Nurses' assessment and management practices of pain among intensive care patients in King Khalid Hospital, Kharj, Riyadh

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ABSTRACT

Background: Pain is a disagreeable combination of sensory and emotional sensations. Employing behavioral pain assessment tools is strongly associated with improved identification of pain.

Purpose: The main purpose of the study is to investigate Nurses' Assessment and Management Practices of Pain among Intensive Care Patients in King Khalid Hospital, Kharj, Riyadh.

Materials and methods: A self-administered questionnaire was employed in a descriptive cross-sectional study. The study focused on nurses employed in the intensive care unit at King Khalid Hospital in Al-Kharj Province. The researchers utilized convenience sampling to recruit participants. Out of the total 48 nurses approached 45 of them provided responses, leading to a response rate of 94%. The Critically Ill questionnaire was utilized to gather information regarding the treatment and evaluation of pain in patients who were in critical condition. Descriptive statistics and inferential statistics were employed to analyze the collected data.

Principal results: it was found that 88% of them utilized instruments to evaluate pain in patients who could express themselves. Among these instruments, the numeric rating scale was the most commonly employed. Furthermore, 77% of the nurses (35 in total) used a pain assessment tool for patients who were unable to communicate, with the Adult Nonverbal Pain Scale being the most frequently used tool in this case. The nurses' perception of the significance of pain assessment was positively associated with the regular utilization of pain assessment tools. Additionally, the nurses considered the use of pain assessment tools with patients who could communicate as more important compared to using such tools with patients who could not communicate.

Conclusions: Most ICU nurses utilized nurses' pain assessment instruments to assess the discomfort levels of both patients who could communicate and those who couldn't express themselves effectively. By employing such tools, nurses can improve patient outcomes, ensure effective pain management, and demonstrate a high standard of professional care.

1. Introduction

Critically ill patients are prone to experiencing pain. It is a type of distressing experience that involves potential or actual tissue damage [1]. It can be caused by various factors such as exposure to toxic chemicals, sensory deprivation, and cognitive and emotional issues. Patients in intensive care units or medical facilities often experience pain at rest [2].

According to the International Association for the Study of Pain (IASP), pain is defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage. This definition emphasizes that pain is not merely a physical sensation but also includes emotional and cognitive components [3].

The bio-psycho-social model of pain recognizes that pain is a complex phenomenon that involves biological, psychological, and social factors. Here's a breakdown of each dimension: The biological dimension of pain refers to the physiological processes and mechanisms involved in pain perception [4,5].

It includes nociception, which is the detection of noxious stimuli by specialized nerve fibers called nociceptors. Nociceptors

transmit signals to the brain, where the pain is ultimately perceived. Biological factors such as tissue damage, inflammation, and nerve sensitization play a crucial role in pain. The psychological dimension of pain encompasses the cognitive, emotional, and behavioral aspects of pain [4,5].

Pain perception can be influenced by cognitive factors such as attention, expectation, and interpretation of pain signals. Emotional factors like fear, anxiety, and depression can amplify pain perception and impact pain tolerance. Additionally, psychological factors such as coping mechanisms, beliefs, and attitudes towards pain can shape the individual's experience and response to pain [4,5].

The social dimension of pain recognizes the impact of social and cultural factors on pain experiences and management. Social factors can include family dynamics, social support systems, cultural beliefs about pain, and societal attitudes towards pain. Social interactions and the response of healthcare providers, family, and friends can influence the individual's perception, expression, and management of pain. Societal factors also play a role in access to healthcare, pain education, and the stigma surrounding pain conditions [3,6].

The bio-psycho-social model highlights the interconnectedness of these dimensions, acknowledging that pain is not solely determined by physical factors but is also influenced by psychological and social factors. This holistic approach is important in understanding and managing pain comprehensively, taking into account the individual's unique experiences, beliefs, and social context [6,7].

Many critically ill patients, including those who survived, experienced severe pain during their stay in the ICU [8] In spite of a common symptom in these patients, it is not always possible to determine how to treat it properly. The Society for Critical Care Medicine suggests that pain should be regularly monitored in adults in the intensive care unit [2].

A systematic approach to pain assessment using validated behavioral pain instruments leads to effective pain management and accurate pain recording. Furthermore, pain assessment had a positive effect on the length of ventilator use and length of stay in the ICU, improved pain perception, decreased pain intensity and frequency, analgesic use, and mortality, and result in fewer complications [1,9].

