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Awareness and Evaluation of the Critical Care Pain Observation Tool (CPOT) Implementation among Critical Care Nurses in Teaching Hospital

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ABSTRACT

Background: Pain is subjective and unmeasurable. The gold standard for pain evaluation is self-reporting. Regrettably, pain often goes unrecognised in critically ill patients. Thus, a valid and reliable pain assessment tool is important to effectively assess pain level among critically ill patients. **Objectives:** This study aims to identify the awareness and evaluation of the implementation of the Critical Care Pain Observation Tool (CPOT) among critical care nurses in Pusat Pakar Perubatan UiTM (PPUiTM), Malaysia. **Methods:** This quasi-experimental research utilised a one-group pretest-post-test design with total population sampling. Forty (40) critical care nurses from the Coronary Care Unit (CCU) or Cardiac Intensive Care Unit CICU, and Intensive Care Unit (ICU) units participated. The intervention involved training on CPOT usage. Pain awareness levels and CPOT evaluation were assessed using a validated questionnaire comprising demographic data, pain assessment awareness, and CPOT evaluation sections. Data were analysed using the Statistical Package for IBM Social Sciences (SPSS) version 27.0, with chi-square applied to assess pre- and post-intervention differences. **Results:** Most participants demonstrated poor pain awareness levels during the pre-test (70%), which significantly increased to 92.5% post-intervention. For the evaluation of CPOT, 77.5% of the participants would recommend using CPOT routinely in their practice. However, there are no significant associations between participant demographic data with the awareness of pain assessment and CPOT evaluation among participants for both pre- and post-tests, as the *p*-value recorded is >0.05. **Conclusion:** The interventions have effectively improved critical care nurses' understanding and awareness of critically ill patient pain assessment. The high rating of CPOT directive clarity indicates that the training provided to nurses for this study was successful.

Keywords: Critical Care Pain Observation Tools; CPOT Evaluation; Nurses' Pain Awareness; Pain in Critically Ill Patients

INTRODUCTION

Pain is defined as "an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage" (International Association for the Study of Pain (IASP), 2020). Pain is a subjective experience that cannot be scientifically measured and has been recognised as the fifth vital sign aside from blood pressure, heart rate, blood oxygen saturation (SpO_2), and respiratory rate (Boitor *et al*., 2019; Modanloo *et al*., 2019; Zhai *et al*., 2020). Pain is frequently under-recognised in critically ill patients, particularly among those who are unable to self-report (Nordness *et al*., 2021; Sandvik *et al*., 2024).

The prevalence of pain in critically ill patients is estimated to be between 33.2% and 95%, with 30% of patients experiencing pain at rest and 50% during nursing procedures (Pinheiro & Marques, 2019; Idris *et al*.,

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2021). Siddiqui *et al.* (2023) also state that patients admitted to the ICU frequently experience moderate to severe pain both at rest and during care-related activities. The consequences of unaddressed pain in the ICU are chronic. In the United States, over five million ICU patients are admitted each year, averaging an ICU stay of 3.8 days. Among these, 17% remember experiencing terrible pain related to their ICU experience up to six months following discharge, and 18% are at risk of developing post-traumatic stress disorder (PTSD) (Kotfis *et al.*, 2017; Nordness *et al*., 2021). These findings highlight the value of improved pain control with potential improvement in short- and long-term outcomes for ICU patients. The critical care environment makes pain assessment in this population challenging, as many patients cannot report their pain due to sedation, delirium or mechanical ventilation (Hamdan, 2019). Patients may also be physically or chemically restrained due to these diseases, which prevents them from displaying normal pain and behaviour. Though physiologic measures such as alterations in vital signs may indicate the presence of pain, they are nonspecific and easily influenced by other factors, including medical procedures (Zhai *et al*., 2020).

