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Review paper

Barriers to nurse-led pain management for adult patients in intensive care units: An integrative review

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ABSTRACT

Objective: This integrative review sought to identify and synthesise quantitative and qualitative evidence on barriers to pain management in adult intensive care units (ICUs).

Background: Pain is experienced by 58% of adult ICU patients, which leads to consequences such as decreased healing and delirium. Managing pain effectively is an integral part of the critical care nurse's role.

Methods: An integrative review was conducted based on Whittemore and Knafl's approach. Peer-reviewed research articles were sourced from five databases. Included articles were limited to those published in English and Arabic. The quality of included papers was evaluated using the Mixed Methods Appraisal Tool (MMAT). Identified barriers to pain management in adult ICUs were mapped onto the components of the COM-B model. The study was reported using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

Results: Nine hundred and ninety-one papers were identified; 19 studies met the inclusion criteria. Seventeen studies focused on pain management from the perspective of nurses, whereas the remaining two focused on the perspectives of patients and nurses. Using the MMAT, two studies were rated 5 stars (out of 5), nine studies were rated 4 stars, seven studies were rated 3 stars, and one study was rated 2 stars. Lack of knowledge and skills was found to be psychological capability barriers, while nurse dependency on following doctor's orders, poor staffing levels, lack of pain assessment skills, and lack of education were barriers mapped to physical capability. Opportunity was represented by three barriers: inadequate documentation of pain and shortage of nurses were mapped to the physical opportunity, and poor communication to the social opportunity. Nurses' beliefs towards pain assessment were mapped to reflective motivation.

Conclusions: The findings of this study suggest that knowledge, nursing beliefs, insufficient numbers of nursing staff, lack of documentation, and lack of communication commonly affect pain management in adult ICUs.

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1. Introduction

Pain is defined as an unpleasant sensory and emotional experience associated with, or resembling, actual or potential tissue damage.[1] Although pain relief is a fundamental right for patients, pain is experienced by 58% of patients in adult intensive care units (ICUs).[2] It can lead to decreased healing, delirium, and other adverse physiological and psychological outcomes.[2] Most ICU

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patients experience pain at some stage during their treatment,[3] including during invasive and noninvasive procedures. ICU patients may not be able to report their pain verbally or through signalling for various reasons such as an altered level of consciousness, mechanical ventilation, or sedation.

Systematic pain assessment is fundamental to achieving effective pain management. An ICU patient's inability to communicate his/her pain does not refute neither the existence of pain nor the need for appropriate pain treatment.[1] Despite this barrier, most pain assessment tools are usually dependent on a patient's ability to communicate. Therefore, ICU nurses must be capable of assessing pain using behavioural pain assessment methods so that a patient's impaired communication capabilities are considered. Devlin, Skrobik[4] propose that when patients cannot communicate, their behavioural reaction should be considered by ICU nurses and doctors as a surrogate measure of pain, providing their motor functions are working.

This systematic review sought to explore the barriers to nurse-led pain management in ICUs globally. The Behaviour Change Wheel (BCW)[5] was used as the guiding framework to analyse and interpret the findings within this review. The BCW is a behaviour change intervention framework that can be used to identify intervention functions and policies based on target behaviours.[6] The model centred in the BCW is known as the Capability, Opportunity, Motivation, Behaviour (COM-B) model.[5] These components are considered necessary for implementing behaviour change and apply to nurses' pain assessment processes in this review. The COM-B model, illustrated in Fig. 1, suggests that one's capability to accomplish the task, motivation to accomplish the task, and opportunity to perform the task, as well as circumstances beyond the individual's control, influence the desired behaviour (in this case, to assess patient pain). Capability and opportunity influence the relationship between behaviour and motivation, and they are the necessary prerequisites for behaviour change to occur. In addition, capability and opportunity influence someone's motivation to perform a behaviour.[7]

1.1. Aim

The aim of this integrative review was to identify and synthesise qualitative and quantitative evidence on the barriers to pain management practices for nurses working in adult ICUs.

2. Methods

2.1. Review methods

This review followed the integrative review framework outlined by Whittemore and Knafl,[8] which comprises the following five stages: (i) identifying the aim of the review, (ii) searching the literature, (iii) assessing the data and then extracting the data, (iv) analysing the data, and (v) presenting the review results. This approach was selected to allow the researchers to synthesise the findings of both quantitative and qualitative studies and provide a comprehensive review of the literature regarding the barriers to nurse-led pain management in adult ICUs.[8]

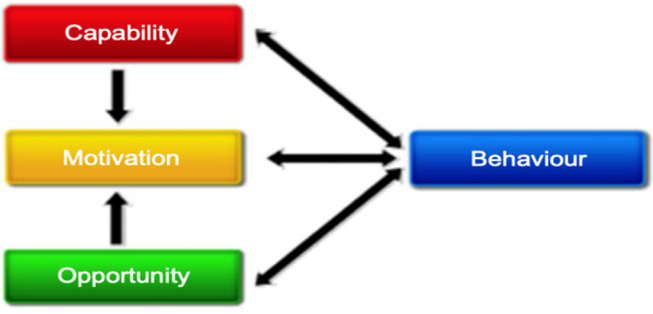

Figure 1. Capability, Motivation, and Opportunity components of Behaviour (COM-B), derived from Crowley et al. (2020).