Several valid observational tools are available for assessing pain in critically ill patients. These tools include the Behavioral Pain Scale (BPS), Critical-Care Pain Observation Tool (CPOT), Behavioral Pain Scale for Non-Intubated Patients (BPS–NI), Non-Verbal Pain Scale (NVPS), Pain Assessment in Advanced Dementia (PAINAD) Scale, and Critical Care Infant Pain Profile (CCIPP) [7].

These tools assess different behavioral indicators such as facial expression, body movements, and compliance with care to estimate pain intensity. They provide healthcare professionals with a structured approach to pain assessment in patients who cannot communicate effectively. The choice of tool depends on the patient population and clinical context [7].

On the other hand, The non-verbal expressions of people in pain can be explained by various theoretical frameworks. These frameworks include the Facial Action Coding System (FACS), the evolutionary perspective, the social communication theory, the Gate Control Theory, and cognitive-behavioral models. FACS provides a standardized way to analyze facial expressions associated with pain. The evolutionary perspective suggests that non-verbal pain expressions have adaptive functions [10,11].

Social communication theory highlights how non-verbal cues elicit support from others. The Gate Control Theory proposes that non-verbal expressions reflect the activation of pain pathways. Cognitive-behavioral models emphasize the influence of beliefs and coping strategies on pain behaviors. Integrating these frameworks enhances our understanding of non-verbal pain expression [10,11].

Addressing the self-report of pain in critically ill patients can be challenging due to their limited ability to communicate effectively. However, there are strategies and considerations that can help in the treatment of pain within this context: Since self-reporting may not be possible, healthcare providers need to explore alternative methods of communication. This can include using visual aids, pictures, or simple yes/no questions to gather information about pain levels or discomfort [12,13].

Additionally, family members or caregivers who are familiar with the patient's pain cues can provide valuable input. Validated observational tools, as mentioned earlier, can be utilized to assess pain in critically ill patients. These tools focus on non-verbal cues such as facial expressions, body movements, or physiological indicators to estimate pain intensity. Regular monitoring and documentation of these cues can help guide pain management strategies [12,13].

Given the complexity of pain, a multimodal approach to pain management is often recommended. This involves using a combination of pharmacological interventions (e.g., analgesics) and non-pharmacological strategies (e.g., positioning, relaxation techniques) to address pain. Regular reassessment and adjustment of the treatment plan based on observed responses are essential. Recognizing that pain experiences and responses vary between individuals, it is important to tailor the pain management approach to each patient's specific needs [12,13].

Considering factors such as the patient's medical condition, cultural background, and previous pain experiences can help guide the treatment plan and optimize pain relief. Pain management in critically ill patients requires a multidisciplinary approach involving healthcare professionals, including physicians, nurses, pharmacists, and pain specialists. Collaborative discussions and regular communication within the team can help ensure a comprehensive and holistic approach to pain treatment [12,13].

Pain management should be an ongoing process with frequent reassessment and evaluation of treatment effectiveness. Regular communication with the patient's healthcare team, patient observation, and adjustment of the pain management plan based on feedback and changing circumstances are crucial. Providing information and education to patients and their families about pain management strategies, including non-verbal cues and communication alternatives, can enhance their understanding and involvement in the process [14,15].

This empowers them to actively participate in advocating for optimal pain management. By employing these strategies, healthcare providers can address the self-report of pain in critically ill patients, ensuring that pain is appropriately assessed and managed despite the challenges of communication [14,15].

Recommendations, guidelines, and validated pain assessment tools are available, but they are inconsistent or not implemented in

clinical practice [12]. Nurses reported that frequent assessment and documentation of pain was equally important for communicative and noncommunicative patients, but not for communicative and noncommunicative patients. Reported that they were less likely to use behavioral pain assessment tools [16] Self-report is the gold standard for measuring pain. However, if a person is unable to communicate verbally, they may be in pain and may require pain management [5,12].

In the ICU, numerous patients can't express their requirements for different reasons, for example, being on a ventilator or on the grounds that their basic condition has modified their condition of cognizance [17,18]. Medical caretakers' familiarity with pain appraisal rules and the accessibility of agony evaluation devices impact attendants' ability in surveying torment in patients who can't convey [19].

The utilization of legitimate and dependable agony appraisal devices works on medical attendants' capacity to assess pain in patients who can't convey it, which in this manner works with proper pain relieving the board [17]. At the point when a patient can't convey, conduct descriptors are utilized to show the presence of agony. The social descriptors most regularly used to depict the presence of agony are frowning, jerking, and fomentation [17].

Physiological indicators such as vital signs can indicate the presence of pain. However, they can be influenced by many other factors rather than specific pain [4,20,21]. Many barriers make it difficult for nurses to assess pain in critically ill patients who cannot communicate. Lack of knowledge and training regarding pain assessment and management was cited by nurses as an important barrier [22,23].

