ORIGINAL RESEARCH

A randomized controlled study to enhance nurses' pain management self-efficacy and knowledge through educational interventions

Abdullah T. Obaid*[1], Fatima A. Mah[1], Basel H. Shroof[1], Malek Alnajar[2]

[1] *Pain Management Team, Sheikh Shakhbout Medical City, Abu Dhabi, United Arab Emirates*
[2] *College of Nursing, University of Utah, Utah, United States*

Received: August 8, 2025 **Accepted:** September 16, 2025 **Online Published:** October 16, 2025
DOI: 10.63564/jnep.v15n10p29 **URL:** https://doi.org/10.63564/jnep.v15n10p29

ABSTRACT

Purpose: Nurses' understanding of pain, commitment to education, and positive attitude are vital for providing high-quality pain care. The goal of this study was to find out how a pain management educational program (PMEP) influenced nurses' self-efficacy, knowledge, and attitudes toward pain care.

Methods: A randomized experimental study design was utilized. The study was conducted in a governmental hospital in United Arab Emirates, with a total sample of 143 nurses (75 in the interventional group and 68 in the control). The interventional group received six-hours PMEP. Both groups completed questionnaires at baseline (T1), immediately after the program (T2), and at one month (T3).

Results: In comparison to T1 (59.31%), the interventional group's Knowledge and Attitude Survey Regarding Pain (KASRP) scores increased significantly to 82.12% and 77.24% at T2 and T3, respectively. However, the control group exhibited no significant changes. From T1 (M = 2.93 $\pm$ 1.27) to T2 (M = 4.27 $\pm$ 0.68) and T3 (M = 4.21 $\pm$ 0.70), the overall scores of Pain Management Self-Efficacy Questionnaire (PMSEQ) rose notably among interventional group. With no significant increase in the PMSEQ scores of control group at T2 and T3. Positive correlations between KASRP and overall PMSEQ scores were observed in the interventional group at T1 and T2 ($p < .05$) but not at T3 ($p = .120$), whereas the control group showed significant correlations at all-time points ($p < .001$).

Conclusions: The PMEP significantly enhanced nurses' knowledge, attitudes, and self-efficacy in pain management. These improvements were sustained for one month post-PMEP, with positive correlations observed over time between KASRP and overall PMSEQ scores in both groups. Incorporating well-structured PMEP into nursing curricula is highly recommended. Further prospective research is recommended to support these findings.

Key Words: Attitude, Education, Knowledge, Pain management, Self-efficacy

1. INTRODUCTION

Pain is a prevalent and debilitating condition,[1] Post-surgical pain is a major cause of acute pain, with around 20% of patients experience severe pain within 24 hours after surgery.[2] Chronic pain also drives high medical demand, affecting 20% of U.S.[3] and 43% of U.K.[4] adults. Despite modern guidelines and multimodal therapies, pain management remains suboptimal.[5,6] Poorly controlled pain has devastating physical and psychological effects, hindering daily function, increasing depression and anxiety, and reducing quality of

*Correspondence: Abdullah T. Obaid; Email: atobaid@ssmc.ae; Address: Sheikh Shakhbout Medical City, Abu Dhabi, United Arab Emirates.

life.[7,8]

Nurses play a crucial role in managing acute and chronic pain, requiring adequate knowledge, positive attitudes, and confidence to provide effective care.[9–12] Those in inpatient settings must be ready and competent to handle all pain types.[10,11,13] Literature confirms that nurses' pain management competency directly influences clinical practice outcomes, including increased patient satisfaction, improved adherence to prescribed pain management protocols, and reduced incidence of unmanaged or undertreated pain.[14–16]

Bandura (1977) defined self-efficacy as one's confidence in successfully executing tasks. Individuals act when believing they can affect outcomes.[17,18] In pain management, healthcare workers' self-efficacy reflects their perceived ability to provide effective care,[19,20] which is crucial for safe treatment.[21,22] While Bandura's theory suggests that enhanced knowledge and skills should boost nurses' self-efficacy,[18,21] barriers like inadequate training, limited resources, fear, and negative attitudes hinder its development, risking patient safety and treatment quality.[9,19,20,22]

