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Effect of Pain Management Educational Program on Competency of Critical Care Area Nurses: A Systematic Review

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ABSTRACT

Background: Pain management in critical care settings is a significant aspect of achieving quality patient care. Pain management education programs can be effective means toward enhancing the competencies of nurses in pain management. Therefore, this systematic review was conducted with the aim of examining the effects of pain management program on competency of critical care nurses.

Methodology: This systematic review was carried out according to a predefined protocol and reported according to PRISMA guidelines. The search was done on PubMed, CINAHL, EMBASE, Cochrane and PsycINFO. The quality assessment was done using the Joanna Briggs Institute's JBI checklist for quasi-experimental studies.

Results: Overall, 14 studies met the inclusion criteria and were included in the review. All the studies were quasi- experimental and achieved high quality methodology rigor. The findings were synthesized into three major themes; effects on knowledge and attitudes, effects nurses on skills of pain management and effects on clinical practices of pain management. The educational programs improved nurses' competencies in terms of knowledge, skills and attitudes. However, the practices of pain management were not slightly improved.

Conclusion: The educational programs proved effective in improving, knowledge, skills and attitude competencies among nurses, in relation to pain management in critical care settings. However, the integration of these competencies in real clinical practices experienced some challenges. This necessitates the need to address structural and systematic barriers that may affect application of gained competencies in clinical practice.

KEYWORDS: Critical Care, Competencies Pain, Management, Nurses, Educational Program, Systematic Review.

INTRODUCTION

Pain can be described as an experience that all people undergo regardless of their age or physical conditions *(Trouvin & Perrot, 2019)*. In medicine, and particularly in intensive care units, managing pain is a priority if recovery and quality of life of the patient are targeted. Patients in critical care units frequently experience excessive pain due to different causes including pain from procedures, pain

resulting from medical conditions, and additionally pain stemming from extreme stress as a result of illness. In these situations, critical care nurses play an important role in assessing, monitoring, and managing pain, thus their competency in this aspect are fundamental in ensuring patients receive quality services *(Nordness et al., 2021)*.

The term pain management includes different techniques which aim at lessening or eliminating the pain experienced by the patient. Such methods can be either chemical as in the case of opioids and non-opioids or psychological behavioral therapies, physical therapy, and other complementary methods. The pain management techniques used vary depending on the type and intensity of pain, patient choice, and the clinical environment *(Zakeri et al., 2024)*. In ICU management, where patients are often heavily sedated or on a ventilator and unable to verbally express localizing pain, evaluation and treatment of pain presents unique and complex obstacles *(Sandvik et al., 2020)*.

Pain management in Intensive Care Units and other critically ill patients lies primarily on the critical care nurses. It is the nature of their job wherever they work; they will be the first to see and manage the pain, hence knowledge and competency in pain assessment and management become mandatory. The American Association of Critical-Care Nurses (AACN) asserts that the critical care nurse ought to assess the patient's pain, understand pain adjunctive pharmacology, and employ a multitude of pain management strategies for the patient's benefit *(Ulrich et al., 2019)*. Literature sources indicate that in dealing with pain dysregulation, the practical and theoretical abilities of nurses in critical care increase the likelihood of favorable health results *(Miller, 2024; Nordness et al., 2021)*. For instance, Gelaye et al. (2021), showed that adequate theoretical knowledge and practical competency among nurses assisted nurses in using established guidelines in managing pain among patients. Poor pain management may be compounded by several factors including prolonged periods of recovery, increased anxiety levels and distress in patients, and high costs of healthcare due to complications arising from pain never treated. In addition, bad practices in the management of pain are likely to result in poor experiences and low satisfaction among patients *(Ayenew et al., 2021)*.

Therefore, educational programs for nurses are critical in improving nursing competencies *(Mlambo et al., 2021)*. Through continuous nursing educational interventions, nurses are given opportunities that can improve their knowledge and competency as well as attitudes in relation to nursing practices. This is important in ensuring that standardized patient care is achieved and maintained in nursing environments. Through these interventions, nurses gain new insights about new knowledge and competency related to diverse patient needs, thus enhancing their proficiency in effectively dealing with diverse patient needs *(Lera et al., 2020)*. Nurses' involvement in such interventions provides them with great opportunities for different advancement in their careers.