To overcome these challenges, validated tools like the Critical Care Pain Observation Tool (CPOT) have been developed, which provide an effective way to evaluate pain in patients unable to communicate in intensive care units (Gélinas *et al*. 2006). This study seeks to assess critical care nurses' awareness and use of CPOT as a tool for standardised pain assessment to withstand the ever-present challenge of pain management in ICU. Pain can be suggested by physiological parameters like vital signs. These characteristics can also change in other situations and not only in pain but also in response to other stimuli, such as medical or nursing procedures. Therefore, the most probable surrogate method for pain assessment must be accurate and non-cognisant because vital signs should not be used as pain assessment surrogates (Hamdan, 2019; Zhai *et al*., 2020; Nordness *et al.*, 2021). Additionally, the pain assessment tool needs to have a sensitivity and specific value for pain (Kouhi *et al*., 2023). Physiological indicators, such as vital signs, can indicate the existence of pain. However, these characteristics are not exclusive to pain and can be influenced by various other events, such as medical or nursing procedures. Hence, an accurate and reliable pain assessment method is the best potential surrogate because vital indicators should not be used as pain evaluation surrogates (Hamdan, 2019; Zhai *et al*., 2020; Nordness *et al.*, 2021). In addition to that, the pain assessment tool should have good sensitivity and specific value for assessing pain (Kouhi *et al*., 2023).

CPOT was developed by Gélinas *et al*. (2006) in French, and it contains four dimensions, which are facial expression, body movement, muscle tension, and compliance with the ventilator (for the intubated patient) or vocalisation (for the extubated patient). In each dimension, the score given was zero (0) to two (2), with a total score ranging from zero (0) to eight (8). CPOT was developed exclusively for critically ill patients and is approved by the Society of Critical Care Medicine for pain assessment in critically ill patients who are unable to express their pain (Sandvik *et al*., 2024; Yamakova *et al.*, 2024; Zhai *et al*., 2020). When a patient is unable to communicate their pain, CPOT acts as a substitute for self-report; the patient is both conscious and unconscious, and it is the most recommended instrument in assessing the critically ill patient's level of pain, as it focuses on the patient's behavioural and psychological indicators (Kouhi *et al*., 2023; Zhai *et al*., 2020).

In addition to that, critical care nurses should have good knowledge of assessing pain in critically ill patients. However, studies show that nurses lack awareness in determining the patient level of pain. Negese *et al.* (2020) mentioned that nurses were having a lack of understanding regarding patient behaviour when they are in pain, and inadequate understanding could be attributed to a lack of guidelines, protocols, and a low priority placed on pain assessment, as well as a lack of familiarity with pain assessment methods.

Hence, this study examined critical care nurses' knowledge of pain assessment and the use of the Critical Care Pain Observation Tool (CPOT) among critical care patients and its effect on pain management practices in the critical care unit in Pusat Pakar Perubatan UiTM (PPUiTM). In this study, it is aimed to assess the degree to which CPOT implementation training improved critical care nurses' awareness of pain and accuracy in pain assessment.

METHODOLOGY

This study employed a quasi-experimental design with a one-group pre-post test approach. It utilised total population sampling, involving 40 critical care nurses distributed across three units: CICU (18 nurses), ICU (10 nurses) and CCU (12 nurses). The population comprised all critical care nurses employed at PPUiTM, a

university-based hospital in Sungai Buloh, Selangor, with 20 critical care beds. Total population sampling was employed, ensuring inclusion of all eligible nurses within the targeted units. The participant allocation to each unit was based on their current working departments to maintain consistency in the intervention process and results. The inclusion criterion for this study is (i) a staff nurse who worked in the critical care unit, while the exclusion criteria for this study are (i) a staff nurse who is on attachment to the critical care unit, (ii) a newly graduated nurse who has working experience of less than six months, (iii) a critical care nurse who is working during office hours, (iv) a critical care nurse on maternity or extended medical leave, and (v) a critical care nurse on long study leave. The sample was determined based on the total number of critical care nurses available during the data collection period to ensure a comprehensive representation.

This study adopted a validated research instrument derived from Maatouk *et al*. (2019), which is the CPOT assessment tool and the feasibility and clinical utility of the CPOT questionnaire, consisting of 3 sections: (i) demographic data, (ii) pain assessment awareness, and (iii) nurses' evaluation of the implementation of CPOT. To ensure content validity, the instruments were reviewed by six panels of experts, consisting of one intensivist and one anaesthetist, one nurse manager, two staff nurses in the critical care unit from the hospital and one nursing lecturer from the university. This instrument shows excellent reliability with Cronbach's Alpha Coefficient of 0.869 for pain assessment awareness and 0.941 for nurses' evaluation on the use of CPOT. Data were analysed using SPSS version 27.0. Paired *t*-tests were used to compare pretest and post-test outcomes, with statistical significance set at $p < 0.05$. The use of this method was justified by its suitability for evaluating within-group differences in interventions involving continuous data.