Recent studies reveal persistent gaps in nurses' pain management knowledge and attitudes,[9,12,23,24] directly impairing clinical efficacy and self-confidence.[15,22,25] Enhancing nurses' expertise is vital for optimal care,[26,27] aligning with the ethical obligation to deliver safe, personalized, evidence-based pain treatment. International standards affirm healthcare professionals' duty to master pain management and uphold patients' rights,[28] necessitating continuous professional development to refine knowledge, skills, and self-efficacy.

While educational programs improve nurses' pain management knowledge and attitudes,[25,26,29–31] few studies examine their impact on self-efficacy representing a critical gap, as effective training must build both competence and confidence.[22,27] Limited studies examine how nurses' pain management knowledge and attitudes relate to self-efficacy, or how educational interventions enhance this confidence. Longitudinal data on knowledge retention are particularly lacking.[19,22,27] Addressing these gaps through rigorous studies would validate strategies to strengthen curricula and boost nurses' pain management confidence.[14,26] This study aims to highlight the importance of incorporating pain-related themes into curricula and identify key elements for educational programs to enhance pain management self-efficacy.

1.1 Research questions

Addressing the following research questions is the aim of this study:

1) What is the impact of a pain management educational program (PMEP) on nurses' self-efficacy, knowledge, and attitudes toward pain management? 2) How does the PMEP influence nurses' knowledge regarding pain assessment and management techniques? 3) What changes occur in nurses' attitudes toward pain management following participation in the PMEP? 4) Is there a significant relationship between nurses' self-efficacy and their knowledge and attitudes toward pain management after the PMEP?

2. Materials and methods

2.1 Study design

A randomized experimental study design was utilized, employing a pre-and post-test methodology.

2.2 Sampling and sample size

G*Power was used to determine the sample size (α = 0.05, effect size = 0.5, power = 0.8), and the independent samples *t*-test demanded 128 nurses (64/group).[32] To account for potential attrition, 143 were recruited. Participants who had more than a year of clinical experience and were licensed bedside nurses were eligible. Administrators and those on leave were excluded. A list of participating nurses was compiled. Using SPSS, nurses were randomized to either the control (n = 68) or interventional (n = 75) groups, each assigned a unique identification number to guarantee fair distribution.

2.3 Settings

The study was conducted at Sheikh Shakhbout Medical City (SSMC), Abu Dhabi, United Arab Emirates (UAE), one of the largest governmental hospitals in the UAE.

2.4 Protection of human rights

Institutional Review Board (IRB) approval was obtained (SSMCREC-424; 18/09/2023). Participants provided informed consent after reviewing study details, with opportunities to ask questions. Participation was entirely voluntary, with the option to withdraw at any time without penalty. Anonymity and confidentiality were preserved. Data were secured in password-protected systems, and all study tools were used with permission.

2.5 Intervention

The educational material was adapted from a previously validated educational program and used with permission.[26] The program was reviewed and modified by the authors of the current study. A Six-hours face-to-face PMEP was developed in line with the current policies and procedures at SSMC, and in accordance with the following resources: the Core Curriculum for Pain Management Nursing (3rd edition), the International Association for The Study of Pain, World Health Organization pain management guidelines, and the

National Comprehensive Cancer Network Adult Pain Management Guideline. The PMEP covered the following topics: overview of pain, obstacles to successful pain care, pathophysiology, pain evaluation and reassessment, pain management techniques, and multidisciplinary approaches. For the detailed agenda and outlines please refer to Appendix A. PowerPoint presentations and interactive education styles (case scenarios, group discussion, role play, and peer feedback) were utilized.

