

# Managing patients' pain in the intensive care units

## Nurses' awareness of pain management

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### ABSTRACT

**الأهداف:** قيمت هذه الدراسة معرفة الممرضات ومواقفهم تجاه إدارة الألم في وحدات العناية المركزة في المملكة العربية السعودية.

**المنهجية:** تم إجراء دراسة ارتباطية مقطعية في خمسة مستشفيات تقع في منطقة القصيم بالمملكة العربية السعودية. جمعنا البيانات خلال الفترة من مايو ويوليو 2020م. قيمنا وعي الممرضين والممرضات بإدارة الألم من خلال أداة تقييم الوعي والتوجه لإدارة الألم للممرضين والممرضات المعروفة باسم (NKASRP). استخدمنا برنامج SPSS IBM® لتحليل البيانات. ومن ضمن العديد من الاختبارات الإحصائية تم إجراء اختبار ارتباط سبيرمان لتحديد الارتباطات المحتملة.

**النتائج:** كان متوسط درجة وعي ممرضات وحدات العناية المركزة بإدارة الألم 22.59؛ مما يشير إلى نقص المعرفة والسلوكيات الكافية تجاه إدارة الألم. وقد وجد الباحثون إرتباطات إيجابية بين عمر طاقم التمريض ومجموع سنوات الخبرة التمريضية السريرية مع الوعي بإدارة الألم. وعلى النقيض لم يُظهر جنس المشاركين، والدين، والتعليم، وسنوات الخبرة كممرضات في وحدة العناية المركزة أي ارتباط مع مستوى الوعي بإدارة الألم.

**الخلاصة:** إن معرفة إدارة الألم لدى المشاركين بهذه الدراسة لم يكن مرضياً وذلك بسبب العديد من الحواجز والعقبات. بناءاً على ذلك يجب عقد برامج تعليمية لتقييم وإدارة الألم بانتظام لجميع طاقم التمريض في منطقة القصيم، وخاصةً لأولئك الذين يعملون في وحدات العناية المركزة.

**Objectives:** To assess nurses' knowledge and attitudes toward pain management in intensive care units (ICUs) in Saudi Arabia.

**Methods:** A cross-sectional correlational study was carried out at 5 governmental hospitals in the Al-Qassim region (namely, Buraydah Central Hospital, King Fahad Specialist Hospital, Al Rass General Hospital, Bukariyah General Hospital, and Al Badaya General Hospital) using purposive sampling to collect data between May 2020 and July 2020. Nurses' awareness of pain management was assessed using the Nurses' Knowledge and Attitudes Survey Regarding Pain (NKASRP). Statistical Pacaksge for the Social Sciences software was used for data analysis. Descriptive statistics were employed. The Spearman's correlation test was carried out to determine correlations.

**Results:** The mean score for ICUs nurses' pain management awareness was 22.59, suggesting knowledge

and behaviors deficits toward pain management. Positive correlations were found between nurses' age, total years of clinical nursing experience, and their total score on pain management awareness. Nurses' gender, religion, education, and years of experience as ICU nurses showed no association with their scores on NKASRP.

**Conclusion:** Insufficient pain management knowledge and unacceptable attitudes were established among nurses owing to several barriers and obstacles. Pain assessment and management educational programs should be held regularly for all nurses in the Al-Qassim, Saudi Arabia, especially ICU nurses.

**Keywords:** pain, assessment, nurse, critical, management, awareness

*Saudi Med J* 2022; Vol. 43 (5): 514-521  
doi: 10.15537/smj.2022.43.5.20220169

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Received 26th February 2022. Accepted 14th April 2022.