Continuous education for nurses has been linked to nurse specialization in specific nursing areas, enhancing their leadership competencies, thus making them take up leadership responsibilities and also enabling them to effectively transition to more advanced nursing fields within their healthcare setting. In lay terms, continuous education is important for nurses' professional growth and development. It enables nurses to take up advanced positions such as clinical nurse educators, and specialists *(Lera et al., 2020; Rouleau et al., 2019)*. Educational interventions on pain management are focused on covering broad topics that provide theoretical and practical competencies to nurses. These interventions are developed to address several components of managing pain in patients including assessment of pain intensity, using pharmacological and non-pharmacological approaches, effective

communication with patients experiencing pain, in addition to ethical issues in pain management and treatment *(Chatchumni et al., 2022)*.

A systematic review of the literature regarding how educational programs on competency of critical care nurses in pain management is necessary in consolidating existing results and provide clear and comprehensive effects of such programs. While diverse studies have examined pain management, especially in general nursing practices, fewer studies have focused on the context of critical care, where the challenge of assessing and managing pain is often acute *(Gelaye et al., 2021; Nguyen & Liu, 2021)*. Understanding the role of educational programs is essential for developing best practices in critical care pain management and ensuring that nurses are adequately prepared to patient needs. Thus, this systematic review was conducted with the aim of examining the effects of pain management program on competency of critical care nurses.

METHODOLOGY

A systematic review methodology was adopted to identify and synthesize research evidence on effects of pain management program on competency of critical care nurses. The review was conducted based on PRISMA guidelines for conducting systematic reviews *(Page et al., 2021)*. The research question for the review was formulated using the population or problem, intervention, comparison and outcome (PICO) format. The following research question guided the systematic review: what are the effects of pain management program on competency of critical care nurses?

Search Strategy

In order to gather the appropriate literature for the review regarding the impact of pain management schemes on the competency of critical care nurses, review of literature was conducted using a systematic literature search approach which was carried out in several other databases such as PubMed, CINAHL, EMBASE, Cochrane and PsycINFO. The search strategy was based on the PICO to enhance its formulation. The key elements were Population (critical care nurses), Intervention (pain management programs) and Outcome (competency). Appropriate keywords and Boolean Operators helped in formulating the search strings. With respect to the population, terms of 'critical care nurses' 'ICU nurses', 'intensive care nurses' were used with OR to cover all forms. Keywords such as 'pain management Programme', 'pain and 'pain management protocols' were used for intervention. The outcome was identified using keywords such as 'competency', 'competency', 'knowledge' and 'proficiency'. These aspects were then combined using AND in order to restrict the search to studies which covered all the issues of the search topic.

Inclusion and exclusion criteria

The inclusion and exclusion criteria used in this study were as tabulated below

Table 1 (Inclusion and Exclusion Criteria.)

Study criteria	Inclusion	Exclusion
Design	Studies with empirical designs, original peer reviewed and focused on educational programs were eligible for inclusion	Editorial, opinion papers, and other non-empirical publications were excluded from the review

Language	Studies published in English	Other language of publication
Population	Nurses and critical care nurses	Other healthcare professionals
Publication range	Published between January 2018-December 2024	Before 2018

Quality Assessment

Quality assessment in systematic reviews entails examining the methodological rigor of studies to be included in the review *(Zeng et al., 2015)*. This encompasses evaluating the design, sampling, sample size and reliability of the findings among others. Quality assessment ensures consideration of the relevance, validity, reliability and consistency of results across the studies to be included in the review to ensure comprehensive and evidence-based conclusions are drawn (Carroll & Booth, 2015; Ma et al., 2020). The quality assessment of the studies included were assessed using the JBI checklist for quasi-experimental studies (Barker et al., 2024). The checklist comprises 9 questions that assesses quality of studies under internal validity, bias related to participant retention and statistical conclusion validity. The questions were rated as "yes" or "no" and 1 mark and 0 mark were allocated for yes response and no response respectively. The studies were categorized based on the following criteria; low quality: (1-3 points), moderate quality (4-6 points) and high quality (7-9 points). Table 3, presents the quality assessment results.

