Furthermore, the American Nurses Association emphasized

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Received: 22-02-2026
Revised: 24-03-2026
Accepted: 31-03-2026

that a nurse's responsibilities in pain management should include assessing patients' pain, developing pharmacologic and non-pharmacologic pain management plans, carrying them out, and assessing how well the patients are responding to the interventions.[5-8] Therefore, it is crucial to assess the understanding of the knowledge and attitudes of the nurses in pain management. In addition, literature in Saudi Arabia and other countries revealed that nurses lack pain management knowledge and attitudes.[9-13] In Turkey, an earlier study revealed that 51% of the nurses stated that they had insufficient knowledge about the evaluation of pain in pediatrics.[11] In Ethiopia, previous findings show that the majority of nurses lack sufficient knowledge and attitudes toward pediatric pain management.[13] Likewise, another study conducted in a developed nation demonstrated that nurses' attitudes and knowledge regarding the assessment and management of pediatric pain did not align with best practice.[14]

An optimistic attitude and sufficient knowledge enable healthcare professionals, including nurses and other healthcare professionals, to treat each patient as best they can, which ultimately improves patient outcomes overall.[15-19] To prevent poor therapy, treatment failure, and higher patient costs, it is essential to maintain the proper knowledge and attitudes about pain management.[13,20] Moreover, research indicates that the most often mentioned obstacles to effective pain management practice among nurses were unfavorable attitudes, inadequate documentation, inadequate patient assessment, and inappropriate use of painkillers.[18,19] Consequently, the goal of the study is to assess Saudi Arabian nurses' attitudes and knowledge regarding pain management with pediatric patients.

MATERIALS AND METHODS

Design, setting, and population

A cross-sectional study was conducted from July to October 2024, among nurses working in a tertiary teaching hospital in Riyadh, Saudi Arabia. Data was collected from registered nurses with Saudi counsel, aged over 18, on duty, regardless of gender or nationality, who provided written consent. Others who did not match the inclusion criteria were excluded from the study. Respondents were informed that data would be used only for research purposes, confidentiality would be maintained throughout the study, and they have the right to withdraw from the study at any point of time. In addition, all the study procedures were performed by the Declaration of Helsinki guidelines for human research.

Sample size

A non-probability convenience sampling technique was used to collect the data. Participants were informed that participation in the study was voluntary. Incomplete questionnaires or a lack of consent resulted in participants being excluded. The sample size was determined using the Raosoft online sample size calculator, based on the 1000 nurses employed at the study location. With a 50% response rate, a 5% margin of error, and a 95% confidence level, a minimum of 278 samples was required to minimize errors and enhance the study's reliability. Twenty-seven out of the 280 completed questionnaires were excluded due to incompleteness. Therefore, 253 questionnaires were included in the survey.

Questionnaire development

The questionnaire used in this study was adopted from earlier studies published with similar objectives and divided into three sections.[7,9,13] Section one of the study covers the demographic of the respondents, including age, gender, education years of experience, and marital status, with a total of 5-items. Section two of the study was about the nurse's knowledge related to pain management and consisted of 11 items, the knowledge-related items were assessed on a three-point scale ranging from agree/Disagree/I do not know. The third section of the study deals with 5 items and consisted of questions about knowledge in the Choice of analgesia and one question about the mechanism of action of analgesics. Followed by two more questions asked nurses about the analgesic dosage of paracetamol and ibuprofen (n = 2). The last section of the study collected information on contraindicated drugs among Children (n = 3 items) and a question about non-pharmacological management of pain. All these questions were assessed using open-ended questions or multiple choices.

After the initial draft of the questionnaire, it was subjected to content review by experts in the field from the College of nursing. The expert team consisted of three senior professors in Nursing and a researcher and practicing nurse from the Hospital to independently give their feedback. After that, the questionnaires were subjected to pilot testing among randomly selected nurses (30) to check the flow, language, and correctness of the questionnaires. The reliability was determined using Cronbach's alpha, which was found to be 0.81, suggesting that the tool is valid and reliable.