This study was then further divided into four phases, as below.

Phase 1: Staff Meeting (Pre-Intervention Phase)

Staff meetings were held with the researcher, nurse manager, and participant. The purpose of these sessions was to explain and introduce the CPOT tools. At the same time, sets of questionnaires (pre-test) were distributed to the participants to assess their level of pain awareness. In addition, it was brought to the attention of the staff that their involvement in this study was entirely voluntary and that they were permitted to withdraw their participation at any point during the study.

Phase 2: Staff Training (Intervention Phase I)

An educational session was held three times per week for two months, from 1st February 2023 until 3rd April 2023. This measure was implemented to guarantee that all critical care nurses possess comprehensive knowledge of pain evaluation and are proficient in the correct use of the CPOT. The instruction was delivered as a continuous nursing education (CNE) programme. An attendance record was collected at the end of the CNE session to verify the participation of all critical care nurses. The CNE highlights the significance of pain evaluation in critically ill patients. The participants were provided with comprehensive explanations of each item in the CPOT tools. Additionally, a video demonstration from a YouTube channel by Celine Gelinas was presented to the participants to increase their understanding and ensure the appropriate utilisation of the CPOT (Gélinas *et al.*, 2006).

Furthermore, a handout was distributed to all units to facilitate the scoring evaluation by providing guidance and reference. The participant was directed to utilise and obtain the CPOT score during the procedure, validated as a painful operation involving suctioning, positioning, and arterial line insertion. The participant was taught and instructed to do the following while using CPOT: (1) take the patient's baseline level of pain by recording CPOT for 1 minute while the patient is at rest, which is before the painful procedure starts; (2) record CPOT while doing the painful procedure and (3) after the painful procedure is done. Then, the participant needs to wait another 1 minute and then take another CPOT score, and (4) record the CPOT score on the CPOT sheet and record it in their nursing documentation.

The trainer must meet two criteria:1) They must be an experienced critical care nurse with a minimum of five years of working experience in critical care, and 2) the head nurse management must approve the selected trainer. The selected trainers were chosen based on their expertise and clinical competence, which made them capable of delivering training to other nurses. The approval for the superior ensures that the selected trainer aligns with the competency standards and the hospital policies and protocols. The trainers served as points of reference during the study, ensuring correct utilisation of CPOT and addressing participants' queries in the researcher's absence. This approach was justified to enhance the intervention's sustainability and address potential knowledge gaps during the training phase.

Phase 3: CPOT Implementation (Intervention Phase II)

The implementation of the CPOT took place at CICU, ICU, and CCU following training and instruction on CPOT. It occurred over three months (10th April 2023 until 10th July 2023).

Phase 4: CPOT Evaluation (Post-Intervention Phase)

This phase involves collecting data after the intervention has been implemented. It started on 17th July 2023 and lasted until 14th August 2023. Each participant received a physical copy of a post-test questionnaire. After the collection, the data were gathered, recorded, and analysed.

Ethical Consideration

The study received ethical approval from the University Research Ethics Committee, UiTM, Malaysia, with reference number 500-FSK (PT. 23/4) on 16th January, 2023. The study also received permission from the Hospital Research Ethics Committee, Pusat Pakar Perubatan UiTM, Malaysia, with reference number 500-PJI (18/4/28) on 16th January, 2023.

RESULTS

Demographic Data

Table 1 shows the demographic data among all 40 participants recruited in the study. Most participants were those aged 31-35 (45.0%, n=18), followed by those aged 25-30 years (12 participants; 30.0%) and more than 35 years (10 participants, 25.0%). As for the level of education, the majority of them have completed formal education at the diploma level (34 participants; 85.0%), while only 5 participants (12.5%) had undergone post-basic courses. Regarding working experience, most participants have worked for 6-10 years (21 participants; 52.5%), while the majority of the nurses have 1-5 years of working in the critical care unit (19 participants; 47.5%), followed by 6-10 years (13 participants; 32.5%), and only 2.9% (1 participant) have less than 1 year of working experience in the critical care unit. In addition, most participants are engaged with CICU (18 participants; 45.0%), followed by CCU (12 participants; 30.0%) and ICU (10 participants; 25.0%). All 40 participants remained actively engaged throughout the study, ensuring a 100% completion rate for the intervention and data collection phases.