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Ibn Sina was the first Muslim scholar to give a clear description of pain.<sup>1</sup> He assumed that physical alteration of an organ was the actual cause of pain, disregarding the role of tissue injury.<sup>1</sup> Interestingly, Ibn Sina's ancient depiction of pain was congruent with recent descriptions of pain. Raja et al<sup>2</sup> defined pain as an unpleasant feeling and undesirable experience associated with anxiety due to physiological changes in an organ and potential tissue injury. Conscious adults can express

pain in several ways. However, failure to express pain does not imply that they do not experience discomfort, such as in unconscious or neonatal patients.<sup>3</sup>

Despite huge advancements in various fields of medicine and improved understanding of pain etiology, patients still suffer from numerous kinds of pain that impair their physical, emotional, and spiritual health indicating that pain control remains a challenge.<sup>4</sup> Owing to its adverse health effects, pain relief is a major concern in patient care. Pain management requires nurses to have thorough expertise and effective knowledge to identify the extent of pain and evaluate its management.<sup>5</sup> Therefore, one of the main tasks of nurses is to assess and manage their pain.<sup>6</sup>

However, nurses may not have adequate pain control expertise and knowledge in different medical areas.<sup>7</sup> An insufficient awareness of pain management can lead to unethical procedures.<sup>8</sup> Additionally, patients' physical and mental health are adversely affected.<sup>9</sup> Furthermore, both patients and healthcare organizations might be adversely affected if the pain is not adequately controlled during the hospital stay.<sup>10</sup> Possible consequences include increased readmission, longer hospital stay, inconsistent health results, reduced patient satisfaction, and development of chronic pain syndromes.<sup>11,12</sup>

Pain is a common phenomenon among patients in the intensive care unit (ICU). The prevalence of extreme pain among medical and surgical patients admitted to the ICU is more than 80.0%.<sup>13</sup> Although pain management is one of the primary tasks of ICU nurses, their awareness and attitudes toward this task has not been earnestly investigated. Although some scholars established that several samples of nurses in Palestine, South Africa, and Spain had poor information and impoverished attitudes toward pain control in ICU units. Rababa et al<sup>14</sup> stated that such pain-related management among ICU nurses remains insufficiently researched. This has been extensively investigated among postoperative and general ward nurses.<sup>15,16</sup> The situation in Saudi Arabia is comparable; it has barely been investigated among nurses in the general wards. Recently, AL-Sayaghi et al<sup>17</sup> carried out a hospital-based study to determine the awareness and practice of nurses toward pain-related management among general nurses working in the biggest hospital in Al-Medinah al-Munawarah, Saudi Arabia. The findings of AL-Sayaghi et al<sup>17</sup> yielded that a

vast majority of nurses had inadequate knowledge and inappropriate attitudes for pain control. Therefore, our study assessed such knowledge and awareness on ICU nurses to bridge the gap in the literature and enable them to adequately diagnose and manage pain, especially for vulnerable critically ill patients. Additionally, we aimed to investigate the presence of associations when ICU nurses' demographic profiles are considered.

**Methods.** A cross-sectional, correlational design was used in this study carried out at the ICUs of 5 governmental hospitals (namely, Buraydah Central Hospital, King Fahad Specialist Hospital, Al Rass General Hospital, Bukariyah General Hospital, and Al Badaya General Hospital), Al-Qassim provenance, Saudi Arabia, between May 2020 and July 2020. The cross-sectional design was chosen because it is particularly suitable for representing, at a fixed point, the existence of phenomena or relationships among phenomena. The Strengthening the Reporting of Observational studies in Epidemiology Guidelines were followed in presenting this study.

A purposive sampling approach was used to recruit participants according to the eligibility criteria. We included independent bedside ICU nurses with a minimum of 2 years of clinical experience. Nursing managers, supervisors, clinical instructors, and other nurses who were primarily engaged in non-clinical duties were excluded to minimize the impact of non-clinical duties on nurses' responses.

An online sample size calculator was used to estimate the number of respondents required in our sample to be statistically adequate.<sup>18</sup> In this study, the total population included 253 ICU nurses available at the study setting. The total population was entered into Raosoft<sup>®</sup> calculator with 5% margin of error and 95% confidence level. The calculations revealed that a sample of 153 respondents were adequate. Therefore, purposive sampling technique was used to recruit all available ICU nurses in the study settings. The survey link was sent to all ICU nurses (N=253). Of these, 218 nurses responded; representing a response rate of 86.2%.