2.2. Search strategy

The keywords used were barrier* OR limit* OR challeng* OR difficult* OR obstacle* AND pain management* OR pain manage* OR pain treatment OR pain relief OR pain control OR pain assessment AND nurs* AND intensive care unit OR ICU OR critical care AND adult. Five databases (CINAHL, EMBASE, Scopus, PubMed, and EMCare) were searched for peer-reviewed research articles that contained the key terms. These five databases were selected to ensure a wide-ranging search and sufficient breadth and depth in the retrieved papers. The search was conducted in two stages: an initial search to identify key terms and a comprehensive search using the identified key terms. The initial search was performed in EMBASE and EMCare. Following this, the identified terms were modified and used to search CINAHL, Scopus, and PubMed. An example of the search strategy in CINAHL is included in Supplemental File 1.

Studies were included if they were written in English or Arabic, focused on nurses' assessment and management of pain, and studied adult patients in the ICU setting. Therefore, studies that examined pain assessment and management of paediatric patients, pain assessment and management by doctors and/or health providers other than nurses, and pain management in non-ICU settings were excluded. Studies that had participants other than nurses such as doctors, respiratory therapists, and cardiac perfusionists were excluded. The titles and abstracts of all eligible studies were screened against the inclusion and exclusion criteria by one author (MA), and 10% of potential studies were reviewed by JD. Two authors (MA and MG) completed screening of all full-text studies. Any disagreements were resolved through discussion that was educative in nature and included input from an additional author (JD).

2.3. Search outcome

A systematic search of the literature was conducted in June 2021. A total of 991 articles were identified (986 identified through database search plus five through other sources) which included 296 duplicates. The 695 remaining articles underwent title and abstract review. After reviewing titles and abstracts, 501 studies were excluded because the study context was not ICU or the study did not examine adults. The 194 remaining studies underwent full-text review; 175 were excluded because either they focused on pain management in different settings or participants were not nurses. Finally, 19 articles met the inclusion criteria (Fig. 2).

2.4. Critical appraisal

The quality of papers included in this review was evaluated using the Mixed Methods Appraisal Tool (MMAT).[9] The MMAT focuses on five fundamental quality criteria for five types of research designs: (i) qualitative research, (ii) randomised controlled trials, (iii) nonrandomised research, (iv) quantitative descriptive research, and (v) mixed methods. MA independently appraised the articles and discussed them with MG and JD as part of Doctoral supervision. MA and MG then independently appraised all articles using the MMAT (version 2018) prior to data extraction. During the independent appraisal, there was one minor disagreement which was