The developed PMEP was reviewed by a panel of experts (2 pain consultants, 5 pain nurses, 2 nurse educators) to assess face validity. The reviewers evaluated clarity, relevance, and accuracy using a 1-5 scale, with results showing high ratings for Clarity (M = 4.8, SD = 0.4), Relevance (M = 4.5, SD = 0.6), and Accuracy (M = 4.2, SD = 0.7). The PMEP outlines and materials were approved by the SSMC Nursing Education Center. The PMEP was granted for 6.25 Continuing Nursing Education (CNE) hours. Participants in the interventional group received a certificate of attendance with the credited CNE hours.

2.6 Data collection procedure

Data collection was conducted from October 11th to November 11th, 2023. For this study, the questionnaires were created using Microsoft Forms. During the program, a QR code that led to the questionnaire was displayed, and participants had 30 minutes to finish the pre- and post-test. Participants in the interventional group completed the study questionnaires at three phases: baseline (pretest) before attending the PMEP (T1), immediately after the program (T2), and one month after attending the program (T3). For the control group the same questionnaires were distributed via email and completed at the same three-time points without attending the PMEP. The online form remained accessible for 2 hours for both the pre-test and post-test, allowing participants to complete them at their convenience.

2.7 Instruments

A demographics form was created for the study and used to identify the participants' characteristics. The PMEP's efficacy was evaluated using the Knowledge and Attitudes Survey Regarding Pain (KASRP) and the Pain Management Self-Efficacy Questionnaire (PMSEQ).

2.7.1 *Demographic form*

The demographic form was used to collect demographic and clinical-related variables: age, gender, educational level, years of experience, experience in the current position, clinical area/unit, and attended educational programs or courses related to pain management (Yes/No).

2.7.2 *Knowledge and attitudes survey regarding pain (KASRP)*

The KASRP, initially developed by Betty Ferrell and Margo McCaffery in 1987 and last revised in 2014,[33] assesses healthcare professionals' pain management knowledge/attitudes through 41 equally weighted items (21 true/false, 14 multiple-choice, 2 case scenarios). Each correct answer scores 1 (max = 41), with higher scores indicating better knowledge. The tool demonstrates strong reliability (test-retest r > 0.80; internal consistency $\alpha > 0.70$).[33]

2.7.3 *Pain management self-efficacy questionnaire (PMSEQ)*

The PMSEQ, developed by Macindo et al. (2018), measures nurses' confidence in pain management using 21 items on a 6-point Likert scale (0 = not confident at all; 6 = highly confident). Higher scores reflect greater self-efficacy. It assesses three sub-dimensions: comprehensive (14 items), evaluative (4 items), and supplemental (3 items) pain management self-efficacy.[34] The tool shows excellent reliability (test-retest r > 0.90; internal consistency $\alpha > 0.80$).[34,35]

2.8 Data analysis

The data were analyzed using various statistical methods to examine the relationships and differences between the interventional and control groups over time. The KASRP and PMSEQ scores at three time points (T1, T2, and T3), as well as the participants' demographic characteristics and key variables of interest, were compiled using descriptive statistics. To examine the differences between the two groups' demographics, chi-square tests were used for categorical variables.

To assess the effectiveness of the intervention, repeated measures ANOVA was conducted to compare the mean scores of the interventional and control groups across the three-time points. Correlation analyses were performed to explore the relationship between KASRP scores and overall PMSEQ scores within each group at each time point. All statistical analyses were performed using SPSS software, with an alpha level set at .05 for determining statistical significance.

3. RESULTS

3.1 Participants' demographics

The study comprised 143 nurses, with 75 in the interventional group and 68 in the control group. By T3, three participants from each group were lost to follow-up. Most were female (76.9%), with a significant gender difference between groups ($\chi^2 = 6.29$, $p = .012$). The mean age was 36.3 years (SD = 6.51), with no significant difference between groups. Most participants had 7-10 years of nursing experience (38.5%) and 35.7% worked in surgical departments. About 62.2%

had no previous pain management training, with 51(39.2%) in the interventional group and 38 (37.0%) in the control group. Most held a bachelor's degree, with 65(45.4%) in the interventional group and 55(38.5%) in the control group. Table 1 provides more demographic information.