Data Extraction and Synthesis

The data from the included studies were extracted using an extraction template. The main characteristics of the studies extracted include authors and year of publication, country, design, study participants, interventions, outcome measures and main findings. A narrative approach was used during synthesis of data and the findings from the studies were categorized thematically.

RESULTS

Identification and selection of included Studies

The search identified 1021 studies. Out of them, 602 duplicates were removed. Titles and abstracts were screened and analyzed on 419 studies, leading to further exclusion of 369 studies. Out of 50 studies sought for retrieval, 26 could not be retrieved. full text assessment included 24 studies and further 8 studies were excluded with reasons. The review included 14 studies reporting effects of effects of pain management program on competency of critical care nurses *(El-Aqoul et al., 2020; Germossa et al., 2018; Innab et al., 2022; Issa et al., 2019; Issa et al., 2021; Mala et al., 2024; Narbona et al., 2020; Olawale et al., 2020; Ozawa et al., 2022; Parvizy et al., 2020; Salim et al., 2020; Sedighie et al., 2020; Siddiqui et al., 2024; Uysal & Yilmazer, 2021).*
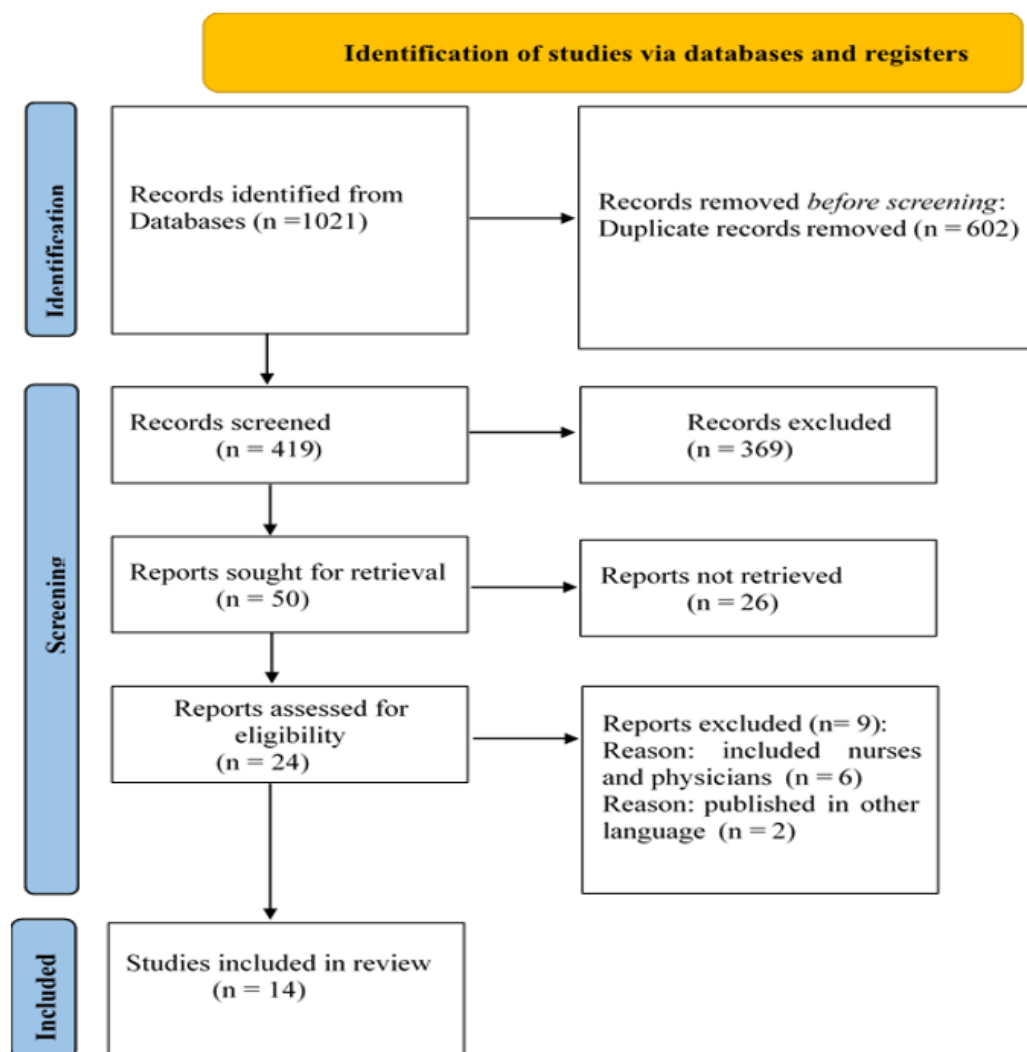
Figure 1 (Prisma diagram.)