Hemodynamic instability, nurses' workload, and patients' lack of communication skills also often affect nurses' ability to assess and manage pain in ICUs [24]. Some studies have shown that nurses' clinical experience, area of clinical practice, nurses' level of education, level of clinical competency, and hospital accreditation can influence nurses' practices in pain assessment and management [22,24,25].

Barely any examinations have been led in the Realm of Saudi Arabia to evaluate medical attendants' information and mentalities with respect to pain appraisal. Al-Sayaghi et al. (2022) saw that 70% of medical caretakers had an unfortunate degree of information and perspectives. A review at Hail College, Saudi Arabia uncovered that nursing understudies were found to have an absence of information and perspectives toward pain assessment and management [26]. Nuseir and Almomani (2016) revealed deficient information about nurses' pain assessment and its management among medical care suppliers. Curiously, attendants had the most minimal score on information on pain appraisal and its management among medical services suppliers [27].

A structured pain assessment is a vital component of effective pain management, but it does not always translate into consistent implementation in practice. This study aims to provide a detailed description of the various methods used by ICU nurses for the assessment of pain in non-communicable and communicable patients [28]. The findings of this study could help improve the quality of care for critically ill patients by helping develop effective interventions for the management of pain. The study was conducted on the use of various pain assessment techniques in an intensive care unit.

The study's objectives were to describe the current practices of nurses in assessing pain in critically ill patients, as well as to examine the behavioral indicators of pain that are commonly used by the nurses in the ICU. Lastly, to analyze the relationship between the practices of nurses and the demographic characteristics of their patients.

2. Materials and Methods

2.1. Design and settings

The process of assessing pain in critically ill patients by intensive care unit nurses was investigated using a descriptive cross-sectional approach. The setting of this study was implemented at King Khalid Hospital, Kharj, Riyadh. The hospital has the highest quality and best medical departments available to patients in different specialties. The hospital has a radiology department, a dental department, and a social services department, which in turn provides all social services to patients and beneficiaries. It also has a special department for working with medical endoscopes and the intensive care unit, which is one of the most important departments of the hospital and to which the hospital pays great attention.

2.2. Population, sample and sampling

The target population of this study was all nurses working in the adult intensive care unit (ICU). For this study, the total number of nurses in the ICU was selected as the target population. The sample was drawn using purposive random sampling [29]. All nurses working in the ICU who are willing to participate in the study are invited to participate in the study. Inclusion criteria include: Being a registered nurse working in the ICU for at least three months, having cared for at least one patient who is unable to communicate and can read and write English.

2.3. Data collection procedure

After obtaining the necessary approvals, Researcher contacted the selected hospitals and obtained permission to collect data from nurses working in intensive care units (ICUs). The researcher visited the hospital's intensive care unit to meet nurses, explain the purpose of the study and data collection procedures, and invite them to participate in the study.

Data was collected through a self-administered questionnaire. The questionnaire consists of two parts. The first part includes a cover letter stating the research objectives and participants' rights. The second section contains a self-administered questionnaire.

Nurses were instructed to submit complete questionnaires provided by the researcher. Nurses had the choice of giving the questionnaire to the researcher or to their head nurse. Nurses were assured that their participation in the study was voluntary and would not influence performance assessments.

When filling out a questionnaire, the process of ticking involved the following steps: Read the question and began by reading the question or statement carefully to ensure understood what it was asking and took note of any instructions or specific requirements. Identified response options provided for the question. These options were in the form of checkboxes, circles, or squares that could be marked. Chose the appropriate response based on the question and selected the response option that best aligned with participants' thoughts or experiences. Selection should be a single option or multiple options depending on the question type. After ticking the appropriate option, the participant moved on to the next question and repeated the process until had answered all the questions in the questionnaire. It was important to be accurate and consistent when ticking the questionnaire to ensure that responses were recorded correctly. If made a mistake or wanted to change an answer, questionnaires were allowed to erase or cross out the previous selection and indicate the new choice clearly. It's important to note that questionnaires may vary in format and design, but the general process of ticking remains consistent. Following the provided instructions and paying attention to the details helps ensure that answers are properly recorded.

2.4. Ethical considerations

Permission was obtained from the author of the instrument to adopt and use it in the study. Ethical approval was obtained from the Standing Committee of Bioethics at the Deanship of Scientific Research (SCBR-035-2022), where the researcher works. Further ethical approval was obtained from the selected hospital before collecting the data.

In addition to being informed about their participation, each nurse was also required to provide written consent. The data collected during the study were protected from unauthorized access. The questionnaires and other materials related to the study were coded with numbers.