Table 1. Nurses' demographics (n = 143)

Variable	Total sample n (%)	Interventional group (n = 75) n (%)	Control group (n = 68) n (%)	*p*
Sex				
Male	33 (23.1)	11 (7.7)	22 (15.4)	.012
Female	110 (76.9)	64 (44.7)	46 (32.2)	
Age (years)				
21-25	9 (6.3)	3 (2.1)	6 (4.2)	.389
26-30	14 (9.8)	5 (3.5)	9 (6.3)	
31-40	93 (65)	53 (37.1)	40 (27.9)	
41-50	24 (16.8)	13 (9.1)	11 (7.7)	
≥ 50	3 (2.1)	1 (0.7)	2 (1.4)	
Experience in nursing (years)				
1-3	13 (9.1)	5 (3.5)	8 (5.6)	.566
4-6	6 (4.2)	2 (1.4)	4 (2.8)	
7-10	31 (21.7)	15 (10.5)	16 (11.2)	
11-15	55 (38.5)	32 (22.4)	23 (16.1)	
≥ 15	38 (26.6)	21 (14.7)	17 (11.8)	
Experience in the current unit (years)				
1-3	53 (37.1)	25 (17.4)	28 (19.6)	.686
4-6	26 (18.2)	16 (11.2)	10 (7.0)	
7-10	20 (14.0)	10 (7.0)	10 (7.0)	
11-15	25 (17.5)	15 (10.5)	10 (7.0)	
≥ 15	19 (13.3)	9 (6.3)	10 (7.0)	
Clinical area				
Critical care units	23 (16.1)	12 (8.4)	11 (7.7)	.465
Medical department	37 (25.9)	21 (14.6)	16 (11.2)	
Surgical department	51 (35.7)	28 (19.6)	23 (16.9)	
Pediatric department	15 (10.5)	7 (4.9)	8 (5.6)	
Other	17 (11.9)	7 (4.9)	10 (7.0)	
Previous pain management training				
Yes	54 (37.8)	24 (58.1)	30 (54.1)	.136
No	89 (62.2)	51 (39.2)	38 (37.0)	
Education Level				
Bachelor	120 (83.9)	65 (45.4)	55 (38.5)	.347
Master	23 (16.1)	10 (7.0)	13 (9.1)	

3.2 Pain management knowledge and attitudes

The study tracked changes in correct response rates on the KASRP across three-time points for both interventional and control groups. In the interventional group, correct responses increased significantly from T1 (59.31%) to T2 (82.12%) and slightly decreased at T3 (77.24%). In contrast, the control group showed less variation, with correct responses at T1 (56.71%), T2 (59.10%), and T3 (56.39%). Percentiles for correct responses at the 75th percentile were consistently higher in the interventional group (27%, 38%, and 35% at T1, T2, and T3, respectively) compared to the control group (26%, 27.25%, and 25.5%).

Detailed analysis of correct responses per item revealed notable trends in the interventional group, such as high initial performance on questions related to sedation assessment during opioid pain management (Q# 22) and recommended routes for cancer pain analgesics (Q# 23). Conversely, lower initial percentages were observed for questions on respiratory depression following opioid use (Q# 28) and opioids physical dependence (Q# 36). Mean KASRP scores in the

interventional group increased from T1 (24.32 ± 3.72) to T2 (33.67 ± 4.26) and then decreased slightly by T3 (31.14 ± 4.74), whereas the control group scores remained relatively stable across T1 (23.25 ± 4.56), T2 (24.23 ± 5.71), and T3 (23.12 ± 5.78). Overall, there were no significant differences in KASRP scores across time points based on demographic variables, except at T1 where participants with previous pain education scored significantly higher (24.31 ± 5.01) than those without (23.62 ± 3.57) (t = -0.970, p = .002). Figure 1 summarizes the findings.