The data were collected using convenience sampling. Nurses were approached by the researcher and handed the questionnaires at the nursing station. Before receiving the paper-based questionnaire, the head of the nursing station was briefed on the significance of the study. Nurses were randomly invited to participate and respond to the questionnaires. To maximize responses, the researcher followed up continuously with the nurses. Nurses were assured of the confidentiality of their data and were informed that the data would only be used for research purposes. They were also informed that they had the right to withdraw from the study at any time.

Data analysis

The Statistical Package for the Social Sciences (SPSS) version 27.0 was used to analyze the data that was gathered in Excel (SPSS Inc., Chicago, IL, USA). A descriptive statistic like percentages (%) and frequencies (*n*), were computed for each variable.

RESULTS

Table 1 presents the demographic and work-related characteristics of the nurses. Most nurses were female (86.2%, *n* = 218), aged 25–28 (56.5%, *n* = 143), with 34% (*n* = 86) having 2–5 years of experience and 29.2% (*n* = 74) having 5–10 years. The participants varied in terms of education level, but the majority held a bachelor's degree (62.1%, *n* = 157) in nursing. In addition, 49% (*n* = 124) of the nurses were married.

Table 1: Demographics characteristic of participants (*n*=253)

Variables	*n* (%)
Gender	
Male	35 (13.8)
Female	218 (86.2)
Age (years)	
25-28	143 (56.5)
29–31	70 (27.7)
32–34	26 (10.3)
≥35	14 (5.5)
Years of experience	
<1	67 (26.5)
2–5 years	86 (34.0)
6–10	74 (29.2)
11 and above	26 (10.3)
Education	
Diploma	80 (31.6)
Bachelor	157 (62.1)
Master	14 (5.5)
PhD	02 (0.8)
Marital status	
Single	88 (34.8)
Married	124 (49.0)
Divorced	36 (14.2)
Widow	05 (2.0)

n: Frequency; %: Percentage

Knowledge of nurses toward analgesics

In terms of independent items on the knowledge scale of pain management, 58.9% of nurses did not agree that codeine is a good treatment for a 10-year-old, and 66.8% of nurses agreed that frequent exposure to analgesics can result in analgesic addiction among children. In addition, the majority of nurses disagreed with the statement that parents should encourage their children to experience as much pain as possible before using painkillers. When it comes to the frequency of pain experienced by children compared to adults, 17.4% of nurses agreed that children feel less pain than adults, and 56.9% agreed that, despite being in extreme pain, children may still be able to sleep. The detailed frequencies of knowledge items related to nurses' pain management are provided in Figure 1.

In this study, 53.8% of the nurses revealed that the choice of analgesic among pediatrics depends on the pain intensity of the child, while 33.6% said that it depends on the age of the child. Regarding musculoskeletal pain among children, 58.5% of the nurses said that paracetamol should not be given, followed by aspirin at 23.7% and diclofenac at 17%, as shown in Table 2. When asked about analgesics that were not prescribed over the counter, the majority (83.4%) of nurses revealed that tramadol was not prescribed, followed by diclofenac at 14.2%. The detailed responses of nurses regarding the choice of analgesics are presented in Table 2.

Only 25.3% (*n* = 64) of the nurses identified the correct mechanism of action of paracetamol as shown in Figure 2.

Regarding contraindications, 63.6% of the nurses agreed that children under 3 months old should not be given paracetamol. In addition, 34.4% of them agreed that paracetamol is not recommended for children with malnutrition. Furthermore, 65.2% of nurses agreed that over-the-counter paracetamol should be avoided for children with asthma. The specific responses of the nurses regarding contraindications of over-the-counter paracetamol for children are detailed in Table 3.

In this study, 2.8% (*n* = 7) of nurses agreed with physical therapy, while 37.2% (*n* = 94) revealed hypnosis, and 12.3% (*n* = 31) said music therapy was the non-pharmacological treatment for pediatric pain management. Most of them do not know about non-pharmacological treatments, as shown in Figure 3.