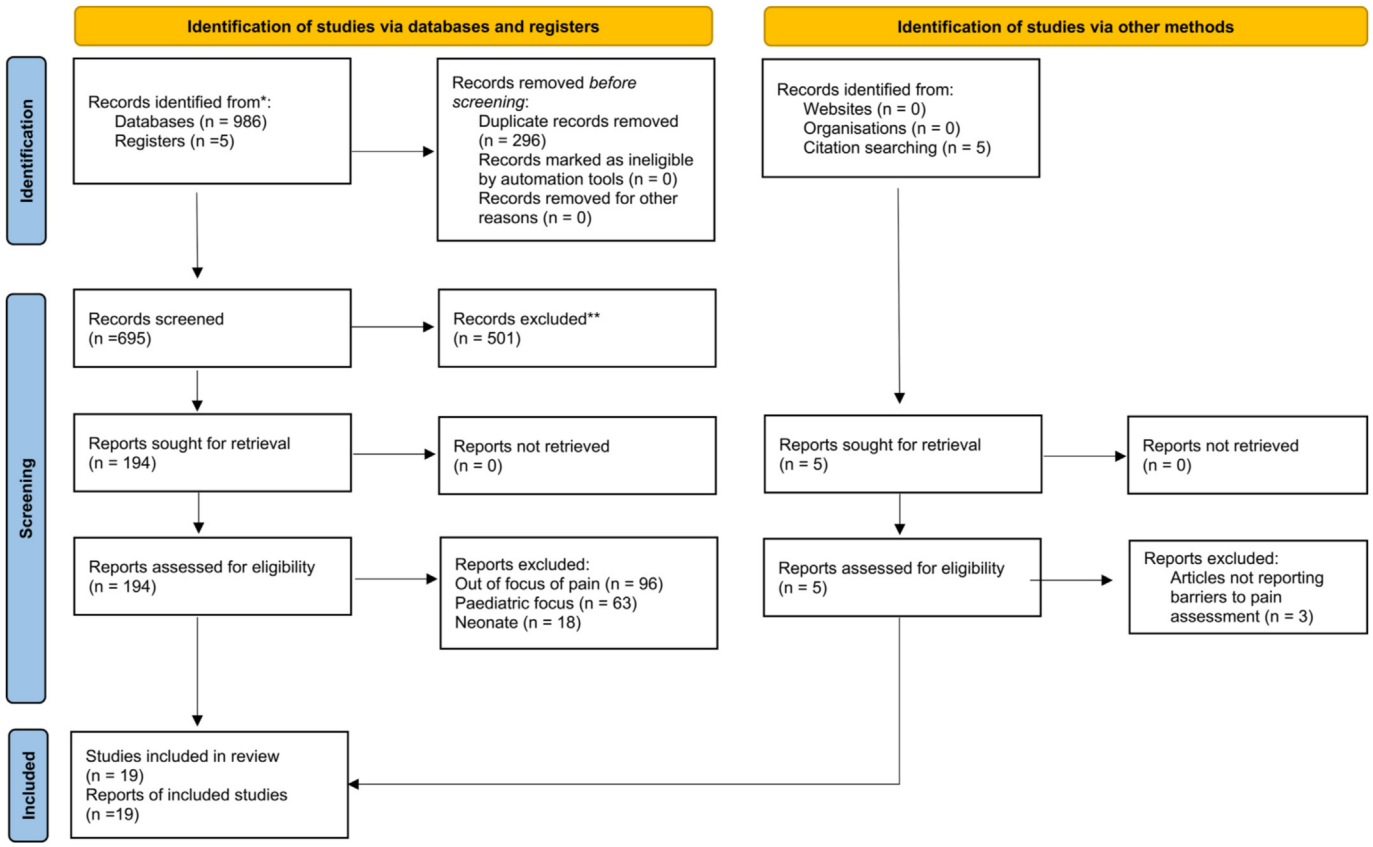

Figure 2. Flowchart showing the process of inclusion and exclusion of studies in this review.

resolved through discussion. The MMAT appraisal for each included study is available in Supplementary File 2.

2.5. Data extraction

Data were extracted independently by three authors (MA, MG, and JD). The data extraction form had subsections for research description (author, year of publication, study location, and paper title), methodology (study design, methods, sampling, and sample size), and findings.

2.6. Data analysis and synthesis

According to Kitchenham,[10] several steps were undertaken in data analysis: the data from the primary sources were ordered, coded, categorised, and summarised into a unified and integrated conclusion about the research problem. In this study, barriers were classified using the COM-B model. Data were subcategorised by the first author and were reviewed by all authors.

3. Results

Nineteen articles met the inclusion criteria and were included in this review (Fig. 2). Seventeen studies focused on pain management from the perspective of nurses working in ICUs, whereas the remaining two focused on the perspectives of both ICU patients and ICU nurses. The MMAT was used to appraise all included studies (see Supplemental file 2). Two studies met 100% of the MMAT criteria and were rated 5 stars (*****), nine studies met 80% of the MMAT criteria and were rated 4 stars (****), seven studies met 60% of the MMAT criteria and were rated 3 stars (***), and one study was rated 2 stars (**) as it met 40% of the MMAT criteria.

Of the included studies, 14 used cross-sectional surveys at one point in time, two used a pre–post quasi-experimental design, and three used qualitative descriptive methods using semistructured interviews. Four studies were conducted in Saudi Arabia and Jordan, two studies were undertaken in the USA and Iran, and one study was undertaken each in Italy, Uganda, Egypt, Rwanda, Taiwan, UK, and Turkey (Table 1).

Data were analysed using the COM-B model[11] and themed into the broad categories of capability, opportunity, and motivation. Capability and opportunity included two subthemes, and motivation included one subtheme.

3.1. Capability

Capability is defined as the individual's psychological and physical capacity to engage in the activity concerned.[11]

3.1.1. Psychological capability

Psychological capability includes an individual's capacity to engage in the necessary thought processes, comprehension, and reasoning through education to perform the target behaviour. The COM-B model differentiates education and training. Education is focused on developing understanding and knowledge, whereas training is focused on developing skills.[5] Ten studies examined a lack of knowledge related to pain management by nurses in adult ICUs.[12–21] The two main types of knowledge that are necessary for effective pain management were categorised by researchers as basic knowledge and pharmacological knowledge. Basic knowledge was related to the understanding and knowledge of the physiology

Table 1
Characteristics of the included studies.