The repeated measure analysis of variance revealed significant between-subjects effects for KASRP scores. There was a significant between-subjects effect, indicating a notable main effect of group ($F(1, 135) = 81.337$, $p < .001$). This implies that the KASRP scores of the interventional and control groups differed significantly. Additionally, the within-subjects effects revealed a significant main effect of time ($F(2, 270) = 86.081$, $p < .001$), demonstrating significant changes in KASRP scores across the three time points. The interaction between time and group was also significant ($F(2, 270) = 62.756$, $p < .001$), suggesting varying alterations in KASRP scores across time between the two groups. Moreover, data suggests that 37.6% of the variance in the knowledge and attitudes score could be explained by the effect of the educational intervention at $p < .001$. More details about the repeated measure analysis are in Table 2.

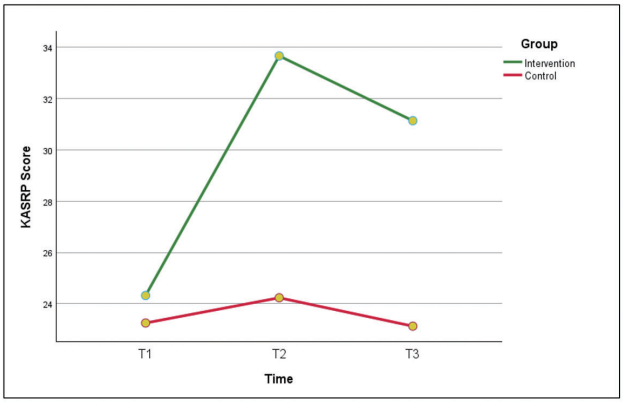

Figure 1. Nurses' KASRP scores at three time points (T1, T2, and T3)

Table 2. Repeated measure analysis of variance for the effects of the PMEP on the KASRP and self-efficacy scores

	KASRP					Self-efficacy				
	Sum of Squares	df	Mean Square	*F*	*p*	Sum of Squares	df	Mean Square	*F*	*p*
Between subjects										
Intercept	290502.467	1	290502.467	6046.699	< .001	4961.326	1	4961.326	2608.922	< .001
Group	3907.693	1	3907.693	81.337	< .001	56.176	1	56.176	29.540	< .001
Within groups (error)	6485.825	135	48.043			262.431	138	1.902		
Within subjects										
Score	1876.610	2	938.305	86.081	< .001	44.96	2	22.48	21.908	< .001
Score*group	1368.114	2	684.057	62.756	< .001	35.789	2	17.895	17.439	< .001
Score within group (error)	2943.054	270	10.900			283.209	276	1.026		

3.3 Pain management self-efficacy

Analysis of PMSEQ scores across three measurement points showed fluctuations in nurse perceptions. In the interventional group, overall PMSEQ scores rose notably from T1 (M = 2.93 ± 1.27) to T2 (M = 4.27 ± 0.68) and stabilized at T3 (M = 4.21 ± 0.70). Similarly, the control group showed a slight increase from T1 (M = 3.02 ± 1.39) to T2 (M = 3.11 ± 1.29), with a slight decrease by T3 (M = 3.09 ± 1.34) (see Figure 2). Demographically, significant differences were observed only at T1, where nurses with previous pain training (M = 3.21 ± 1.49) scored higher than those without (M = 2.86 ± 1.22) (t = -1.51, p = .025).

Examining PMSEQ sub-scales (comprehensive, evaluative, supplemental), the interventional group showed substantial improvements across all sub-scales from T1 to T3, contrasting with minimal changes in the control group. Initially, the interventional group scored slightly lower on comprehensive pain management self-efficacy at T1 (M = 2.94, SD = 1.27) compared to the control group (M = 3.00, SD = 1.40), but surpassed the control group by T2 (M = 4.27, SD = 0.68 vs. M = 3.13, SD = 1.30) and T3 (M = 4.21, SD = 0.70 vs. M = 3.12, SD = 1.31). This improvement indicates increased confidence in comprehensive pain assessment and treatment customization aligned with patient preferences. Evaluative pain management self-efficacy similarly showed gains in the interventional group from T1 (M = 2.93, SD = 1.29) to T3 (M = 4.20, SD = 0.72), whereas the control group exhibited minimal changes (M = 2.98 to 3.00 across time points). Supplemental self-efficacy scores also significantly increased in the interventional group from T1 (M = 2.83, SD = 1.28) to T3 (M = 4.19, SD = 0.73), compared to the control group's stability (M = 2.82 to 2.95).