3. Questionnaire description

3.1. Demographic data

Demographic data such as years of ICU experience, highest education level, employment status, shift rotation, ICU experience, age, and gender were collected by demographic questionnaire.

3.2. Pain assessment practices for critically ill patients

In this study, pain assessment and treatment for critically ill patient investigation were used to describe caregiver pain assessment practices in critically ill patients. A questionnaire was tested for clarity, content adequacy, and completeness by 10 experts in pain, critical care, and questionnaire methodology [30].

This questionnaire included items evaluating practices for assessing perceived pain in patients who could and could not self-report pain. Items included information about who provided the most accurate assessment of pain assessment, use of pain assessment tools, frequency of use of pain assessment tools, the importance of pain assessment tools, frequency of pain assessment and documentation, and frequent pain assessment. It included the importance of evaluation and documentation. The questionnaire also included questions about the frequency of use of various pain assessment tools. The questionnaire included a list of 25 behaviors included in 7 behavioral pain assessment tools.

The inclusion of a list of 25 behaviors in the questionnaire encompassing 7 behavioral pain assessment tools serves several purposes: The list of behaviors provides a comprehensive range of indicators that can be used to assess pain in critically ill patients. Different patients may exhibit pain in various ways, and by including a wide array of behaviors, the questionnaire aims to capture the diverse manifestations of pain. The use of multiple behavioral pain assessment tools indicates an intention to standardize pain assessment practices. Each tool may have its own set of behaviors or indicators for pain assessment [31]. By including behaviors from multiple tools, the questionnaire aims to ensure a comprehensive and standardized approach to pain assessment. The questionnaire may be designed to compare and evaluate the effectiveness and reliability of different behavioral pain assessment tools. By including behaviors from various tools, researchers can compare the consistency and validity of each tool in assessing pain in critically ill patients [32]. This information can be valuable in determining the most appropriate tool for specific patient populations or clinical settings. By analyzing the overlap or consistency of behaviors across different tools, the questionnaire can identify common indicators that are universally recognized as indicative of pain. This can help in simplifying pain assessment processes and creating a unified approach to nurses' pain assessment [33]. Overall, the inclusion of a list of 25 behaviors from 7 behavioral pain assessment tools in the questionnaire allows for a comprehensive evaluation of pain in critically ill patients, facilitates standardization, enables comparison among different tools, and may contribute to the development of improved pain assessment practices.

During the final evaluation, strong internal reliability (Cronbach's α, 0.85; 95% confidence interval), and moderately strong validity (concordance coefficient, 0.70; 95% confidence interval) were achieved.

The nurse was asked to rate her/his frequency of using these behaviors on a scale from never to routinely. Nurses undergo comprehensive training to effectively utilize self-report and observational assessment tools in their practice. Training programs focus on equipping nurses with the necessary knowledge and skills to administer self-report questionnaires and interpret the responses

accurately. They learn effective communication techniques to establish a trusting and empathetic relationship with patients, encouraging open and honest self-reporting. Nurses also receive training on the psychometric properties of assessment tools to ensure the reliability and validity of the data collected. Ethical considerations, such as maintaining patient confidentiality and privacy, are emphasized throughout the training. In addition, nurses are taught how to conduct observational assessments, including systematic observation, accurate documentation, and appropriate interpretation of patient behaviors and interactions. Practical training, supervised practice, and ongoing support help nurses develop proficiency in utilizing self-report and observational assessment tools, enabling them to provide comprehensive and patient-centered care.

3.3. Data analyses

The Statistical Package for the Social Sciences (SPSS) software, version 21, was used to analyze the study data [34]. Years of experience as a critical care nurse, highest qualification, employment status, shift rotation, ICU-type experience, hospital type, and gender were all described using descriptive statistics, including frequencies and percentages. The sample was described using the mean and standard deviation.

In answer to inquiries about the significance of using pain assessment tools, replies were grouped into three categories: not at all, minimally, and slightly important; moderately, and highly important. The responses regarding the frequency of using pain assessment tools were categorized as follows: frequently and routinely vs never, rarely, and occasionally.

Patients who can self-report their pain are more likely to use pain assessment instruments than those who cannot. The statement implies that patients who possess the capacity to verbally or otherwise self-report their pain tend to be more willing and able to engage with these pain assessment instruments. They can provide detailed information about their painful experiences, allowing healthcare professionals to gain a better understanding of their condition and tailor appropriate treatment plans accordingly. On the other hand, patients who cannot communicate their pain effectively, such as infants, individuals with severe cognitive impairments, or those under anesthesia, may rely on alternative methods for pain assessment. Healthcare providers often employ observational cues, physiological measurements, or behavioral indicators to assess pain in these patients.