DISCUSSION

In this study, about 60% of nurses agreed that codeine is unsuitable for a 10-year-old with a pain score of 5. Earlier literature suggested that codeine or codeine-containing medications should not be prescribed for children under 12 years old due to their adverse effects on the respiratory system, including breathing problems.[21] In addition, the Food and Drug Administration (FDA) drug label for codeine states that even at labeled dosage regimens, individuals who are ultrarapid metabolizers (UMs) – who can metabolize codeine to morphine more rapidly and more completely – may have

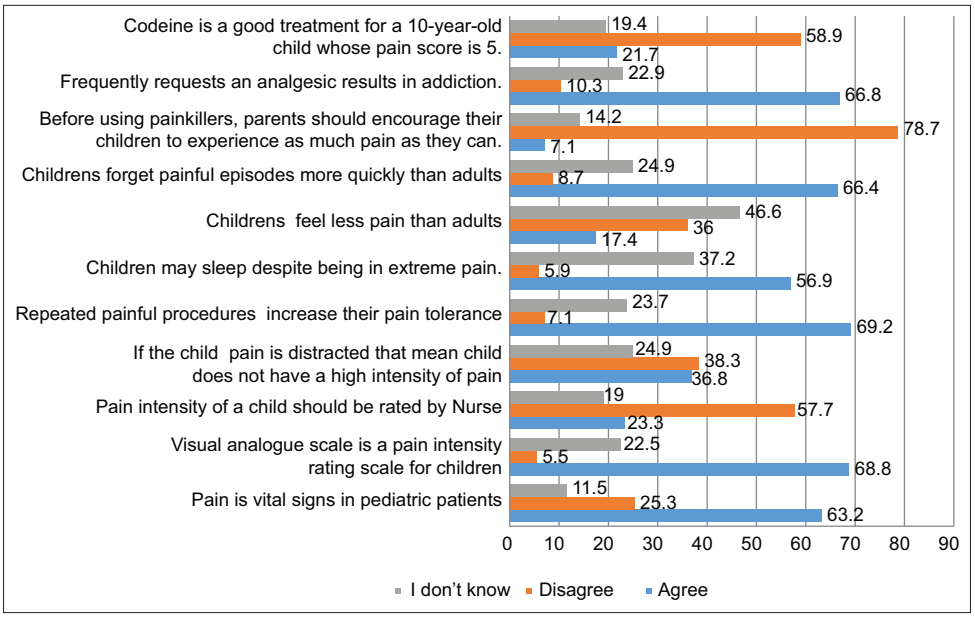

Figure 1: Knowledge of nurses toward pain management

Table 2: Nurses responses toward knowledge in the choice of analgesics

Variable	Frequency (*n*)	Percentage
Choice of analgesic among pediatrics depends on:		
Pain intensity of the child	136	53.8
Child age	85	33.6
Pain duration	01	0.4
Origin of pain	31	12.3
Children with musculoskeletal pain should not be given		
Paracetamol	148	58.5
Ibuprofen	02	0.8
Aspirin	60	23.7
Diclofenac	43	17.0
WHO analgesic ranking for children does not include:		
Weak opioids	03	1.2
Adjuvants	165	65.2
Non-opioids	41	16.2
Strong opioids	44	17.4
Analgesics is not prescribed as OTC		
Paracetamol	06	2.4
Diclofenac	36	14.2
Tramadol	211	83.4
All are examples of analgesic adjuvants except		
Carbamazepine	36	14.2
Celecoxib	185	73.1
Amitriptyline	18	7.1
Dexamethasone	14	5.5

WHO: World Health Organization

Table 3: Contraindicated drugs among children according to their age and disease status

Variable	Frequency (*n*)	Percentage
Over-the-counter paracetamol is contraindicated in children		
<3 months	161	63.6
Child with malnutrition	87	34.4
I don't know	05	2.0
Over-the-counter paracetamol is contraindicated in with		
Dehydration	03	1.2
Asthma	165	65.2
Pneumonia	41	16.2
I don't know	44	17.4
Over-the-counter ibuprofen is contraindicated in children		
<3 months	06	2.4
A child with chicken pox	36	14.2
Dehydration	211	83.4
Pneumonia		
All of the above		

life-threatening or fatal respiratory depression.[22] The label also contains a boxed warning, which states that respiratory depression and death have occurred in children who received codeine following tonsillectomy, adenoidectomy, or both, and had evidence of being CYP2D6 UMs.[22]

Furthermore, 66.8% of the nurses were knowledgeable about analgesic addiction and agreed that frequent use of analgesics results in addiction among children. Similar findings were reported in earlier studies.[23,24] For example, among hospital