#	Author/s [reference]	Study location	Participants/setting	Study design	MMAT	Findings
1	Alasiry and Löfvenmark (2013)	Saudi Arabia	10 CCU nurses	Qualitative semistructured interviews	***	• Pain assessment was perceived to be challenging because of the language barrier. It was difficult for patients to describe the quality of their pain. • ICU nurses lacked the knowledge of proper use of pain assessment scales. • Nurses lacked the skills and experience to assess patients who could not communicate.
2	Fatma et al. (2005)	Turkey	91 general ICU nurses	Quantitative cross-sectional study	****	• ICU nurses showed limited knowledge regarding pain assessment. Nearly half of nurses administered medication before assessing patients' pain. • 25% of nurses were unable to articulate what was a physiological response to pain. • Education and training would enhance nurses to provide better pain assessment and treatment.
3	Ayasrah et al. (2014a)	Jordan	301 adult ICU patients	Quantitative cross-sectional study	***	• 65.2% of medical records contained no pain assessment in the nurse's documentation. • 63% of the pain episodes were not reassessed. • Pain management – pharmacological interventions were documented in 78% of the medical records • 45.9% nonpharmacological interventions to relieve pain were documented.
4	Deldar et al. (2018)	Iran	20 general ICU nurses	Qualitative semi-structured interviews	****	The authors categorised the results into four groups; • Forgotten priority: The pain was not assessed and evaluated routinely; lack of physician–nurse interaction about pain management; and lack of pain assessment policies and regulations. • Organisational barriers: inadequate nurse-patient ratio and the presence of less experienced nurses. • Attitudinal barriers: nurses did not believe in pain assessment scales for non-verbal patients; and failed to comprehend pain in non-verbal patients. • Barriers to Knowledge: there was no awareness of how to use a non-verbal pain scale; and lack of training on pain assessment scales.
5	Eid et al. (2014)	Saudi Arabia	593 nurses from wards and adult ICU	Quantitative cross-sectional study	*****	Nurses' Knowledge and Attitudes Survey Regarding Pain (KASRP) was used to test nurses' knowledge and attitude. The most prominent findings were as follows: • 25.5% of participants had attended training about pain. • Three out of 593 nurses achieved a "high" score. • 64.4% of participants underestimated the smiling patient's pain. • 4% answered the right dose of morphine.
6	Erkes et al. (2001)	USA	30 adult ICU nurses	Quantitative, pre –post quasi-experimental study	****	The KASRP was used pre and post study to determine the level of knowledge and attitude ICU nurses achieved. • Findings indicated inadequate pain management in hospital settings • Results revealed that knowledge and attitude improved from baseline to the post test ($t = 9.60$, $p = ,0005$) • Spearman's correlation analysis showed a significant correlation between scores and experience.
7	Hamdan (2019)	Jordan	300 adult ICU nurses	Quantitative cross-sectional study	****	• Low awareness among nurses about indicative pain behaviours. • Approximately 35% of nurses said that using pain tools to assess pain in patients unable to talk is either somewhat or moderately important. • Most valid and reliable pain assessment tools were not used often.
8	Hsiang-Ling and Yun-Fang (2010)	Taiwan	370 general ICUs nurses	Quantitative cross-sectional study	****	Taiwanese version of the KASRP was used to evaluate nurses' knowledge and attitude regarding pain in the adult ICU. • The average overall score was 53.4% which refers to poor pain management knowledge. • The top barrier was nurses were dependent on doctors' orders. • Education was recommended to enhance knowledge and correct attitude for nurses working in adult ICUs in Taiwan.
9	Issa et al. (2019)	Saudi Arabia	204 ICU nurses	Quantitative pre-post quasi-experimental study	****	• 60.3% of nurses believed patients should be encouraged to endure as much pain as possible before using an opioid. • 50% of nurses had poor knowledge regarding pain indicators and opioid doses.
10	Khalil and Mashaqbeh (2019)	Jordan	117 adult ICU nurses, 66 ED nurses, medical 70 nurses, surgical 90 nurses, oncology 74 nurses.	Quantitative cross-sectional study	****	• Nurses demonstrated lack of knowledge and attitude deficits as a result of the Bachelor of Nursing undergraduate curricula pain management gap. • 54% of nurses believed that ICU patients should be instructed to tolerate pain as much as they can.
11	Khalil (2018)	Egypt	60 ICU nurses in medical, neurosurgery, and emergency critical care units	Quantitative cross-sectional study	***	• Lack of nurses' knowledge, lack of time, nurses' workload, and patients' instability were barriers to nonpharmacological pain practices being used by nurses.
12	Kia et al. (2021)	Iran	224 ICU nurses from 14 general ICU and two cardiac surgery and burn ICU ward	Quantitative cross-sectional design	***	• The rate of nonpharmacological pain management methods among ICU nurses in Iran was not high due to various factors such as fatigue, multiple responsibilities, a heavy workload, and an insufficient number of nurses per shift.

Table 1 (*continued*)