This was determined using an X^2 test. Because all of these variables are at the ordinal level, the Spearman correlation was used to analyze the relationships between the frequency of using pain assessment tools and the importance of using these tools, as well as the frequency of pain assessment and documentation and the importance of frequent pain assessment and documentation. The relationship between age-related differences in pain assessment techniques among ICU nurses was examined using an independent-sample *t*-test. The X^2 test was used to evaluate variations in pain assessment procedures based on the gender, type of hospital, and ICU experience of the nurses. If $\alpha > 0.05$., the findings were deemed statistically significant.

Table 1
Sample characteristics.

Variables (n = 45)	n (%)
ICU experience	
<2 years	13 (29)
2–5 years	23 (51)
>5–10 years	4 (8)
>10 years	5 (11)
Employment status	
Full-time	44 (98)
Part-time	0 (0)
Casual	1 (2)
Qualifications	
Diploma	4 (8)
Baccalaureate	39 (87)
Masters	2 (5)
Shift Rotation	
Days only	0 (0)
Evenings only	0 (0)
Nights only	0 (0)
Rotating shifts	45 (100)
ICU type experience	
Surgical (only)	26 (58)
Medical (only)	34 (76)
Neuroscience (only)	9 (20)
Cardiovascular (only)	4 (9)
Burns (only)	0 (0)
Trauma (only)	7 (16)
Combined specialty	13 (29)
Sex	
Male	2 (4)
Female	43 (96)

ICU = intensive care unit.

4. Results

4.1. Demographic characteristics

45 of the 48 nurses who were qualified to take part in the questionnaire (n = 48) did so (response rate = 94%). Table 1 lists the study sample's demographic characteristics. The participants were 36 years old on average (standard deviation: 2.5).

The majority of the participants, or 80%, had fewer than five years of ICU experience (n = 36). Regarding qualifications, 87% (n = 39) of the participants held a bachelor's degree in nursing, and 98% (n = 44) were ICU full-time workers.

Table 2 lists the pain assessment techniques used by nurses in the ICU with patients who were able to self-report pain and those who were unable to do so.

The findings show that 38 nurses (84.4%) utilized a pain assessment instrument when patients could self-report, and 25 nurses (55.5%) said they used more than one tool. The nurses utilized the Numeric Rating Scale for Pain (NRS) the majority of the time (88.8%, n = 40). The frequency with which nurses used a pain assessment tool with patients who could self-report was positively correlated with nurses' perceptions of the value of such tools: r (45) = 0.4, p .01.

When patients could self-report pain, 38 nurses (84.4%) used a pain assessment tool, and 25 nurses (55.5%) reported they used more than one tool. The Numeric Rating Scale for Pain (NRS) was used by the nurses 88.8% of the time (n = 40). A positive correlation between nurses' evaluations of the value of such tools and the frequency with which they utilized a pain assessment tool with patients who could self-report pain was found: r (45) = 0.4, p.01.

Table 2
Nurses' pain assessment practices for critically ill patients able and unable to self-report.

Nurse Variables	N (%)	
	Patient Able to Self-Report	Patient Unable to Self-Report
Person Provides the Most Accurate Rating of Pain Intensity		
Physicians	2 (4)	3 (6)
Nurses	6 (14)	39 (88)
Relatives	2 (4)	3 (6)
Patients	35 (78)	
Use of pain assessment tool		
Yes	38 (84.4)	13 (29)
No	4 (9)	5 (11)
Tool used for pain assessment		
	0-10 Numeric Rating Scale for Pain (NRS) 40 (88.8)	Adult Nonverbal Pain Scale (NVPS) 15 (34)
	Visual analog scale (VAS) 20 (44)	Behavioral Pain Scale (BPS) 9 (20)
	Verbal rating scale (VRS) 10 (22)	PAIN algorithm 4 (8)
	FACES scale 14 (30)	Pain Behavior Assessment Tool (PBAT) 5 (11)
	McGill Pain Questionnaire (short form) 3 (6)	Behavioral Pain Rating Scale (BPRS) 7 (15)
	Brief Pain Inventory 6 (13)	Critical-Care Pain Observation Tool (CPOT) 6 (13)
		Checklist of Nonverbal Pain Indicators (CNPI) 4 (8)
		Other tools 5 (11)
Frequency of use of pain assessment tool		
Never	3 (6)	6 (13)
Seldom	6 (13)	4 (9)
Sometimes	9 (20)	8 (18)
Often	18 (40)	17 (38)
Routinely	14 (31)	11 (24)
Importance of pain assessment tool		
Not at all important	0	2 (4)
Minimally important	2 (4)	2 (4)
Somewhat important	7 (16)	8 (18)
Moderately important	9 (20)	13 (29)
Extremely important	27 (60)	20 (44)
The frequency of pain assessment and documentation		
<Q1H	3 (6)	4 (9)
Q1H to <4QH	6 (13)	9 (20)
Q4H to < Q8H	15 (33)	13 (28)
Once Q12H shift	10 (22)	7 (15)
Never	6 (13)	7 (15)
PRN only	5 (11)	5 (11)
Importance of frequent pain assessment and documentation		
Not important at all	3 (6)	1 (2)
Minimally important	7 (15)	4 (8)
Somewhat important	8 (17)	8 (18)
Moderately important	13 (28)	13 (29)
Extremely important	14 (31)	19 (42)