A self-report questionnaire was used to collect data. The questionnaire included 2 sections. The first section inquired socio-demographic information. The second section included the Nursing Knowledge and Attitudes Survey Regarding Pain (NKASRP) questionnaire developed by Ferrel and McCaffery.<sup>19</sup> Currently, it is one of the most commonly used instruments for assessing nurses' knowledge and attitudes toward pain management. The NKASRP is a 39-item instrument including 2 case studies. It comprises 21 true or false

**Disclosure.** This study received funding from the Deanship of Scientific Research, College of Nursing Research Center at King Saud University, Riyadh, Saudi Arabia.

questions, 16 multiple-choice questions, and 2 case studies containing 2 questions, resulting in 41 points with one point per correct response. However, a target of 80.0% (28 correct answers) was determined as a bare minimum for indicating an adequate knowledge and attitudes regarding pain management among nurses.<sup>11,19</sup>

Concerning the psychometric appraisal, NKASRP's construct validity was ascertained by its developers, Ferrel and McCaffery.<sup>19</sup> Its reliability has been ascertained previously using test-retest reliability and the Spearman-Brown prediction formula as a measure of internal consistency reliability; both measures yielded acceptable reliability.<sup>11,19</sup> In this study, the internal consistency of the NKASRP using the Spearman-Brown prophecy was 0.82, indicating good reliability.<sup>21</sup> As a disclaimer, the original authors of the instrument allowed the free use of the tool with the condition of mentioning appropriate citations.

An online survey was the only alternative due to the unfortunate circumstances of the COVID-19 pandemic. The researcher translated the survey into an online, self-administered questionnaire. Each hospital was consulted and arrangements were made with the ICU head nurses. WhatsApp groups and zoom meetings were used to guide the study. Each ICU head nurse shared the link to the questionnaire with his/her staff using a weekly reminder. Data were collected over 3 months between May 2020 and July 2020.

All researchers have completed a "Protecting Human Research Participants" accredited National Institute of Health web-based training course. The Institutional Review Board of the Saudi Ministry of Health (MOH) approved this study (reference number: H-04-Q-001). As a new policy of the Saudi MOH, the researcher also received permission to collect data from each hospital involved in this study. The voluntary nature of participation in this study was communicated to the nurses. Their written informed consents were obtained as a condition to login to the questionnaires. Personal information was not included in the questionnaire to ensure confidentiality. The participants were informed that they had the freedom to withdraw from the study at any stage without consequences. They were also explained that the data would be stored electronically on the cloud with a password and would not be used for any other purpose, except for the current research. Additionally, this study was carried out according to the ethical norms of the Declaration of Helsinki.

**Statistical analysis.** Statistical Package for the Social Sciences, version 25.0 was used for data analysis. Descriptive analyses were carried out for demographic variables. Specifically, the mean, standard deviation (SD), and range were calculated for the continuous

variables, including age, total years of clinical nursing experience, and years of experience as an ICU nurse. Additionally, the mean and SD were calculated for the total NKASRP scores. Frequency and percentage were calculated for gender, religion, nationality, and educational level. Frequency counts and percentages were calculated to identify the percentage of respondents who provided the correct answer for each item in the survey. Spearman's product-moment correlation coefficient (*r*s) was used to examine the association between total NKASRP scores and the respondents' background characteristics.

**Results.** Table 1 presents the participants' demographic profiles. Participants' age ranged from 25-56 years, with a mean of 33.40±6.88 years. More than two-thirds of the participants were female (87.6%), and more than half of them were Christian (55.5%). The participants were fairly distributed across 3 nationalities, with Indians nurses as the largest proportion of the sample (45.4%), followed by Filipino nurses (31.7%), and Saudi nurses (22.9%). Concerning the contextual variables, majority of the participants had a Bachelor degree in nursing (73.4%), while only 17.4% had finished diploma in nursing and 9.2% graduated from programs in nursing. The mean total years of experience as a nurse was 10.08±6.47 years (range: 1.00-32.00) and as an ICU nurse was 4.66±4.18 years (range: 1.00-25.00).