#	Author/s [reference]	Study location	Participants/setting	Study design	MMAT	Findings
						• The majority of the participants in this study had never attended a nonpharmacological pain management course.
13	Kizza and Muliira (2015)	Uganda	170 nurses from critical care units	Quantitative cross-sectional study	***	• The main perceived barriers to acute pain assessment practices were workload (84.1%), poor documentation and communication of pain assessment and management (77.6%), lack of education, lack of availability of assessment tools (74.1%), and lack of protocols and guidelines.
14	Latina et al. (2015)	Italy	286 nurses from ICU, SICU & ordinary wards	Quantitative cross-sectional study	****	Italian Version of the KASRP was used to evaluate nurses' knowledge and attitude toward pain: • Nurses had never attended education course regarding pain management. • The mean correct responses for the knowledge survey were 55.5% (SD 6.33). • Surgical wards and ICU showed 62% to develop positive attitude and gain good understanding in combination with other wards. • Limited level of knowledge and poor attitudes towards pain management within the three different settings.
15	Puntillo et al. (2002)	USA	14 ICU nurses and 5 units (3 ICUs and two PACUs)	Quantitative cross-sectional study	**	After using the Pain Assessment and Intervetion notation (P.A.I.N.) tool, participants stated barriers to the use of the tool and to the pain assessment in the ICU such as • The inability of an ICU patient to communicate makes pain assessment difficult for ICU nurses.
16	Subramanian et al. (2012)	UK	21 adult critical care nurses	Qualitative semi-structured interviews	****	• ICU nurses described four main challenges in managing pain: a lack of clinical guidelines, limited autonomy in decision-making, a lack of structured pain assessment tool, and the patient's condition itself.
17	Samarkandi (2018)	Saudi Arabia	247 nurses from adult ICU (49), oncology (34), medical surgical (59), ED (12), and others (93).	Quantitative cross-sectional study	*****	The KASRP was used to assess the level of nurses' knowledge and attitude regarding pain, and the significant outcomes were as follows: • 50% of nurses stated no previous education about pain assessment and management. • The mean of correct answers was 18.5 out of 40 in the KASRP, and the range was 3–37 • Spearman's correlation test showed a positive significant relationship with years of experience ($r = 0.163$, $P = 0.022$)
18	Ufashingabire et al. (2014)	Rwanda	69 adult ICU nurses	Quantitative cross-sectional study	***	KASRP was used to assess the level of nurses' knowledge and attitude regarding pain, and the significant outcomes were: • Nurses lack adequate knowledge and have poor attitudes toward pain management. • The level of nursing education ($p < 0.008$) and the hospital where nurses worked ($p < 0.0001$) significantly influenced nurses' attitudes toward pain management. • 42% believed that patients who can be distracted from pain do not have severe pain.
19	Younis et al., (2021)	Jordan	300 ICU nurses from 22 general ICUs.	Quantitative cross-sectional study	***	• Nurses noted that the most common impediments affecting pain assessment and management were nurse workload (84.6.3%), patient instability (54.4%), patient incapacity to speak (53.3%), and sedation interfering with pain assessment (50%).

CCU, coronary care unit; ED, emergency department; ICU, intensive care unit; KASRP, Nurses' Knowledge and Attitudes Survey Regarding Pain; MMAT, Mixed Methods Appraisal Tool; PACU, postanaesthesia care unit; SICU; subintensive care unit.

of pain, including the difference between acute and chronic pain, the evaluation of pain, and the risks associated with poor pain management. Pharmacological knowledge was related to the understanding and knowledge of pain medication dosage, complications, and their mechanism of action.

Basic knowledge included assessing pain using vital signs and other physical cues as an indicator of pain, understanding the pathophysiology, and assessing pain. Some nurses believed that vital signs were always a reliable indicator of pain.[12,21] Another study showed that nurses defined pain as a physical ailment and stressed the importance of looking for a pathological basis in pain assessment.[21] Most nurses in the included studies had low levels of knowledge of effective techniques and processes for pain assessment, low levels of knowledge about assessing facial expressions during painful procedures;[13,16] and the need to reassess pain following pain relief.[17,18] In addition, there was limited knowledge on the use of nonpharmacological pain management strategies.[20]

The nurses' knowledge about the pharmacological treatment of pain in the ICU settings was also limited.[12–18] Several studies identified that ICU nurses had poor knowledge regarding the best route and administration of opioids.[12,16,17] Nurses in ICU settings also had knowledge deficits about the possible complications of opioid administration, such as respiratory depression.[12–14,17] Approximately 70% of ICU nurses reported that they withheld opioids due to concern that the patient could become addicted to opioids as a result of treatment.[12,14] In some quantitative studies examining nursing knowledge, ICU nurses were unable to answer all questions about tolerance to opioids, which reveals a lack of knowledge in this area.[12,17]

Lack of education was another barrier that negatively impacted the psychological capability of ICU nurses concerning pain management.[14,17,20–22] For instance, lack of education regarding pain assessment was a barrier to providing optimal pain management to ICU patients.[17] Pain assessment tools are enablers of psychological capability as they guide the process of pain assessment in ICUs. Two studies evaluated the Critical Care Pain Observation Tool (CPOT) and found it was easy to use, simple, and clear to understand, requiring minimal education and training and improving nurses'

performance in achieving favourable outcomes regarding pain management.[23,24] The first study stated that the CPOT is more sensitive to pain and valid than the Behavioral Pain Scale.[26] The second study investigated nurses' pain management strategies in 22 ICUs in Jordan and concluded that nurses do not use the best evidence-based pain scales such as the CPOT.[25] The Behavioral Pain Scale was evaluated and found to be effective in measuring the pain score of patients who cannot self-report.[23] Another study investigated the Pain Assessment and Intervention Notation (P.A.I.N.) tool and found that P.A.I.N. was effective in helping novice nurses to assess and manage pain experienced by ICU patients.[26] Similarly, Hamdan[24] concluded that the Adult Nonverbal Pain Scale increased nurses' self-confidence in the pain assessment of ICU patients.