Characteristics of the Studies

All the 14 studies included in this systematic review used quasi-experimental design. These studies were carried out in different countries; three studies were carried out in Saudi Arabia design (Issa et al.,2019; Issa et al., 2021; Innab et al.,2022), two studies in Iran (Parvizy et al.,2020; Sedighie et al.,2020), Ethiopia (Germossa et al., 2018), Turkey (Uysal & Yilmazer, (2021), Jordan (El-Aqoul et al., 2020), Spain (Narbona et al., 2020), Thailand (Mala et al., 2024), Japan (Ozawa et al.,2022), Pakistan (Siddiqui et al.,2024), Nigeria (Olawale et al.,2020), and United Arab Emirates (Salim et al.,2020). Further details of the included studies are summarized in Table 2 below.

Table 2 (Summary of Studies included in this systematic review.)

Authors	Year	Country	Design	Study Participants	Interventions	Outcome Measures	Main Findings

Issa, M. R., Awajeh, A. M., Khraisat, F. S., Rasheed, A. M., Amirah, M. F., Hussain, A., Alharthy, A.	2019	Saudi Arabia	Pretest-Posttest Experimental	204 ICU nurses	Pain management educational program	Knowledge and Attitude Survey Regarding Pain (KASRP)	Significant improvement in knowledge and attitudes towards pain management post-education.
Innab, A., Alammar, K., Alqahtani, N., Aldawood, F., Kerari, A., Alenezi, A.	2022	Saudi Arabia	Quasi-Experimental	124 ICU/inpatient nurses	12-hour structured educational program	Knowledge and Attitudes Survey Regarding Pain, Learning self-efficacy scale	Significant improvement in knowledge and attitudes regardless of educational background.
Issa, M. R., Muslim, N. A., Sharif, Z. M.	2021	Saudi Arabia	Quasi-Experimental	330 nurses	Model-based learning and educational strategies	Knowledge, Attitude, Pain Management Awareness	Model-based learning significantly improved nurses' attitudes and awareness towards pain management.

Salim, N. A., Joshua, R., AbuBaker, N. A., Chehab, F., Jose, A.	2020	United Arab Emirates	Quasi-Experimental	200 nurses	In-service educational program on pain management	Knowledge and Attitude Survey Regarding Pain (KASRP)	Significant improvement in pain management knowledge post-intervention.
Olawale, M. O., Olorunfemi, O., Oyewole, O. M., Salawu, R. A.	2020	Nigeria	Quasi-Experimental	60 nurses in surgical ward	Teaching program on postoperative pain management	Knowledge of postoperative pain management	Significant improvement in knowledge of postoperative pain management post-education.
Siddiqui, A. S., Zehra, T., Ahmed, A., Rehman, A., Ahmed, U., Afshan, G.	2024	Pakistan	Pretest-Posttest Experimental	86 nursing staff	Hybrid educational course on pain assessment	Clinical assessment scores for PCIA and Epidural Analgesia	Significant improvement in clinical skills for pain assessment post-education.
Ozawa, M., Yokoo, K., Sumiya, T., Kawano, R.	2022	Japan	Quasi-Experimental	115 neonatal nurses	Virtual neonatal pain management program	Pain knowledge and measurement skill acquisition	Significant improvement in pain measurement skills post-education.
Sedighie, L., Bolourchifard, F., Rassouli,	2020	Iran	Quasi-experimental	ICU nurses from Shahid Beheshti	Comprehensive pain management training program	Nurses' awareness and attitude towards	Significant increase in awareness post-training.