Q1H = every hour; Q4H = every 4 h; Q8H = every 8 h; Q12H = every 12 h; PRN = as necessary (as needed).

The nurses utilized the Adult Nonverbal Pain Scale (NVPS) the most (29% of the time). The frequency of utilizing pain assessment tools with patients who were unable to self-report showed a statistically significant positive association between nurses' perceptions of the relevance of the instruments and their frequency of use: rs (45) = 0.5, p .01. Additionally, there was a statistically significant positive association between the frequency of pain assessment and documentation for patients who were unable to self-report and the relevance of frequent pain assessment and documentation as assessed by nurses: rs (45) = 0.2, p .01.

The use of pain assessment tools with patients who can self-report is seen by nurses as being more crucial than the use of such tools with patients who can't, $X^2 = 14.25$, $p < .01$.

4.2. Pain behaviors

Table 3 displays the nurses' assessments of various pain-related behaviors. According to the findings, battling with the ventilator, clenching fists or teeth, and vocalizing were the actions that were most frequently regarded as routinely suggesting pain. Splinting and retreating, on the other hand, were the behaviors that were most usually assessed as never or rarely suggesting discomfort.

4.3. Relationship between nurses' pain assessment practices and their demographic

The findings of this study show a substantial relationship between nurses' age, ICU experience, and pain assessment procedures, but not a significant relationship between pain assessment practices and nurses' gender.

4.4. Age

The importance of frequent pain assessment and documentation for patients unable to self-report and nurses' age differed significantly between groups: t (45) = 1.95, $p < .01$. Older nurses thought frequent pain assessment and documentation for patients who couldn't self-report were less important than younger nurses.

4.5. ICU experience

The use of pain assessment tools differed significantly by ICU experience in patients who were unable to self-report: X^2 (1) = 4.5, p < .01. Nurses with less than 5 years of experience were more likely than nurses with more than 5 years of experience to use a tool. The significance of frequent pain recording and documentation in patients who were unable to self-report varied significantly according to ICU experience: X^2 (1) = 3.75, $p < .01$.

Nurses with less than five years of experience valued frequent pain assessment and documentation more than nurses with more than five years of experience. Other pain assessment methods were not affected by ICU experience.

Table 3
Nurses' ratings of behaviors indicative of pain (n = 45).

Behaviors Potentially Indicative of Pain	Never to Sometimes <50%	Often 51%–75%	Routinely >75%
Vocalization (producing voice)	11 (24)	16 (36)	18 (40)
Clenching fists/teeth	13 (29)	13 (29)	19 (42)
Fighting ventilator/activation of alarms	9 (20)	17 (38)	19 (42)
Repetitive touching of area of the body	14 (31)	18 (40)	13 (29)
Brow lowering/frowning	14 (31)	17 (38)	14 (31)
Pulling ET tube	12 (27)	16 (36)	17 (38)
Guarding (involuntary reaction to protect area of pain)	17 (38)	18 (40)	10 (22)
Grimacing (a sharp contortion of the face)	12 (27)	17 (38)	16 (36)
Retraction (withdraws) of upper limbs	25 (56)	10 (20)	10 (20)
Rigidity	13 (29)	17 (38)	15 (33)
Seeking attention through movements	11 (24)	17 (38)	17 (38)
Trying to climb out of bed	9 (20)	19 (42)	17 (38)
Closing eyes	14 (31)	19 (42)	12 (27)
Thrashing (hitting) limbs	12 (27)	17(38)	16 (36)
Sighing (a long, deep, audible breath)	16 (36)	22 (49)	7 (16)
Resistance to passive movements	14 (31)	19 (42)	12 (27)
Attempting to sit up	11 (24)	18 (40)	16 (36)
Arching (curving)	13 (29)	18 (40)	14 (31)
Not following commands	12 (27)	18 (40)	15 (33)
Striking staff (attracting attention)	15 (33)	14 (31)	16 (36)
Wincing (involuntary shrinking movement of the body)	14 (31)	17 (38)	14 (31)
Slow cautious movements	15 (33)	15 (33)	15 (33)
Restlessness	13 (29)	17 (38)	15 (33)
Withdrawing	13 (29)	16 (36)	16 (36)
Splinting (temporary immobilization)	35 (78)	8 (18)	2 (4)

ET = endotracheal.