**Table 1** - Respondents' background characteristics variables (N=218).

Variable	n (%)
Age, mean±SD (range)	33.40±6.88 (25-56)
<b>Gender</b>	
Female	191 (87.6)
Male	27 (12.4)
<b>Religion</b>	
Islam	75 (34.4)
Christianity	121 (55.5)
Hinduism	22 (10.1)
<b>Nationality</b>	
Saudi	50 (22.9)
Filipino	69 (31.7)
Indian	99 (45.4)
<b>Education</b>	
Diploma	38 (17.4)
Bachelor	160 (73.4)
Graduate	20 (9.2)
Total years of clinical nursing experience	10.08±6.47 (1.00-32.00)
Years of experience as an ICU nurse	4.66±4.18 (0.60-25.00)

Values are presented as a number and (%). SD: standard deviation, ICU: intensive care unit

The mean score of the participants on the NKASRP was  $22.59 \pm 7.37$ , representing 55.1% of the possible total score of 41.00 and indicating a low level of knowledge and attitude toward pain management among nurses.

There were 120 (55.0%) respondents who scored 28 and above points. **Table 2** presents the percentage of correct and incorrect answers for each item. The range of the percentage of correct responses was 27.1-91.3%. Three (items 14, 20, and 22) of the true-or false-type questions were answered correctly by 91.3% of the sample. Additionally, item 21 received the second highest percentage of correct responses (87.6%), followed by items 7 (85.3%), item 19 (73.4%), and item 13 which was correctly answered 70.2% of the

sample. Contrarily, item one (vital signs are always reliable indicators of the intensity of a patient's pain) was answered correctly by the lowest percentage of participants (27.1%).

For the multiple choice questions, the percentage of correct answers ranged from 28.9-82.1%. The highest correct answer percentage (82.1%) was recorded on item 24 (the recommended route of administration of opioid analgesics for patients with brief, severe pain of sudden onset such as trauma or postoperative pain), followed by items 25 (80.7%), item 27 (72.0%), and item 34 with correct answer percentages of 71.6%. While item 28, which asked regarding the "likelihood of the patient developing clinically significant respiratory