M., Zayeri, F.				University Hospital		pain managem ent	
Parvizy, S., Tarvirdina sab, S., Raznahan, R., Aliakbari, M.	2020	Iran	Quasi-experime ntal	Pediatric nurses	Pain management workshop training program	Knowledg e, attitude, and self-efficacy	Significant improvements in knowledge, attitude, and self-efficacy post-training.
Uysal, N., Yilmazer, T.	2021	Turke y	Quasi-experime ntal	Nurses in internal medicine clinics	Pain management training program	Knowledg e and practice in pain managem ent	Significant improvements in knowledge but no change in practices.
El-Aqoul, A., Obaid, A., Jarrah, I., Al-Rawashde h, K., Al Hroub, A.	2020	Jorda n	Experime ntal (with control group)	150 nurses (75 experiment al, 75 control)	Structured pain education program	Knowledg e and attitude toward cancer pain managem ent	Significant improvement in knowledge and attitude in experimental group.
Germossa, G. N., Sjetne, I. S., Hellesø, R.	2018	Ethio pia	Quasi-experime ntal	111 nurses at Jimma University Medical Center	In-service educational program on pain management	Knowledg e and Attitudes Survey Regarding Pain (KASRP)	Significant improvement in knowledge and attitudes post-education.

Muñoz-Narbona, L., Cabrera-Jaime, S., Lluch-Canut, T., Barroso Castaño, P., Roldán-Merino, J.	2020	Spain	Quasi-experimental	401 nurses	E-learning course for pain assessment (PAINAD-Sp)	Pre- and post-course quiz, satisfaction survey	99% of participants passed the quiz, high satisfaction with the course.
Mala, O., Kain, V. J., Forster, E. M.	2024	Thailand	Quasi-experimental	68 neonatal nurses and midwives	Web-based learning program for neonatal pain management	Knowledge, attitude, and self-competence in neonatal pain management	Significant improvement in knowledge, attitude, and perceived self-competence.

Methodological Quality of the Studies

All the studies included were categorized as high-quality studies. Most of the studies scored 8/9 (El-Aqoul et al., 2020; Innab et al., 2022; Issa et al., 2019; Issa et al., 2021; Mala et al., 2024; Narbona et al., 2020; Ozawa et al., 2022; Parvizy et al., 2020; Sedighie et al., 2020; Siddiqui et al., 2024) and only four studies adhered to all items in the checklist, scoring 9/9 (Germossa et al., 2018; Olawale et al., 2020; Salim et al., 2020; Uysal & Yilmazer, 2021).

Table 3 (methodological quality assessment results.)

	Issa et al., (2019)	Innab et al., (2022)	Issa et al., (2021)	Salim et al., (2020)	Olawale et al., (2020)	Siddiqui et al., (2024)	Ozawa et al., (2022)	Sedighie et al., 2020)	Parvizy et al., 2020)	(Uysal & Yilmazer, 2021)	(El-Aqoul et al., 2020)	(Germossa et al., 2018)	Narbona et al., 2020)	Mala et al., 2024)
Internal Validity														
Is it clear in the study what is the "cause" and what is the "effect" (i.e., there is no confusion about which variable comes first)?	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Was there a control group?	0	0	0	1	1	0	0	0	0	1	0	1	0	0
Were participants included in any comparisons similar?	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Bias related to assessment, detection and measurement of the outcome														
Were there multiple measurements of the outcome, both pre and post the intervention/exposure?	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Were the outcomes of participants included in any comparisons measured in the same way?	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Were outcomes measured in a reliable way?	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Bias related to participant retention														
Was follow-up complete and if not, were differences between groups in terms of their follow-up adequately described and analyzed?	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Statistical Conclusion Validity														

Was appropriate statistical analysis used?	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total scores	8	8	8	9	9	8	8	8	8	9	8	9	8	8
Quality (out of 9)	High	High	High	High	High	High	High	High	High	High	High	High	High	High

Effects of Educational Programs.

The synthesis of evidence from the included studies were categorized into three broad themes illustrating the effects of educational programs on competency of nurses in critical care in pain management. These themes included effects on Knowledge and Attitudes, effects on skills and effects on clinical practices of pain management.