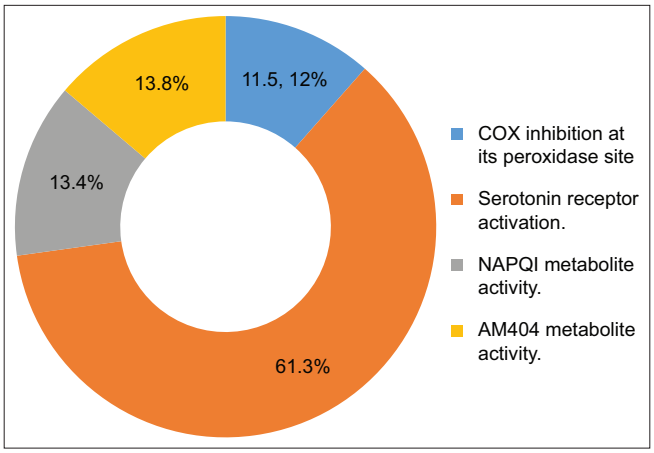

Figure 2: Nurses responses toward the mechanism of action of paracetamol

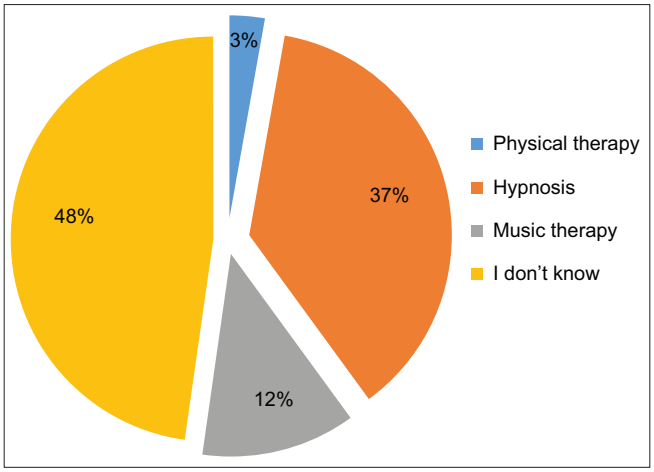

Figure 3: Non-pharmacological treatment for pediatric pain management

nurses, the majority (90%) revealed good knowledge about pain management, with 92.8% agreeing that analgesia for continuous pain should be given, and 86.5% agreeing that analgesics for post-operative pain should initially be given.[23] However, a study conducted in Ethiopia by Fenta *et al*. with 292 nurses found that 74.7% of the nurses (n = 218) lacked the understanding and positive attitudes to manage pain.[13] The most commonly correctly answered questions in the previous study were "Parents are not required during painful procedures" and "Further doses of an opioid analgesic should be adjusted based on the patient's response after an initial dose is given."[13] In the current study, nurses disagreed with the statement that parents should encourage their children to experience as much pain as possible before using painkillers. When it comes to the frequency of pain experienced by children compared to adults, 17.4% of nurses agreed that children feel less pain than adults, and 56.9% agreed that, despite being in extreme pain, children may still be able to sleep. However, these findings were in support of earlier findings where the author revealed that it is increasingly evident that pain is made worse by sleep deprivation and poor sleep quality.[25] Therefore, nurses need to be aware and knowledgeable about various techniques for letting their patients fall asleep.[25]

Similarly, another study from Ghana revealed similar findings and concluded that 61.1% of nurses had an overall good knowledge of pain management, while 57.8% demonstrated good practices of pain management.[24] Another study revealed that 51% of nurses had insufficient knowledge about the evaluation of pain.[11] Therefore, it is recommended to identify the factors contributing to limited knowledge and address the barriers to pain management among healthcare professionals. This may not only help in increasing the knowledge and practice of healthcare providers and nurses but also lead to improved treatment outcomes. Literature has shown that barriers such as the unavailability of analgesic drugs, lack of training, assessment tools, continuous monitoring and evaluation, updated protocols, shortage of resources, and others hinder proper pain management.[26] In addition, 63.2% of the nurses agreed that pain is a vital sign in pediatric patients. Approximately 70% of the nurses agreed that repeated painful procedures increase their pain tolerance. Similar findings were reported in another study, where 81% of the nurses agreed that children with pain should be encouraged to endure as much pain as possible before resorting to a pain relief measure.[23] In this study, 53.8% of the nurses revealed that the choice of analgesic among pediatrics depends on the pain intensity of the child, while an earlier study showed that the choice of analgesics depends on effectiveness, safety/tolerability, ease of use, onset/duration of action, pain intensity, and contraindications/possibility of drug-drug interactions.[27] The age of the individual is another important factor while prescribing medications. For instance, in this study, 33.6% of the nurses said that the choice of analgesics depends on the age of the child. According to earlier literature, when prescribing analgesics for special populations like children, it's important to consider their age, weight, and the specific condition being treated.