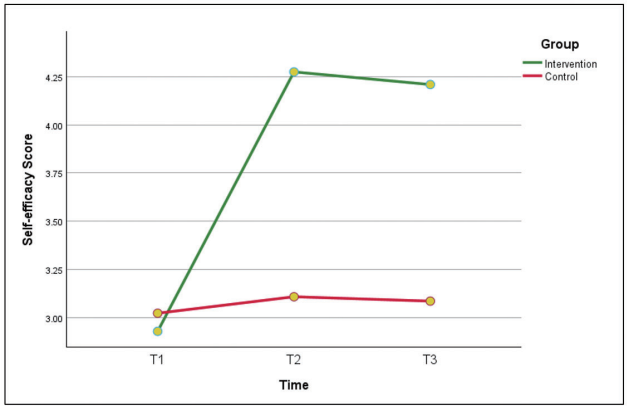

Figure 2. Nurses' PMSEQ mean scores at three time points (T1, T2, and T3)

Statistical analysis ($p < .001$) revealed significant differences between groups at all time-points. Detailed item analysis highlighted initial challenges in collaborative pain alleviation and pain assessment tool selection, which improved significantly by T2 and T3. Conversely, consistent proficiency was observed in documenting pharmacologic and non-pharmacologic treatments, suggesting sustained competence in these areas. Variability in scores for assessing pain during emergencies and integrating complementary pain management modalities underscored ongoing areas for development. Overall, the intervention enhanced nurses' confidence in pain management practices, evidenced by improved PMSEQ scores across multiple domains and sub-scales over the study period.

According to the repeated measure analysis (see Table 2), overall PMSEQ scores also revealed significant between-subjects effects. The analysis also indicated a significant between-subjects effect with a notable main effect of group ($F(1, 138) = 29.540$, $p < .001$), highlighting substantial differences in PMSEQ scores between the interventional and control groups. The within-subjects effects showed a significant main effect of time ($F(2, 276) = 21.908$, $p < .001$), indicating significant changes in PMSEQ scores across the three-time points. Moreover, the interaction between time and group was significant ($F(2, 276) = 17.439$, $p < .001$), suggesting varied changes in PMSEQ scores over time between the interventional and control groups. Furthermore, data revealed that 31.7% of the variance in the PMSEQ scores could be explained by the effect of the intervention at $p < .001$.

3.4 Relationship between nurses' knowledge and attitudes toward pain and self-efficacy

Table 3 presents the relationship between nurses' KASRP scores and their overall PMSEQ scores across three time points for both groups. Notably, positive correlations were observed between KASRP and overall PMSEQ scores in the interventional group at T1 and T2 (T1: $r = 0.501$, $p < .001$; T2: $r = 0.263$, $p = .023$). However, at T3, the correlation between KASRP and overall PMSEQ scores in the interventional group was not statistically significant ($r = 0.185$, $p < .120$). In the control group, positive correlations were found between KASRP and overall PMSEQ scores at the three time points (T1: $r = 0.623$, $p < .001$; T2: $r = 0.541$, $p < .001$; T3: $r = 0.500$, $p < .001$). Further analysis revealed that the interventional group demonstrated significant improvements in all sub-scales of PMSEQ from T1 to T3, whereas the control group showed minimal changes over the same period. At all three time points, the differences between the interventional and control groups were statistically significant ($p < .001$), with the interventional group consistently achieving higher mean scores in comprehensive, evaluative, and supplemental pain management self-efficacy.