Effects on Knowledge and attitudes

These studies combined show how the various educational programs were effective in enhancing the knowledge as well as attitudes of the nurses on pain. In a study Issa et al (2019), the knowledge and attitude of the ICU nurses improved after conducting an intervention with workshop and lectures. First, the average scores of nurses' overall knowledge and attitude toward pain assessment were low, while after the intervention, the total average score of the knowledge improved from 89 to 131, and attitudes improved from 71.8 to 142, indicating significant improvement in their understanding and attitudes to pain management.

Another study conducted by Innab et al. (2022) in Saudi Arabia revealed that a 12-hour educational intervention could improve the knowledge and attitudes of the nurses. Before the intervention, the nurses' knowledge was at a moderate level and but there was improvement after the health education program with the knowledge score increasing from 20.3 to 22.2. Salim et al. (2019) employed a similar in-service education program in the UAE that was 5 hours in duration; the results showed an improvement in the nurses' knowledge because the scores increased from 61.36% to 69.94%, but it still did not meet the ideal score of 75%. This implies that short educational interventions have the potential to enhance the knowledge and attitude of the nurses toward pain management.

In Thailand, Mala et al. (2024) conducted a study with an objective of assessing the impact of developing a web-based educational program for neonatal nurses and midwives. Before the implementation of the intervention, the knowledge, attitude and perceived self- efficacy of the nurses on neonatal pain management was low. After the acquisition of the online program, nurses demonstrated significant enhancement in all the aspects. The participants' post-test questionnaires indicated they felt more knowledgeable, and the Wilcoxon test results proved that the training made a positive impact in the ability of participants to manage patients' pain. Equally important this study has highlighted the benefits of accessible online education in enhancing knowledge and attitude with regard to low resource context.

Further, Narbona et al., (2020) examined the efficacy of the e-learning course about pain assessment in patients who are unable to communicate through the PAINAD-Sp scale. In the pre-intervention

assessment, it was ascertained that the PAINAD-Sp scale remained relatively unknown among the nurses and was not applied in practice to any significant degree. Almost all of the participants who attended the e-learning course successfully completed the knowledge quiz at the end of the session and their perception of pain assessment was found to have improved remarkably. This study also established the high significance of online training in enhancing the knowledge and attitudes of nurses on the use of the standardized pain assessment tools. Based on the contextual framework, a study done in Ethiopia by Germossa et al. (2018) aimed to determine the effectiveness of in-service educational intervention on knowledge and attitude about pain among the nurses in an academic hospital. The pre-test revealed that nurses lacked adequate knowledge of pain management and had negative attitudes towards it, while by the end of the Programme the nurses' KASRP scores had increased from 41.4% to 63%. This study highlighted the importance of knowledge-focused, attitudinal change in in-service education especially in the context of the absence of pain management education for nurses.

Effects Nurses on skills of pain Management

Several of these studies revealed enhancement in actual core competencies and skills of nurses, especially on pain assessment and its management. The study by Siddiqui et al. (2024) carried out in Pakistan was an effort to improve nurses' application of pain control tools such as PCA and epidural. In the intervention, the nurses did not demonstrate sufficient clinical skills in these areas but after attending a 5 hours hybrid nurse education course the competency and skills were significantly increased. The scores for each of the PCIA skills rose by 90.79% while the epidural analgesia rose by 79.47% implying that hand on training coupled with online learning boosted the nurses' practical skills. The same improvement in competency was also observed in Japan after virtual neonatal pain management program by Ozawa et al., (2022). The findings showed improved in skills of using neonatal pain scales by nurses after the completion of the program that was facilitated through synchronous online lectures and instructional videos.

Parvizy et al. (2020) in their study among the pediatric nurses organized participation in a workshop on pain management and found an increase on nurses' skills and self-efficacy. The study found in the pre-intervention survey that nurses participating in the study expressed a low level of self-efficacy and had poor skills regarding pediatric pain management. After the intervention, knowledge regarding pediatric pain management was higher, as was the level of skills and confidence. The increase in self-efficacy is significant; this domain involves the maturity of clinical reasoning among the nurses, the extent of which has improved in the course of nursing practice.