5. Discussion

This study described the current pain assessment practice used by nurses in the intensive care unit for critically ill patients who can and cannot express themselves. It also explained how nurses interpret the behaviors that are most likely to indicate pain. Finally, the researchers investigated the links between nurse characteristics and pain assessment practice.

The findings show that the majority of nurses used pain assessment tools with patients, whether they could self-report or not. This was to be expected, as the majority of hospitals in the Kingdom of Saudi Arabia currently meet accreditation requirements indicating the importance of using pain assessment tools to measure patients' pain in various clinical settings. This study's assessment rates were higher than in a previous study [35]. In patients who were unable to communicate, 77% of nurses (n = 35) were more likely to use pain assessment tools. A study from Canada discovered that 33% of nurses used a pain assessment tool in patients who couldn't communicate (Hamdan, 2019).

In the current study, nurses used the NRS most frequently to assess pain in patients who could communicate, followed by a verbal rating scale and then the FACES scale. Previous research has looked into the preference for different pain scales in critically ill patients. One study, for example, suggested using the visual analog scale, verbal descriptor scale, and 0–10 NRS to assess pain in patients who can describe themselves (Hamdan, 2019). In addition, a previous study comparing various self-report instruments (e.g., visual analog scale, verbal descriptor scale, verbal 0–10 NRS, and visually magnified laminated 0–10 NRS) discovered that the visually magnified 0–10 NRS was the most feasible and discriminative self-report instrument for use in critically ill patients [36]. The use of an appropriate pain scale is important because patient self-assessment is the gold standard for pain assessment; however, the instrument should be used correctly and communicated with other members of the health care team to facilitate appropriate pain management.

The NVPS, on the other hand, was the most commonly used tool by nurses to assess pain in patients who were unable to communicate, followed by the Critical-Care Pain Observation Tool (CPOT) and the Behavioral Pain Scale, according to the findings of this study. The Behavioral Pain Scale and CPOT are the most valid and reliable behavioral pain scales, according to the Society of Critical Care Medicine, and should be used to monitor pain in adult critical care patients who are unable to communicate [2]. Despite these recommendations, the NVPS was the tool that nurses used the most in this study.

A study of the impact of implementing the NVPS in an ICU discovered that most staff (78%) rated the instrument as simple to use, and that the instrument's implementation increased staff confidence in assessing pain in nonverbal patients [37] A study that described nurses' evaluations of the CPOT after 12 months of implementation discovered that the CPOT was feasible to use and that nurses viewed it as quick to apply, easy to understand, and simple to complete. The CPOT was rated as relevant to nurses' daily practice, but it did not necessarily help them communicate effectively with other members of the ICU care team [37].

Another study that looked at the feasibility and clinical utility of the CPOT in assessing pain in critically ill ventilated adults discovered that 90% of nurses (n = 33) thought the CPOT guidelines were clear, easy to understand, and simple to follow. Furthermore, 70% of nurses thought the tool was useful and recommended that it be used on a regular basis [38].

Nurses who care for critically ill patients should be aware of pain-related behaviors to help with pain recognition and treatment [39]. Fighting the ventilator, clenching fists or teeth, and vocalizing were the behaviors most commonly classified as routine signs of pain by nurses in this study. In contrast, Rose et al. (2011) discovered that grimacing was most frequently rated as never or occasionally indicating pain by 142 nurses (47.3%) [30]. Grimacing was found to be a commonly observed behavior in response to pain in studies examining behavioral indicators of pain in ICUs [40–42].

However, the nurses in the present study did not view grimacing as the behavior most indicative of pain. Nurses need to become more aware of the role of facial expressions, especially grimacing, in indicating pain.

Patient self-report is the gold standard for measuring pain [43]. Interestingly, 22% of nurses did not believe that a patient self-reporting would provide an accurate assessment of pain intensity. A previous study conducted to determine whether nurses and patients estimate pain intensity the same found that there was moderate agreement between patients and nurses in estimating pain intensity [44]. Another study conducted to compare symptoms reported by patients after palliative surgery and mechanical ventilation in an intensive care unit with nurses' perceptions of symptoms found that patients reported more pain than nurses perceived [45].