For pain management among individuals and children, common analgesics include acetaminophen and ibuprofen, which are most often considered by healthcare professionals and are generally safe for use in children when dosed appropriately. The correct dosage of pain medications depends on the patient's age and body weight. Half of the nurses in the current study were found to know about the recommended dosage of paracetamol and agreed that 10–15 mg of paracetamol is the recommended dosage for children. Similar findings were reported in another study. For example, earlier literature suggested that the recommended dosages for oral paracetamol and ibuprofen in children are 10–15 mg/day and 5–10 mg/kg (maximum of 30 mg/kg/day in children ≤35 kg or 400 mg every 6 h in children >40 kg), respectively, according to clinical studies and guidelines.[28]

In this study majority of the nurses agreed that tramadol is not prescribed as an over-the-counter drug, suggesting the adequate of tramadol and its adverse effects. Since

the FDA has classified tramadol as a class IV controlled substance due to its potential for misuse and addiction.[29,30] In addition, due to the nature of its withdrawal symptoms when stopped only with a prescription from a physician, Tramadol is accessible.[30,31] Regarding contraindications, 63.6% of the nurses agreed that children under 3 months old should not be given paracetamol. Furthermore, 65.2% of nurses agreed that over-the-counter paracetamol should be avoided for children with asthma, and one-third of nurses agreed that paracetamol is not recommended for children with malnutrition. Although previous research indicates that most children can safely take paracetamol; however, the dosage should be smaller for children who are yet below the age of 2 months. Furthermore, it was found that paracetamol is contraindicated among children who have liver or kidney illness.[32] It can be used on children as early as 2 months for vaccination-related fever and as early as 3 months for fever and pain.[32,33] More efforts should be made to remove the obstacles that prevent the practice of pain management since it should be prioritized.[20,24]

Even though most drugs are commonly used among adults and even children without the consultation of healthcare providers, including painkillers, some patient populations, such as those with kidney disease, need to avoid taking painkillers.[20,34] Therefore, it is important to understand the knowledge of nurses in dealing with children in pain management, as nurses play a crucial role in following guidelines set by physicians for pain management in patient populations. Nurses typically assess and treat children's pain, ensuring that they receive appropriate treatment. Evaluating their knowledge of pain management can lead to better health outcomes. In addition, there is a need to introduce educational activities on both pharmacological and non-pharmacological pain management strategies. Implementing such activities in healthcare systems can help improve the knowledge and practice of pain management among nurses and other healthcare professionals.

Limitations

There are certain limitations to the current study. First, the findings were based on a self-administered online questionnaire, which could have increased the risk of biases such as social desirability bias or recall bias. Second, the findings were based on a specific hospital in a single region in Saudi Arabia, making them non-representative of nurses working in other regional hospitals and at international levels, and therefore not applicable to the entire nurse population. Despite these limitations, our research suggests that more emphasis should be placed on raising individual awareness of pain management and its strategies provided by nurse professionals to improve the health of everyone in the community.

CONCLUSION

Nurses have shown significant knowledge in pediatric pain management. There is a growing trend in using both pharmacological and non-pharmacological methods for pain management. Consequently, there is a need to enhance nurses' understanding to bridge the knowledge gap in pain management strategies. Our research could help explore the most effective and practical ways to increase nurses' awareness and knowledge of pain management. It is crucial to incorporate ongoing education on pain management and training modules. Integrating the pharmacology of pain into clinical practice will undoubtedly improve treatment outcomes, minimize adverse medication effects, and positively impact patient care in the future.

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Source of Support: Nil. **Conflicts of Interest:** None declared.