For instance, Sedighie et al. (2020) assessed the impact of comprehensive pain management training program on the awareness and competence among the ICU Care nurses. Employing a self-developed survey before the training, the study found that the ICU nurses were initiating but had moderate awareness and skills of pain assessment tools. The findings depicted that the understanding of knowledge and the consistency of application of pain tools among the nurses had improved after the intervention. Still, the study also revealed that the improvement in the skills was not followed by the same level of improvement in the attitudes toward pain management; the authors stated that merely skill competencies are comparable to the knowledge in pain management but change in attitudes may take longer.

Effects on clinical practices of pain management.

Lastly, in the overall pain management practices, there was an enhancement for which was also seen across the studies. Olawale et al. (2020) evaluated the efficiency of a teaching program on postoperative pain management in Nigeria. The analysis of results for nurses in the experimental group revealed the increase of the mean test scores from 1.05 to 1.62, proving the subjects' enhanced knowledge after the intervention. These enhancements of knowledge are clearly related to improvement in the management of pain especially postoperative pain because the nurses performed the assessment and documentation properly. Similarly, Issa et al. (2021) conducted a model-based learning intervention to increase the nurses' awareness and attitudes towards pain management and noticed the improvement. Specifically, there was an emphasis for the practice of pain reassessment and the changes in the interventions according to the patients' reactions which helped in improving the pain management in the ICU.

On the contrary, Uysal et al. (2021) aimed to determine the effects of a pain management training program for nurses working at internal medicine clinics. This showed that while improvement in the knowledge level of nurses who received the training as evidenced by the tests administered to them, there was not much enhancement of the trainees' clinical capabilities and practices. The nurses showed less improvement in the practice of the use of non-pharmacological methods. The study also highlighted the need for to provide more follow-up training as most of the participants were receptive to acquiring more knowledge but challenged by implementing it in practice settings.

Similarly, Sedighie et al. (2020) also examined the impact of the acquainted training on the knowledge and practice of nurses working in the ICU; the findings revealed that the scores of both the nurse's awareness and usage of the pain assessment tools post-training were significantly higher as compared to that of the initial phase, but there is still room for further enhancements concerning practices related to pain management in the ICU including the re-evaluation of pain. This implies that even though educational initiatives impact clinical practices positively the actual practice of these practices in clinical setting requires constant influence and encouragement. Lastly, the study conducted by El-Aqoul et al. (2020) in Jordanian cancer patients evaluated the impact a structured pain education. After the intervention, knowledge and attitudes of the nurses in the experimental group changed favorably, but the changes in clinical practices were less evident.

DISCUSSION

This systematic review was conducted with the aim of examining the effects of pain management program on competency of critical care nurses. The research findings highlighted in the current synthesis give a broad perspective on the interventions' influence on knowledge, attitudes and practice amongst the nursing staff. Results of the studies revealed that pain management education improved nurses' knowledge of pain in different healthcare areas, including neonatal intensive care units, pediatric units, internal medicine ward, and intensive care units. While both knowledge and attitude were effectively enhanced, maintaining positive change and using them to deliver better clinical practices was a challenge that was not easily overcome.

 The review showed that across the educational interventions implemented whether face-to-face, online and hybrid approach, they had positive impacts on nurses' knowledge and attitudes toward management of pain (Innab et al., 2022; Issa et al., 2019; Issa et al., 2021). This indicates that nurses are very responsive to organized training interventions therefore implies that any knowledge deficits in pain management can be corrected by well-designed continuing education programs. Many ideas of educational models such as face-to-face workshops, distance education, and blended learning show that

it is possible to use different methods effectively in order to improve pain management competencies. The change in attitude is important, especially regarding pain management, as it implies an increased understanding of the issue and a firm focus on patients' needs (Mala et al., 2024; Narbona et al., 2020; Salim et al., 2020). But change in attitude does not go far enough if it is not accompanied by a change in clinical practice. This brings the question about the level of applying what have been learnt to meaning changes in clinical practices (Sedighie et al., 2020; Siddiqui et al., 2024).