Table 1 : Frequency and Percentage Distribution of Demographic Variables among Participants

Variables		Frequency (n)	Percentage (%)
Age Group	25 – 30 years	12	30.0
	31 - 35 years	18	45.0
	More than 35 years	10	25.0
Level of Education	Diploma	34	85.0
	Post Basic	5	12.5
	Degree	1	2.5
Staff Nurse Working Experiences	1 – 5 years	3	7.5
	6 – 10 years	21	52.5
	More than 11 years	16	40.0
Working Experience in Critical Care Unit	Less than 1 year	1	2.9
	1 – 5 years	19	47.5
	6 – 10 years	13	32.5
	More than 11 years	7	17.5
Working Unit	ICU	10	25.0
	CICU	18	45.0
	CCU	12	30.0

Pain Assessment Awareness among Critical Care Nurses Pre- and Post-Implementation of CPOT Education Program

The analysis of each item in pain assessment awareness, which was the first objective of this study, aimed to determine the level of pain assessment awareness among critical care nurses pre- and post-implementation of the CPOT education programme, as displayed in Table 2. Before the intervention, only 31 participants

(77.5%) reported regularly assessing pain; this increased to 100% post-intervention. Similarly, familiarity with CPOT showed substantial improvement. Initially, only 12 participants (30%) had used CPOT, but post-intervention, this number increased to 37 (92.5%), demonstrating a significant uptake of the tool in clinical settings. In the pre-test, participants predominantly identified 'vital signs' and 'behaviour' as key indicators of pain, with 17 respondents (42.5%) selecting each method. 'Ventilator compliance' was less frequently selected, with only 6 participants (15%) viewing it as a primary indicator. Notably, in the pre-intervention phase, no participants identified 'Others (CPOT)' as a primary method for assessing pain. However, a dramatic shift in perception was observed post-intervention, with all participants (100%) identifying 'Others (CPOT)' as the best method for assessing pain. Initially, the majority of participants demonstrated a poor level of awareness, which significantly increased to 92.5% (37 participants) post-intervention. A notable decrease in the fair awareness level was observed, from 30.0% (12 participants) in the pre-test to 7.5% (3 participants) in the post-test. Most importantly, the poor awareness level, which was initially prevalent in 70.0% (28 participants), was completely eliminated in the post-test results.

Table 2: Summary of Intervention Findings on Pain Assessment

Item	Pre-test	Post-test	Statistical Test Results (*p*-value)
Analysis of Each Item in Pain Assessment Awareness			
Do you assess pain regularly?	31 (77.5%)	40 (100%)	-
Have you use CPOT before?	12 (30.0%)	37 (92.5%)	-
Have you received education regarding pain management in critically ill patient before?	25 (62.5%)	40 (100%)	-
Best Pain Assessment Method			
Vital signs	42.5% (17)	0% (0)	-
Behaviour	42.5% (17)	0% (0)	-
Ventilator compliance	15% (6)	0% (0)	-
CPOT	0% (0)	100% (40)	-
Pain Awareness Level			
Good	0% (0)	92.5% (37)	-
Fair	30% (12)	7.5% (3)	-
Poor	70% (28)	0% (0)	-
Nurses' Evaluation of CPOT Implementation			
Is CPOT easy to complete?	-	M=4.10, SD=0.709	-
Were the directives for CPOT use clear?	-	M=4.05, SD=0.749	-
Is CPOT quick to use?	-	M=4.05, SD=0.714	-
Is CPOT simple to understand?	-	M=4.05, SD=0.714	-
Has CPOT positively influenced practice?	-	M=3.98, SD=0.698	-
Demographic Influence on CPOT Evaluation			
Age Group	-	-	$p > 0.05$
Level of Education	-	-	$p > 0.05$
Working Experience (ICU)	-	-	$p > 0.05$
Working Unit (ICU, CICU, CCU)	-	-	$p > 0.05$

Regarding the critical care nurses' evaluation of CPOT implementation, as illustrated in Table 3, the highest-rated item was "Is the CPOT easy to complete?", with a mean score of 4.10, indicating substantial agreement among nurses about the tool's ease of use. Similarly, the clarity of the directives for CPOT use was also highly rated, with a mean score of 4.05. Additionally, the tool's quickness and simplicity were equally well-received, with both aspects scoring a mean of 4.05. Meanwhile, the willingness of nurses to recommend

routine CPOT use, also with a mean of 4.05, demonstrates a strong endorsement of the tool. However, for the item "Has the CPOT positively influenced your practice in assessing the patient's pain?", the mean score was 3.98, with 52.5% (n=21) agreeing.