3.1.2. Physical capability

The second aspect of capability in the COM-B framework is physical capability which involves having the required skill, strength, and stamina to perform pain assessment. The studies suggested that workshops and training can help nurses improve their knowledge (psychological capability) and their strength, stamina, and skills (physical capability).[11] Three findings were subcategorised to physical capability in the included studies. Firstly, the lack of skills is an obstacle to pain assessment and management. Nurses need to increase their skill levels to be competent in pain management in the ICU. Secondly, the training gave the nurses the capability to provide the best pain care to ICU patients.[25] The number of nurses using nonpharmacological methods to manage pain in a cross-sectional study was not optimal due to many barriers, including fatigue.[20] Thirdly, limiting the nurses' role to solely focusing on patient assessment, checking drug charts, and notifying the physician of patients' pain reduces nurses' scope of practice and diminishes nurses' ability to manage pain using evidence-based guidelines that lead to optimum pain management.[21]

3.2. Opportunity

Opportunity is defined as all the factors that lie outside the individual that make the behaviour possible or prompt it. The environment influences physical opportunity, while the social opportunity is influenced by language and culture.[11]

3.2.1. Physical opportunity

Documentation is critical to ICU nurses' assessment and management of pain. Insufficient and incomplete documentation of pain leads to limitations in assessing the patients' pain status and recognising the need for reassessment and follow-up. There is a need to develop and implement hospital policies that promote compliance with comprehensive pain documentation processes by nurses. Nurses were interviewed about the barriers to the documentation of pain management. They found that nurses described organisational barriers such as lack of nurse staffing, insufficient time for quality patient care, and high workloads. Nearly half of all ICU nurses believed that the hospital where they worked did not have appropriate forms and electronic systems to document comprehensive pain assessments.[25]

A lack of staff is another barrier related to physical opportunity. An inadequate patient-to-nurse ratio results in a high workload, which reduces the opportunity to assess and manage pain effectively, contributing to poor pain assessment and management among adult ICU patients.[13,15,20,27,28] Two studies identified that one of the barriers to pain management was poor staffing levels leading to a high workload by nurses and suggested that healthcare managers had a role in overcoming this.[15]

3.2.2. Social opportunity

The inability of patients to communicate or verbalise pain is a known barrier that leads to inadequate assessment and management of pain in adult ICU patients.[18,29] The unstable patient is challenging to care for, and this is exacerbated further if the patient has a communication barrier.[26] The severity of illness that a patient experiences was documented as a communication barrier (53.3%) and contributed to the need for sedation (50%) among ICU patients in a cross-sectional study of 300 nurses in Jordan.[28] Therefore, being competent to assess pain in patients who are unable to communicate is a core skill requirement of ICU nurses.

3.3. Motivation

Motivation is defined as the processes that energise and direct behaviour and includes more than just goals and conscious decision-making. Reflective motivation involves an individual's evaluation and beliefs, while automatic motivation involves emotion and impulses.[11]

3.3.1. Reflective motivation

Several studies examined how nurses' attitudes, influenced by personal beliefs and behaviours, were barriers to pain management in ICUs.[12,14,16,18,19,25,29,30] Multiple studies identified that more than half of the nurses working in ICUs felt that patients should be encouraged to endure pain as much as possible before opioids are administered.[12,16,30] Similarly, more than half of the ICU nurses did not believe patients' self-reports regarding pain,[12,14,16,30] and approximately 50% of the nurses assumed that distraction could be effective in relieving pain.[16,18,30] The ICU nurses' views included that sleeping patients or patients with decreased levels of consciousness were not experiencing pain.[14,16,29,30] Some ICU nurses reported that patients with stable vital signs should not be given analgesia[12,16] and expressed that if patients were smiling, they were not experiencing pain.[12,16] These subjective judgements were also identified in settings where nurses did not want to use a pain assessment tool and preferred using their instincts.[29]

3.3.2. Automatic motivation

From the selected studies, there were no identified data that mapped to automatic motivation.

4. Discussion

This integrative review aimed to synthesise evidence on the barriers to pain management practices by nurses working in adult ICUs. The review found various barriers, including lack of knowledge, nurses' attitude, and lack of documentation and skills. Such barriers negatively affect the pain assessment and management process for nurses in ICU. To the best of our knowledge, this study is the first to map the barriers to nurse-led pain management in the ICU using the COM-B model (11).

Our findings indicate that the most common barrier to nurse-led pain management in adult ICUs is the lack of knowledge. The impact of lack of theoretical and pharmacological knowledge on optimal pain management was examined in eight studies.[12,14,16,18,20,25,29–32] According to the BCW intervention framework, a suitable solution for lack of knowledge and skills is education and training.[11] Some studies have implemented educational programs to enhance ICU nurses' knowledge of pain management, and the outcomes showed significant improvement in the nurses' knowledge of pain management.[33] A study was conducted to measure nurses' knowledge pre and post the intervention. The evidence shows significant changes in knowledge scores ($t = 9.60$, $p = 0.0005$) post test[19] and concluded that education is crucial for nurses' pain management in

critical care. In addition, nurses should be responsive and integrate evidence-based pain management guidelines to provide pain relief and optimal care. In a quasi-experimental pre–post design, nine (out of a total of 27) nurses were allocated and received 7 h of education.[33] Nurses who participated in the educational intervention improved their post-scores on the Knowledge and Attitude Survey Regarding Pain (preintervention mean = 18.44; postintervention mean = 27.56).[33] Despite the small sample size (9 nurses), it highlights the significance of educating ICU nurses to enhance knowledge and correct attitudes.

This integrative review shows that a lack of documentation is an obstacle to pain management.[11,13,22,34] According to the COM-B framework, physical opportunity can be improved using suitable pain assessment tools (such as the CPOT) that emphasise the importance of documentation. Gelinas et al. [35] evaluated the CPOT and found that after 12 months of use, nurses perceived it was quick to use, simple to comprehend, and easily used in practice. Similarly, Mascarenhas et al.[36] implemented the CPOT and found that 4-hourly pain assessment increased in 89% of participants.