Evidence on the difficulty of implementing pain management knowledge into practice is seen in several studies whereby there was improvement in knowledge score but clinical care was not ideal (El-Aqoul et al., 2020; Sedighie et al., 2020; Uysal & Yilmazer, 2021). This divergence might demonstrate that the main challenges for pain management are not solely as a result of workforce's knowledge deficit but also system constrains. The demands created by the job, as well as nurse shortages, also act as an obstacle in introducing solutions since the nurses, despite being aware of the value of such changes, may not always have the capacity to put them into practice (Parvizy et al., 2020; Sedighie et al., 2020). Therefore, a strong foundation from top management and well-coordinated protocols and staffing are compulsory for the prioritization of adequate pain management. With no such support structures in place, it remains the responsibility of the nurses to change, making it difficult to generate and sustain change.

The other important consideration is the culture within the organization in relation to the management of pain. When pain management is not established as fundamental part of the nursing care, then the nurses can find it difficult to implement the training they received (Parvizy et al., 2020; Sedighie et al., 2020). An organization culture that measures the rate of productivity and the ability to finish tasks may not encourage comprehensive pain assessment and individualized management (Ozawa et al., 2022; Salim et al., 2020). This calls systemic change that cannot be noticed at the level of learner education programs but permeates other institutional structures. Measures should be taken to incorporate pain management into quality improvement, and to evaluate feedback and progress which reassures nurses about its applicability (Narbona et al., 2020; Uysal & Yilmazer, 2021).

Additionally, the success of pain management education programs relies on the level of the practical component and role-playing scenarios. Knowledge is important but pain management is something which involves clinical decision making on the spot and that cannot be achieve through theory classes and online programs (Olawale et al., 2020; Ozawa et al., 2022). Training sessions, focusing on such activities as simulation-based training, use of mentors and case discussions, give the nurse a possibility to supplement their knowledge with real life practice. The analyzed studies point out that educational interventions improve knowledge gains; however, their application in clinical work would benefit from introducing knowledge-based exercises imitating clinical practice (Innab et al., 2022; Siddiqui et al., 2024).

Another concern is whether the changes that were on knowledge and attitudes are sustainable. Several researches confirmed that there was significant improvement post training, but few studies did check for long term effects (El-Aqoul et al., 2020; Narbona et al., 2020; Parvizy et al., 2020; Uysal & Yilmazer, 2021). This points to the fact that traditional one-shot intensive educational programs may not be effective in the long run. It may be necessary to have repeated training, coursework, and feedback measures to maintain a focus on pain management within professional practice. The education programs should also encompass not only one-time training but also continuous skills improvement

with knowledge regarding which areas call for reinforce learnt at different points in life (Narbona et al., 2020; Uysal & Yilmazer, 2021).

Limitations

This review has the following limitation: It has only focused upon analysis of effectiveness of educational intervention rather than exploring and comparing the integrated health center's pain management strategies. . Another limitation is the diversity of the education interventions as the studies various teaching models making it challenging to compare the specific effectiveness of each intervention.

Implications for Nursing Practice

Some of the implications of the findings of this review are as follows: First, this review highlights that nurses' competencies, in terms of knowledge, their attitudes and skills concerning pain management could be improved through educational intercessions and therefore underlines the importance of continuing education for nurses. Pain management is one of the most important aspects that reflect the quality of the provided healthcare services, and the nurses are most often responsible for the assessment of the patients' pain and the subsequent administration of the relief measures. Hence, structured training programs whether face-to-face, online based or hybrid type needs to be embraced as evidenced by the findings of this review. However, translating the acquired knowledge to clinical practice remained a significant challenge. This implies that organizational support is crucial for effective practice, in addition to educational programs. Healthcare organization, should ensure that they make the tools of pain assessment easily available, protocols on pain management are clearly stated and ensure that nurses are facilitated to apply the recommended procedures. Also, professional development should be incorporated in the career ladder of nursing. Ongoing teaching and coaching should be done to remind the nurses of the changes in practice and to determine whether patients are receiving quality, patient-centered pain management.

CONCLUSION

In conclusion, this systematic reviewed ascertained that educational programs can bring about positive improvement in the competencies of nurses, especially in knowledge, skills and attitude of nurses towards the management of pain. However, the translation of these enhancements and implementation in constant practice necessitates institutional support. Pain management education for nurses and the application of the gain knowledge skills and attitudes within healthcare institution will better equip these nurses to advocate for their patients with improved patient outcomes.

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