**Table 2 -** Descriptive results of nurses' knowledge and attitudes survey regarding pain (N=218). (to be continued)

Items	Correct response	Incorrect response
<i>Section one: true or false questions</i>		
1. Vital signs are always reliable indicators of the intensity of a patient's pain. <sup>‡</sup>	59 (27.1)	159 (72.9)
2. Because their nervous system is underdeveloped, children under 2 years of age have decreased pain sensitivity and limited memory of painful experiences. <sup>‡</sup>	128 (48.7)	90 (51.3)
3. Patients who can be distracted from pain usually do not have severe pain. <sup>‡</sup>	99 (45.4)	119 (54.6)
4. Patients may sleep in spite of severe pain. <sup>†</sup>	76 (34.9)	142 (65.1)
5. Aspirin and other nonsteroidal anti-inflammatory agents are not effective analgesics for painful bone metastases. <sup>‡</sup>	96 (44.0)	122 (56.0)
6. Respiratory depression rarely occurs in patients who have been receiving stable doses of opioids over a period of months. <sup>†</sup>	148 (67.9)	70 (32.1)
7. Combining analgesics that work by different mechanisms (namely, combining an NSAID with an opioid) may result in better pain control with fewer side effects than using a single analgesic agent. <sup>‡</sup>	186 (85.3)	32 (14.7)
8. The usual duration of analgesia of 1-2 mg morphine IV is 4-5 hours. <sup>‡</sup>	88 (40.4)	130 (59.6)
9. Opioids should not be used in patients with a history of substance abuse. <sup>‡</sup>	74 (33.9)	144 (66.1)
10. Elderly patients cannot tolerate opioids for pain relief. <sup>‡</sup>	129 (59.2)	89 (40.8)
11. Patients should be encouraged to endure as much pain as possible before using an opioid. <sup>‡</sup>	110 (50.5)	108 (49.5)
12. Children less than 11 years old cannot reliably report pain so clinicians should rely solely on the parent's assessment of the child's pain intensity. <sup>‡</sup>	110 (50.5)	108 (49.5)
13. Patients' spiritual beliefs may lead them to think pain and suffering are necessary. <sup>†</sup>	153 (70.2)	65 (29.8)
14. After an initial dose of opioid analgesic is given, subsequent doses should be adjusted in accordance with the individual patient's response. <sup>†</sup>	199 (91.3)	19 (8.7)
15. Giving patients sterile water by injection (placebo) is a useful test to determine if the pain is real. <sup>‡</sup>	77 (35.3)	141 (64.7)
16. Vicodin (hydrocodone 5 mg + acetaminophen 300 mg) PO is approximately equal to 5-10 mg of morphine PO. <sup>†</sup>	139 (63.8)	79 (36.2)
17. 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. <sup>‡</sup>	68 (31.2)	150 (68.8)
18. Anticonvulsant drugs such as gabapentin (neurontin) produce optimal pain relief after a single dose. <sup>‡</sup>	115 (52.8)	103 (47.2)
19. Benzodiazepines are not effective pain relievers and are rarely recommended as part of an analgesic regiment. <sup>†</sup>	160 (73.4)	58 (26.6)
20. 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. <sup>‡</sup>	199 (91.3)	19 (8.7)
21. The term 'equianalgesia' means approximately equal analgesia and is used when referring to the doses of various analgesics that provide approximately the same amount of pain relief. <sup>†</sup>	191 (87.6)	27 (12.4)
22. Sedation assessment is recommended during opioid pain management because excessive sedation precedes opioid-induced respiratory depression. <sup>†</sup>	199 (91.3)	19 (8.7)

Values are presented as a number and (%). <sup>‡</sup>The right answer is wrong, <sup>†</sup>the right answer is true, ( ): parentheses contain the right answer, NSAID: non-steroidal anti-inflammatory drugs, mg: milligram, PRN: pro re nata

depression in the absence of new comorbidity,” received the lowest percentage of correct responses (28.9%). In the case studies, the majority of the nurses answered the 4 questions incorrectly. Approximately 72.0% of the participants noted incorrect pain levels of the patients in case 1 and 57.3% of the participants in case 2. Similarly, 86.2% of the participants answered incorrectly on the subsequent action they should take on the second scenario of case 1 and 73.4% of case 2.

To investigate the association between ICU nurses' total NKASRP knowledge scores and their background characteristics, Spearman's correlation test was employed because of categorical variables and the non-normal nature of our data. **Table 3** shows a weak positive correlation between nurses' total NKASRP scores and age. Similarly, another weak positive correlation existed between the total years of experience as a nurse and nurses' total NKASRP score. However, no significant associations were found between scores on NKASRP