Communication between patients and nurses is another way for nurses to assess and manage pain. Three studies reported that poor nurse–patient communication is an obstacle to pain management in ICUs and leads to improper pain assessment and treatment.[25,26,37] Lack of communication is mapped as social opportunity, and the intervention is enablement. Enabling a patient's family to assist nurses to comprehensively assess pain as a family member can help in the identification of pain-related behaviours[37] and assist in overcoming the communication barrier. Including a patient's family in their pain management is both an individual nurse decision[25,26,37] and an administrative decision.[37]

4.1. Strengths and limitations

A strength of this study is its systematic search strategy enabling a large number of articles to be included. The use of the COM-B model enhanced mapping the barriers of nurse-led pain management with the implementation enablers to assist readers in overcoming common barriers found in the literature. A limitation of this study is that a grey literature search was not conducted, and five databases were searched, so some relevant studies may have been missed. The review included studies that used different research designs, populations, and outcomes, and the quality of included studies was varied, with most consisting of descriptive quantitative and qualitative studies. Data analysis and synthesis was conducted using the approach described by Kitchenham,[10] but it is acknowledged that there are limitations in the strength of findings generated from integrative reviews. In addition, one author undertook the title and abstract review of potential papers which may have limited the reliability of this process; however, an experienced researcher audited 10% of all potential papers to support knowledge and skill development of the primary author and three authors participated in full-text review, critical appraisal, and data extraction.

5. Conclusion

The findings of this study suggest that a deficiency in knowledge, nursing beliefs, insufficient numbers of nursing staff, lack of documentation, and poor communication are common barriers to effective pain management in adult ICUs. Based on the COM-B model, barriers and interventions were mapped, providing strategies to enable nurses to improve pain assessment and pain management in the ICU. Educational and training interventions are the most suitable way of enhancing nurses' knowledge of pain assessment and medication, correcting negative attitudes, educating nurses about documentation, and communication between nurses and patients. Pain assessment tools can effectively support nurses in assessing pain in the ICU.

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CRediT authorship contribution statement

Majid Alotni: Data curation, Writing- Original draft preparation, Writing- Reviewing and Editing, **Jed Duff.**: Visualisation, Supervision, Conceptualisation, Methodology, Validation **Michelle Guilhermino**: Supervision Visualisation, Investigation, Validation. **Jenny Sim:** Writing- Reviewing and Editing, Supervision, Validation.

Protocol registration

This systematic review was registered in PROSPERO 2020 under the ID: CRD42020179913 by the International Prospective Register of Systematic Reviews (PROSPERO).

Availability of data and materials

All data in this study are included in this published article (and its supplementary information files).

Consent for publication

Not applicable.

Conflict of interest

No conflicts of interest have been declared by the authors.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.aucc.2022.09.002.

References

[1] International Association for the Study of Pain. IASP's proposed new definition of pain released for comment. 2019 [cited 2020 Jan 6,]; Available from: https://www.iasp-pain.org/PublicationsNews/NewsDetail.aspx?ItemNumber=9218.
[2] Alasad JA, Tabar NA, Ahmad MM. Patients' experience of being in intensive care units. J Crit Care 2015;30(4):859. e7–e859. e11.
[3] Olsen BF, Valeberg BT, Jacobsen M, Småstuen MC, Puntillo K, Rustøen, T. Pain in intensive care unit patients—a longitudinal study. Nursing Open 2021;8(1):224–31.
[4] Devlin JW, Skrobik Y, Gélinas, C, Needham DM, Slooter AJ, Pandharipande PP, et al. Clinical practice guidelines for the prevention and management of pain, agitation/sedation, delirium, immobility, and sleep disruption in adult patients in the ICU. Crit Care Med 2018;46(9):e825–73.