Another study, which sought to ascertain the level of agreement between ICU patients and their family members, caregivers, and physicians regarding patients' symptoms, including pain, discovered that some family members, caregivers, and physicians overestimated and others underestimated patients' symptoms [46].

More than 80% of nurses in the current study used pain assessment tools with both communicable and noncommunicable patients, and more than 50% used these tools frequently and routinely. Similarly, previous research on the impact of implementing pain assessment tools in ICU nursing practice discovered that pain assessment documentation increased after implementation [38,47].

In the current study, 88% of nurses thought behavioral pain assessment tools were moderately to extremely important for patients who could communicate, compared to 77% for patients who couldn't. In a Canadian study of intensive care nurses, fewer participants rated behavioral pain assessment tools as moderately to extremely important for patients unable to communicate (595 nurses, 74%), compared to self-report tools (703 nurses, 88%) [30].

Older nurses in the current study thought regular nurses' pain assessment and documentation in patients unable to self-communicate were less significant than younger nurses. Additionally, compared to nurses with more expertise, nurses with less experience were more likely to utilize a nurses' pain assessment instrument on patients who were unable to talk. It appears that the older nurses were out of touch with current recommendations for nurses' pain assessment and management, which state that it should be done just as regularly as vital sign measurements.

According to the recommendations, measuring pain is the fifth vital sign and should be done more frequently when the patient is exposed to unpleasant stimuli. Similar findings were made in a research that described the methods that doctors and nurses used to

evaluate postoperative pain. Sjostrom et al. (1997) found that experienced nurses' estimates of pain were less accurate and tended to underestimate discomfort [48].

The findings emphasize the importance of taking a holistic approach to pain assessment and management. Pain is a complex phenomenon influenced by various factors, including physical, psychological, social, and cultural aspects. Interprofessional guidelines and practice concepts should promote collaboration among healthcare professionals from different disciplines to address all these dimensions of pain. This could involve the involvement of physicians, nurses, psychologists, physical therapists, and other relevant professionals to provide comprehensive care. In addition, the findings support the concept of shared decision-making in pain management. Interprofessional collaboration encourages healthcare providers to involve patients in the decision-making process, considering their individual preferences, values, and goals. By collaborating across disciplines, healthcare professionals can combine their expertise to present a range of treatment options and educate patients about the potential benefits, risks, and alternatives. This approach promotes patient-centered care and improves treatment outcomes. Furthermore, The findings underscore the importance of education and training for healthcare professionals in pain assessment and management. Interprofessional guidelines should emphasize the need for ongoing education and training programs that enhance the knowledge and skills of healthcare providers in this domain. This can include training on the use of standardized assessment tools, communication strategies, interdisciplinary collaboration, and evidence-based interventions. By promoting continuous learning, interprofessional guidelines can ensure that healthcare professionals stay updated with the latest advancements and best practices in pain management.

Overall, the findings regarding pain assessment and management call for interprofessional collaboration, standardized approaches, shared decision-making, education and training, and continuity of care. By incorporating these implications into interprofessional guidelines and practice concepts, healthcare systems can enhance the quality of pain management and improve patient outcomes.

6. Limitations

The researcher cannot infer causation among the variables in the study since the study is cross-sectional. One disadvantage of the questionnaire employed in this study was the absence of information on the clinical value of employing pain assessment instruments. However, this is one of the first research to look at the practice of pain assessment among critical care nurses in the Kingdom of Saudi Arabia.

7. Conclusions

In critically ill patients, pain is a serious concern, and in order to manage it successfully, it must be appropriately measured using the most suitable pain assessment instruments for the patient's state. According to the findings of this study, the majority of ICU nurses employ pain assessment methods in both communicable and noncommunicable patients; nevertheless, the most accurate and reliable instruments are rarely used. The pain behaviors most likely to signal discomfort in critically ill patients were unknown to nurses.

Pain assessment tools should be used by ICU nurses with all patients who can communicate. Nurses should use assessment tools and behavioral indicators of pain as a valid approach to pain assessment when patients are unable to communicate their pain. Furthermore, ICU nurses should be encouraged to stay current on the most dependable and valid pain assessment tools for both communicative and noncommunicative patients.

To support effective pain assessment and management in critically ill patients, healthcare facilities, particularly ICUs, must establish protocols and guidelines for the use of pain assessment measures. Further research into the suitability and clinical significance of various pain assessment methods in critically ill patients is required.

Author contribution statement

Ahmad Saleh: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Data availability statement

The data that has been used is confidential.

Declaration of competing interest

The author declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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