**Table 2 -** Descriptive results of nurses' knowledge and attitudes survey regarding pain (N=218).

Items	Correct response	Incorrect response
<i>Section 2: multiple choice questions</i>		
23. The recommended route of administration of opioid analgesics for patients with persistent cancer-related pain is: (oral)	68 (31.2)	150 (68.8)
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)	179 (82.1)	39 (17.9)
25. Which of the following analgesic medications is considered the drug of choice for the treatment of prolonged moderate to severe pain for cancer patients? (morphine)	176 (80.7)	42 (19.3)
26. A 30 mg dose of oral morphine is approximately equivalent to: (morphine 10 mg IV)	113 (51.8)	105 (48.2)
27. Analgesics for post-operative pain should initially be given: (around the clock on a fixed schedule)	157 (72.0)	61 (28.0)
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%)	63 (28.9)	155 (71.1)
29. The most likely reason a patient with pain would request increased doses of pain medication is: (the patient is experiencing increased pain)	139 (63.8)	79 (36.2)
30. Which of the following is useful for treatment of cancer pain? (all of the above)	129 (59.2)	89 (40.8)
31. The most accurate judge of the intensity of the patient's pain is: (the patient)	147 (67.4)	71 (32.6)
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)	132 (60.6)	86 (39.4)
33. How likely is it that patients who develop pain already have an alcohol or drug abuse problem? (5-15%)	90 (41.3)	128 (58.7)
34. The time to peak effect for morphine given IV is: (15 minutes)	156 (71.6)	62 (28.4)
35. The time to peak effect for morphine given orally is: (1-2 hours)	124 (56.9)	94 (43.1)
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)	90 (41.3)	128 (58.7)
37. Which statement is true regarding opioid induced respiratory depression: (obstructive sleep apnea is an important risk factor)	117 (53.7)	101 (46.3)
<i>Section 3: case studies</i>		
38.1. 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)	61 (28.0)	157 (72.0)
38.2. Your assessment, above, 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 q1h PRN pain relief." Check the action you will take at this time. (Administer morphine 3 mg IV now)	30 (13.8)	188 (86.2)
39.1. 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)	93 (42.7)	125 (57.3)
39.2. Your assessment, above, 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 q1h PRN pain relief." Check the action you will take at this time. (Administer morphine 3 mg IV now)	58 (26.6)	160 (73.4)
Values are presented as a number and (%). †The right answer is wrong, ‡the right answer is true, ( ): parentheses contain the right answer, NSAID: non-steroidal anti-inflammatory drugs, mg: milligram, PRN: pro re nata		

and nurses' gender, religion, nationality, education level, and total years of experience as an ICU nurse.

**Discussion.** Sufficient pain management and relief are the primary needs of patients and fulfill the core strategic aim of hospitals. Sufficient nurses' awareness and proper attitudes for pain control are crucial for optimal nursing care and performance in critical units. Hence, it makes sense to appraise such knowledge and skills among ICU nurses for ensuring providing a professional healthcare. Our findings suggest that nurses who served in the ICUs of governmental hospitals in Al-Qassim, Saudi Arabia, had poor awareness and impoverished attitudes toward pain management. These findings highlight that nurses' efforts in the ICU settings are devoted to emergencies and documentation, which places pain management on a lower priority.

In comparison, our findings were congruent with those of previous studies carried out over ICU nurses.<sup>9,22,23</sup> For instance, Issa et al<sup>9</sup> assessed the knowledge-related pain management among the King Saud Medical City, Riyadh, Saudi Arabia, ICU nurses. The results of Issa et al<sup>9</sup> indicated that such nurses lacked sufficient knowledge for assessing and managing pain among critical patients. The international situation is comparable; these national unfavorable results were in keep with those of Taínta et al<sup>21</sup> who reported that the awareness level of pain-related management among Spanish ICU nurses was very low. Likewise, an empirical evidence comes from South Africa showed that ICU nurses lacked adequate knowledge and attitudes to provide an optimal pain management for patients in ICUs.<sup>22</sup> Despite that high-dependency units nurses care for less critical patients than those in ICUs, their knowledge-related pain management was also poor.<sup>23</sup> However, these studies indicated that the absence of

clear pain management policies within their medical institutions underpin the reported poor knowledge and impoverished attitudes for pain management.<sup>9,21,22</sup> This assumption supported the claim of Lim et al<sup>24</sup> which stated that many countries have failed to create their own pain management policy within their medical organizations across the world, including Saudi Arabia.