Table 3. Correlation between nurses' knowledge and attitudes and self-efficacy scores in three-time points (N = 143)

	Interventional Group *r* (*p*-value)	Control Group *r* (*p*-value)
NKAS_T1* Self_Efficacy_T1	.501 ($p < .001$)*	.623 ($p < .001$)*
NKAS_T2* Self_Efficacy_T2	.263 ($p = .023$)**	.541 ($p < .001$)*
NKAS_T3* Self_Efficacy_T3	.185 ($p = .120$)	.500 ($p < .001$)*

*. Correlation is significant at the .01 level (2-tailed).
**. Correlation is significant at the .05 level (2-tailed).

4. Discussion

Nurses play a crucial role in providing high-quality pain care, as always at the forefront. Their responsibilities encompass completing an extensive assessment, implementing interventions, and routinely evaluating and analyzing the efficacy of the pain management strategies.[25, 26, 31, 36–38] Unfortunately, nurses continue to report knowledge deficits and negative attitudes toward pain management which are essential for providing high-quality and effective nursing care.[23, 39–41] This study aimed to evaluate the impact of PMEP on nurses' knowledge, attitude, and self-efficacy regarding pain management. The findings were promising, showing significant improvements in nurses' knowledge and attitudes, as well as their self-efficacy in performing various pain management activities after participating in the PMEP. These improvements were sustained one month after completing the program. Our results supported the findings of several previously conducted studies.[26, 29, 30, 36, 41]

Baseline KASRP scores in the this study were 59.31% and 56.71% for the interventional and control groups, respectively, which are fairly close to those reported in previous studies conducted in the UAE,[30, 41] as well as in other

Arab[10,26,29,42] and international countries.[12,22,36,43] Post-test scores demonstrated the effect of attending PMEP on improving nurses' knowledge and attitude toward pain management. The interventional group showed an increase in the KASRP mean scores post-test, with significant and sustained improvements one month after the program. In contrast, the control group showed no significant changes across the three measurement points. Our findings supported those of Salim et al. (2020) and El-Aqoul et al. (2020), who found that exposure to a well-designed education program can greatly improve nurses' knowledge of pain, with sustained improvements for one to three months afterward.[26,41]

This study also explored the effect of the PMEP on nurses' self-efficacy in performing various pain management activities. Similar to the KASRP, the PMEP enhanced nurses' pain management self-efficacy, with the interventional group showing sustainable and higher levels of confidence compared to the control group. Minimal and non-significant changes in PMSEQ scores were observed over time in the control group, while the interventional group demonstrated significant improvements in the three PMSEQ sub-scales. Participants who attended the workshop showed higher scores in comprehensive pain management self-efficacy, evaluative pain management self-efficacy, and supplemental pain management self-efficacy, indicating increased confidence in their ability to provide collaborative and supportive pain management based on pain features and available treatment options, with ability to thoroughly appraise the treatment plans. Limited research has explored how educational programs influence nurses' self-efficacy in pain management. The findings of this study align with earlier research,[19,22,27] which indicated enhancements in knowledge, attitudes, and self-efficacy as a result of educational interventions.[19,22] Further prospective and longitudinal research is recommended to support these findings.

No significant differences were found in the KASRP and PMSEQ scores based on clinical and demographic variables, except for baseline data showing that nurses with previous pain training had higher scores. This supports the idea and goals of the current research regarding the positive effect of pain education among nurses. Further exploratory and larger survey studies are recommended to provide detailed descriptions of this variable.