[5] Michie MM Van Stralen, West R. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. Implement Sci 2011;6(1):42.
[6] Michie L Atkins, West R. Needed: physician leader. The Behaviour Change Wheel: a guide to designing interventions, vol. 26. UK: Silverback Publishing; 2014.
[7] West R, Michie S. A brief introduction to the COM-B Model of behaviour and the PRIME Theory of motivation [v1]. Qeios; 2020.
[8] Whittemore R, Knafl K. The integrative review: updated methodology. J Adv Nurs 2005;52(5):546–53.
[9] Hong Q, Fàbregues S, Bartlett G, Boradman F, Cargo M, Dagenais P, et al. The Mixed Methods Appraisal Tool (MMAT) version 2018 for information professionals and researchers. Educ Inf 2018;34(4):285–91.
[10] Kitchenham B. Procedures for performing systematic reviews, vol. 33. Keele, UK: Keele University; 2004. p. 1–26. 2004.
[11] Michie S, Atkins L, West R. The Behaviour Change Wheel: a guide to designing interventions. UK: Silverback Publishing; 2015.
[12] Issa MR, Awajeh AM, Khraisat FS, Rasheed AM, Amirah MF, Hussain A, et al. Impact of an educational program on the knowledge and attitude about pain assessment and management among critical care nurses. Dimens Crit Care Nurs 2019;38(5):271–7.
[13] Ayasrah SM, O'Neill TM, Abdalrahim MS, Sutary MM, Kharabsheh M. Pain assessment and management in critically ill intubated patients in Jordan: a prospective study. Int J Health Sci 2014;8(3):287.
[14] Eid T, Bucknall T, Almazrooa A. Nurses' knowledge and attitudes regarding pain in Saudi Arabia. Pain Manag Nurs 2014;15(4):e25–36.
[15] Wang HL, Tsai YF. Nurses' knowledge and barriers regarding pain management in intensive care units. J Clin Nurs 2010;19(21–22):3188–96.
[16] Khalil H, Mashaqbeh M. Areas of knowledge deficit and misconceptions regarding pain among Jordanian nurses. Pain Manag Nurs 2019;20(6):649–55.
[17] Latina R, Mauro L, Mitello L, D'Angelo D, Caputo L, De Marinis MG, et al. Attitude and knowledge of pain management among Italian nurses in hospital settings. Pain Manag Nurs 2015;16(6):959–67.
[18] Ufashingabire CM, Nsereko E, Njunwa KJ, Brysiewicz P. Knowledge and attitudes of nurses regarding pain in the intensive care unit patients in Rwanda. Rwanda Med J 2016;3(1):21–6.
[19] Erkes EB, Parker VG, Carr RL, Mayo RM. An examination of critical care nurses' knowledge and attitudes regarding pain management in hospitalized patients. Pain Manag Nurs 2001;2(2):47–53.
[20] Kia Z, Allahbakhshian M, Ilkhani M, Nasiri M, Allahbakhshian A. Nurses' use of non-pharmacological pain management methods in intensive care units: a descriptive cross-sectional study. Compl Ther Med 2021;58. no pagination.
[21] Fatma A. How do intensive care nurses assess patient's pain? Nurs Crit Care 2005;8(2):62–7.
[22] Kizza I, Muliira J. Nurses' pain assessment practices with critically ill adult patients. Int Nurs Rev 2015;62(4):573–82.
[23] Damico V, Cazzaniga F, Murano L, Ciceri R, Nattino G, Dal Molin A. Impact of a clinical therapeutic intervention on pain assessment, management, and nursing practices in an intensive care unit: a before-and-after study. Pain Manag Nurs 2018;19(3):256–66.
[24] Hamdan KM. Nurses'assessment practices of pain among critically ill patients. Pain Manag Nurs 2019;20(5):489–96.
[25] Alasiry S, Löfvenmark C. Nurses' perceptions of pain assessment and pain management for patients with myocardial infarction in a coronary care unit. Middle East J Nurs 2013;7(5):9–22.
[26] Puntillo KA, Stannard D, Miaskowski C, Kehrle K, Gleeson S. Use of a pain assessment and intervention notation (PAIN) tool in critical care nursing practice: nurses' evaluations. Heart Lung 2002;31(4):303–14.
[27] Khalil NS. Critical care nurses' use of non-pharmacological pain management methods in Egypt. Appl Nurs Res : ANR 2018;44:33–8.
[28] Younis MB, et al. Barriers and enablers toward pain assessment and management in nonverbal patients in the ICU. Turkish Journal of Physiotherapy and Rehabilitation 2021;32(3):2410–7.
[29] Deldar K, Froutan R, Ebadi A. Challenges faced by nurses in using pain assessment scale in patients unable to communicate: a qualitative study. no pagination BMC Nurs 2018;17(1). Article Number: 11. Date of Publication: 16 Mar 2018.
[30] Samarkandi OA. Knowledge and attitudes of nurses toward pain management. Saudi J Anaesth 2018;12(2):220.
[31] Watt-Watson J, et al. Relationship between nurses' pain knowledge and pain management outcomes for their postoperative cardiac patients. J Adv Nurs 2001;36(4):535–45.
[32] Rose L, Smith O, Gélinas C, Haslam L, Dale C, Luk E, et al. Critical care nurses' pain assessment and management practices: a survey in Canada. Am J Crit Care 2012;21(4):251–9.
[33] Machira G, Kariuki H, Martindale L. Impact of an educational pain management programme on nurses' pain knowledge and attitudes in Kenya. Int J Palliat Nurs 2013;19(7):341–5.
[34] Asadi Noghabi AA, et al. Effect of application of critical-care pain observation tool in patients with decreased level of consciousness on performance of nurses in documentation and reassessment of pain. Hayat 2012;18(3):54–65.
[35] Gélinas C, Ross M, Boitor M, Desjardins S, Vaillant F, Michaud C. Nurses' evaluations of the CPOT use at 12-month post-implementation in the intensive care unit. Nurs Crit Care 2014;19(6):272–80.
[36] Mascarenhas M, Beattie M, Roxburgh M, MacKintosh J, Clarke N, Srivastava D. Using the model for improvement to implement the critical-care pain observation tool in an adult intensive care unit. BMJ Open Qual 2018;7(4):e000304.
[37] Gelinas C, Arbour C, Michaud C, Robar L, Côté J. Patients and ICU nurses' perspectives of non-pharmacological interventions for pain management. Nurs Crit Care 2013;18(6):307–18.