Table 3: Analysis of Each Item in The Nurses' Evaluation on the Use of CPOT in Assessing Pain among Critically Ill Patient

Item	Frequency, *n* %					*M*	*SD*
	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**		
Was the length of time sufficient to train to use CPOT accurately?	0	8	8	13	11	3.68	1.095
	0%	20%	20%	32.5%	27.5%		
Were the directives about the use of the CPOT clear?	0	0	10	18	12	4.05	0.749
	0%	0%	25%	45%	30%		
Is the CPOT quick to use?	0	0	9	20	11	4.05	0.714
	0%	0%	22.5%	50%	27.5%		
Is the CPOT simple to understand?	0	0	8	20	12	4.05	0.714
	0%	0%	20%	50%	30%		
Is the CPOT easy to complete?	0	0	10	18	12	4.10	0.709
	0%	0%	25%	45%	30%		
Would you recommend using CPOT routinely?	0	0	9	20	11	4.05	0.749
	0%	0%	22.5%	50%	27.5%		
Is the CPOT helpful for nursing practice?	0	0	9	20	11	4.05	0.714
	0%	0%	22.5%	50%	27.5%		
Has the CPOT positively influenced your practice in assessing the patient's pain?	0	0	10	21	9	3.98	0.698
	0%	0%	25%	52.5%	22.5%		
Evaluation						4.00	0.674

DISCUSSION

Pain Assessment Awareness among Critical Care Nurses Pre- and Post-Implementation of CPOT Education Programme

Prior to the intervention, 77.5% of the participants claimed regular pain assessments. Post-intervention this increased to 100%, as all participants adopted CPOT for pain assessment and abandoned previous methods. Likewise, knowledge of CPOT increased markedly. In the pre-test, only 30% of participants had utilised CPOT, but following the intervention, this number rose to 92.5%, indicating the effectiveness of CPOT. Finally, to illustrate the extent of the knowledge gain, 100% of nurses had received training on pain management in the post-test compared to only 62.5% of respondents who had received previous training on the management of pain in critically ill patients during the pre-test.

Pain assessment tools can be categorised into self-report tools and behavioural assessment tools. For patients who are unable to self-report pain but display observable behaviours, behavioural assessment tools must be used for evaluation (Kobayashi *et al*., 2023). According to Kobayashi *et al*. (2023) and Siddiqui *et al*. (2023), the Behavioural Pain Scale (BPS) and the Critical Care Pain Observation Tool (CPOT) are reliable and validated objective assessment tools designed for patients in the ICU who are unable to self-report pain, as they both have shown the best validity and reliability to date. However, previous research has shown higher diagnostic accuracy for CPOT than other behavioural pain assessment tools, specifically for non-communicative patients in ICU. This is supported by recent studies. In a meta - analysis, Zhai *et al*. (2020) showed that CPOT had the best

diagnosis for behaviour pain assessment tools, especially for non-communicating patients in the ICU. A narrative review by Afenigus (2024) revealed that CPOT serves as a highly effective instrument for pain assessment in non-verbal ICU patients, exhibiting superior accuracy and reliability when compared to other tools such as the Behavioural Pain Scale (BPS) and the FLACC scale.

Similarly, Alotni *et al.* (2025) conducted a study in six adult ICUs in Saudi Arabia where the implementation of CPOT resulted in a significant improvement in pain assessment frequency. In addition to that, Sandvik *et al*. (2024) mentioned that the implementation of structured CPOT education improved the nurses' ability to assess and treat pain, thus resulting in positive patient outcomes. In addition, Sedighie *et al*. (2020) showed improved awareness and attitudes of ICU nurses towards pain management through pre- and post-test training programmes similar to the outcome of the study. Rahman *et al.* (2022) also reported improvement in their pain knowledge following the intervention but stressed the importance of continuous education, as their nurses' knowledge still lay below desired levels. This study was supported by a study done by Siddiqui *et al.* (2023), which mentioned that the training positively influences both knowledge and clinical skills related to pain assessment in critically ill patients. The increase in knowledge observed after the educational session was statistically significant.