In terms of associations, our findings showed that nurses' age positively correlated with their scores on NKASRP; indicating that as a nurse age increases, her/his knowledge and awareness toward pain management considerably improves. These results were consistent with those of Shoqirat et al<sup>26</sup> who affirmed a positive association between nurses' age and their scores on NKASRP. Additionally, our results indicated that nurses' experience in clinical nursing was correlated with their scores on NKASRP; indicating the role of clinical experience in improving nurses' knowledge and awareness for pain control. These findings have been reported previously.<sup>25,26</sup> Jaleta et al<sup>26</sup> affirmed such associations among postoperative staff nurses-older nurses with extensive clinical nursing experience scored higher scores on NKASRP than those scored by junior nurse staff. Likewise, these findings were reported also with Jordanian postoperative nurses and among Zimbabwean medical ward nurses.<sup>25,27</sup>

Indeed, scholars stated that lack of sufficient knowledge and abilities for pain management among nurses stemmed from several barriers and obstacles.<sup>14</sup> These barriers can be categorized according to their causes within healthcare organization into several categories, including systems/organizations, nurses, physicians, and patients. The absence of consistent pain assessment instruments for both verbal and nonverbal critically ill patients, the absence of pain control guidelines and protocols, and inadequate nurse-to-patient ratios were the most reported barriers associated with the system.<sup>28-31</sup> Nurse-related obstacles for effective pain relief included poor awareness and improper practice of both pain assessment tools and pharmacological pain management.<sup>7,32,33</sup> Inconsistent interactions between ICU nurses and physicians when prescribing analgesics have been frequently reported as a physician-related barrier.<sup>33</sup>

To remove barriers and enhance awareness toward pain management among nurses, education is one of the most effective facilitators. Pain assessment and management for critically ill patients should be introduced as a core topic in the nursing curriculum and as a criterion for recruiting nurses to the ICU settings. Educational programs on pain management must be placed on high priority and held regularly for all staff nurses. Additionally, providing a work

**Table 3 -** Results of relationships between nurses' knowledge and attitudes survey regarding pain total score and the background characteristics (N=218).

Variable	NKASRP total score	
	r	P-value
Age	0.15	0.029*
Gender	0.18	0.52
Religion	0.62	0.09
Nationality	0.03	0.40
Education	0.09	0.12
Total years of experience as a nurse	0.14	0.047*
Years of experience as ICU nurse	-0.01	0.861

\*Significant at  $p \leq 0.05$  level, r: Spearman correlation coefficient, NKASRP: nurses' knowledge and attitudes survey regarding pain

environment that promotes pain control and prioritizes it is no less important in the ICU settings. Furthermore, documentation of pain assessment is crucial for ensuring proper practice of quality pain management, as it improves the communication between interdisciplinary teams and results in consistent pain management.

However, our findings could help policymakers and nurse leaders develop well-structured continuous educational programs for staff nurses. These programs should contain different learning approaches for proper pain assessment, documentation, and communication of the findings to physicians. Additionally, our findings might be helpful in developing effective pain assessment tools for both verbal and nonverbal critically ill patients.

**Study limitations.** First, this study was carried out in one of the 13 regions of Saudi Arabia, with a conveniently selected sample, which limited the representation of the ICU nurses' population. Hence, these findings cannot be generalized and it is encouraged for future studies to involve larger and diverse samples. Second, we gathered the required data using a self-report survey which maximize the bias potentiality. Thus, future studies with different methodologies are recommended to ensure an in-depth understanding of nurses' awareness of pain management.

In conclusion, optimal pain management for critically ill patients is a primary task of ICU nurses. This task relies heavily on nurses' knowledge of and attitudes toward pain control. Insufficient pain management knowledge and unacceptable attitudes were found among nurses due to several barriers and obstacles. Pain assessment and management educational programs should be held regularly for all nurses in the Al-Qassim, Saudi Arabia, especially ICU nurses. In an academic setting, pain assessment and control should be integrated into the nursing curriculum. Proper pain assessment and management would contribute to various positive patient outcomes and meet organizational goals. Hence, it can be used as a criterion to recruit critical care nurses.

**Acknowledgment.** The authors gratefully acknowledge the Deanship of Scientific Research, College of Nursing Research Center, King Saud University, Riyadh, Saudi Arabia. The authors also would like to thank Editage (<https://www.editage.com/>) for English language editing.

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