The results of this study demonstrated short-term improvement in pain assessment awareness of critical care nurses after implementing the CPOT education programme. Pre-intervention, 70% of participants demonstrated poor levels of awareness, with only 77.5% assessing pain routinely. Follow-up demonstrated 100% of participants performing regular pain assessment combined with marked increases in knowledge. After the structured training sessions, familiarity with CPOT was increased from 30% at the pre-test stage to 92.5% at the post-test stage. The pre-test data showed that most participants used physiological indicators such as vital signs and behaviour to measure pain. Nevertheless, after the intervention, all participants selected CPOT as an optimal method for assessment, showing a paradigm shift in techniques based on education and hands-on experience.

These results are consistent with Damico *et al*. (2021). Likewise, in the current study, 62.5% of nurses had been without training related to pain management in the pre-test phase, highlighting the need for continuing education programmes. In fact, Negese *et al*. (2020) found that two-thirds of nurses do not show enough competence in the behaviour induced by pain in critically ill patients. This finding is in line with those reported by Azhigul (2020) about very limited pain assessment by ICU nurses due to inadequate knowledge and awareness. Additionally, Ou *et al.* (2021) demonstrated that 43.6% of the nurses in their study have never had continuing education regarding pain management, once again demonstrating the need for organisational needs and structured educational interventions such as the CPOT training programme, which was performed in this study. The significant improvements regarding pain awareness and CPOT usage in this study demonstrate the importance of targeted training programmes in providing nurses with the skillsets needed to appropriately manage the pain of patients at risk of critical illness in the hospital. These results highlight the importance of ongoing education to overcome existing knowledge deficits and better inform clinical practice.

Almutairi *et al*. (2022) revealed that ICU nurses have deficient knowledge and behaviours towards pain management. A recent study by Jamal *et al.* (2023) also supported the finding that the majority of nurses possessed inadequate knowledge of pain management. The latest study done by Rababa *et al.* (2023) mentioned that inadequate pain assessment, documentation, and education represent critical issues that necessitate a comprehensive re-evaluation of current pain management practices. Thus, enhancing pain assessment, documentation, and education through comprehensive educational programmes and initiatives is crucial for achieving optimal pain management outcomes. This was supported by Abdelmalik *et al.* (2024), who suggest that nurses require ongoing education and training programmes, as optimal management depends on the development of adequate awareness, attitudes, and skills on pain awareness and management. This highlights the significance of implementing a continuous education strategy to enhance nurses' understanding and proficiency in pain assessment.

Meanwhile, according to the study done by Sedighie *et al.* (2020), who did pre- and post-test training for nurses, the mean score of nurses' awareness was significantly different in pre- and post-training programmes on the awareness and attitude of intensive care unit nurses' pain management. Their study also demonstrates that implementing the pain management programme significantly improved the nurses' awareness in this domain.

Then, a study done by Innab *et al* . (2022) revealed that prior to receiving pain management education, nurses exhibited a moderate degree of knowledge and attitudes towards pain. However, following the intervention, these levels significantly increased. Concurrently, Rahman *et al.* (2022) state that a notable difference in the pre- and post-test scores was observed. However, despite the comprehensive pain education provided, nurses' pain knowledge falls below the recommended level, highlighting an urgent need for enhanced and ongoing education.

Critical Care Nurses' Evaluation on CPOT Implementation

The participants in the present study agreed that the CPOT was straightforward to use, provided clear guidance, was easy to comprehend, and was also quick to complete.

Phillips *et al*. (2019) mentioned that nurses who underwent CPOT training expressed that they perceived it to be clear, simple to use, and beneficial when implemented in a clinical environment. Furthermore, the implementation of CPOT facilitated nurses' accurately distinguishing whether their patients were experiencing pain, thereby strengthening their confidence in their assessment of pain.

In terms of pain assessment, Modanloo *et al.* (2019) noticed a notable rise in the frequency of pain assessment per patient per day in nursing practice following the implementation of CPOT in comparison to the previous practice. This finding was verified by a study conducted by Lutz (2020) in which it asserts that the implementation of CPOT enhances nurses' responsiveness to pain and facilitates communication.

For CPOT usage, Idris *et al*. (2021) mentioned that CPOT is more user-friendly because of its clear operational resolutions for each observed item. However, Zhai *et al*. (2020) suggest that CPOT is a fair but not excellent tool. But, compared with other valid and reliable behavioural pain assessment tools, CPOT, on the other hand, is the best method of choice.

The Association between Nurses' Demographic Data and Pain Assessment Awareness among Critical Care Nurses' Pre- and Post-Implementation of CPOT Educational Programme

The study's findings show a significant difference in pain assessment awareness pre-and post-implementation of the CPOT education programme. However, according to their demographic data, there is no significant difference in pain assessment awareness among critical care nurses pre-and post-implementation of the CPOT education programme. Damico *et al.* (2021) found that there is a positive association between knowledge of pain management and years of ICU experience but no correlation between age and pain management knowledge. Meanwhile, Almutairi *et al*. (2022) asserted that there is a positive correlation between the age of nurses and their total years of nursing experience in relation to pain management awareness. However, there is no association observed between pain management awareness and the degree of education or years of working experience in the ICU among nurses in ICU. In contrast to that, Sweity*et al.* (2022) revealed that there is no association between age, sex, working experience, place of work and area of work with pain assessment and management. This was concurrent with the current study, where there is no significant difference between participant age, working experience, place of working and area of working with pain assessment and management.

The Association between Nurses' Demographic Data and CPOT Evaluation among Critical Care Nurses' Post-Implementation of the CPOT Education Programme

Based on the findings, there is no significant difference among participant demographic data in the evaluation of CPOT. According to Ülgen and Tüfekci (2024), the knowledge level of nurses had a crucial role in pain assessment and management. The study also demonstrated that the training provided was beneficial in enhancing nurses' knowledge and practices in pain management. Nevertheless, the nurses' practice for managing pain both before and during the training did not exhibit any significant differences. However, a recent study done by Rababa *et al.* (2023) revealed that demographic factors, such as qualifications, employment status, shift rotation, number of beds in the ICU, years of experience as a registered nurse, and years of experience as a critical care nurse, did not show a significant association with the utilisation of the pain assessment tool for patients who are unable to communicate their pain.

After implementing a CPOT education programme, there is no statistically significant difference in the way staff nurses evaluate the use of CPOT in critically ill patients based on their demographic information, according to the findings of this study. Thus, the findings of this study suggest that demographic characteristics do not exert a statistically significant effect on CPOT ratings among the participants.

Limitations

A limitation of this study was that it was carried out in a single healthcare facility with a limited number of nurses serving as participants. Consequently, it is not viable to generalise the findings of this research to other healthcare institutions or hospitals because it is probable that they may not accurately reflect the actual conduct of critical care nurses.

CONCLUSION

Critically ill patients find the occurrence of pain distressing, as it can be felt both during periods of rest and while receiving medical treatment or nursing care. Pain is universally acknowledged as a natural right of every individual. When pain is inadequately attended to, it can lead to a variety of adverse outcomes, such as Post-Traumatic Stress Disorder (PTSD), illness, and even mortality. However, pain in critically ill patients is commonly underestimated and inadequately addressed. Research suggests that nurses frequently neglect to employ suitable methods and tools for assessing pain in these patients. Hence, nurses must demonstrate extensive proficiency in the appropriate tools and techniques for pain management, as well as effectively comprehend, recognise, and evaluate patient pain. Unfortunately, numerous studies suggest that critical care nurses have a deficient knowledge of pain awareness and treatment. Nevertheless, this inadequacy can be rectified through training or continuous nursing education. Hence, it is highly recommended that the hospital administration adopt a proactive stance by actively promoting the participation of their nurses in pain management training programmes.

Furthermore, for future research, it is recommended to conduct a more extensive study with a larger sample size encompassing diverse healthcare establishments, such as private hospitals, university-affiliated hospitals, and private hospitals. Researchers strongly recommend conducting a study to evaluate the efficacy of CPOT from the patients' perspective. This could facilitate a more comprehensive understanding of the implementation of CPOT by nurses, as well as the patient's viewpoint on the effectiveness of the tools in alleviating their pain and their satisfaction with the pain assessment tools. Further studies on CPOT would be needed to observe its implementation and effectiveness in various other hospitals.

Conflict of Interest

The authors declare that they have no conflict of interests in this study.

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