Notably, positive correlations were observed between KASRP and overall PMSEQ scores in the interventional group at T1 and T2; however, by T3, this correlation was no longer statistically significant. In contrast, the control group demonstrated positive correlations across all three time points. This inconsistency may be attributed to the limited sample size, which may have constrained the ability to detect stable associations. Despite this limitation, the overall pattern suggests a tendency for nurses to feel more confident when they possess greater knowledge of pain management, which is consistent with the notion that enhanced knowledge can favorably influence practice. These findings align with Alzghoul and Abdullah (2020), who reported that nurses with adequate knowledge and skills felt more confident in their ability to manage patients' pain,[15] yet differ from the results of Stanly and Pollard (2013), who found no significant association between knowledge and self-efficacy among pediatric nurses, possibly due to their small sample size.[20] Taken together, our findings suggest that while the pain education program effectively enhanced knowledge and self-efficacy, the relationship between these two variables may be more complex than anticipated. Future research is recommended to explore whether pain education workshops mediate or moderate the association between knowledge and self-efficacy, ideally through studies with larger samples and longer follow-up periods.

Our study was conducted in UAE, a country well-known for its cultural and racial diversity made up of several ethnic groups. This study didn't explore the effect of the cultural diversity among nurses on the current results. However, studies conducted at UAE revealed that the cultural and ethnic disparities among patients and care providers influence on pain perception and management strategies.[44–46] Pain assessment and management could be challenging at UAE due to cultural variations, language barriers, and varying expectations.[44–46] The necessity for nurses to become culturally competent is well recognized in transcultural nursing research.[44] This requires further research studies to investigate the effect of these disparities among nurses on pain management and how the educational programs overcome such challenging component.

Strengths and limitations

Although knowledge and attitudes toward pain management, as well as the effects of educational programs, are extensively studied in the literature, the current study is considered unique and could be the first in the UAE to investigate the effect of an education program on both knowledge and nurse self-efficacy in providing various pain management strategies, with an evaluation of the sustainability of improvements over time. The random assignment utilized added more strength and power to the study.

Several limitations were identified. The sample was limited to one government hospital in the UAE which may limit the generalizability to other healthcare systems and countries. However, the variation in clinical demographics in this study

which included nurses from different units and work experiences, could add value, so that the results of this study can be projected and expanded to variance hospital settings. Larger multicenter research studies are recommended to support and generalize the results of the current study. Another limitation could be the Hawthorns effect as the participants knew that they were part of a study. This was mitigated having a control group and observing the data at three time points. Furthermore, the possibility of guessing on true/false and multiple-choice questions could have influenced scores. Future research should consider in-person interviews to mitigate this risk.

5. Conclusions

Nurses have a crucial role in all aspects of pain assessment, management, and advocacy for high-quality pain care, which requires knowledge and confidence. The study's findings are encouraging, since the PMEP has significantly enhanced the knowledge, attitudes and self-efficacy of pain management in nurses. These improvements were sustained for one month post-PMEP, with positive correlations observed over time between KASRP and overall PMSEQ scores in both interventional and control groups. Incorporating well-structured and evidence-based pain management educational programs into pre-graduation curricula and general orientations for newly hired nurses is highly recommended. Periodic monitoring of staff competency and self-efficacy is also necessary. Pain educational sessions should be developed based on need, using various interactive methods. Further prospective research with larger sample size is recommended to support these findings and to evaluate the relationship between knowledge, attitude, and self-efficacy, exploring how this may positively affect nursing care.

Implications to clinical practice and recommendations

Implementing PMEP will add value in improving nurses' pain management knowledge and self-efficacy, which in turn may effectively contribute to improving the clinical practice and care provided. Therefore, PMEP should be developed and integrated within the clinical settings, targeting nursing staff from different hospital settings regardless their educational backgrounds or years of experience. This information can also be used by nursing schools to create curricula that include concepts of pain assessment and management with enhancing nursing pain management self-efficacy. Nurses must prioritize lifelong learning to maintain clinical competence and follow evidence-based practice recommendations. Due to the subjective and multifaceted character of pain, nurses must employ culturally appropriate assessment methods. Regular evaluations of nurses' attitudes, management skills, and pain assessment are necessary.

Literature from UAE pointed out significant gaps in existing guidelines, emphasizing the importance for the creation of thorough and culturally aware guidelines.[44,47] These guidelines should be reviewed and updated on a regular basis to guarantee their relevance and efficacy in clinical settings, incorporating best practices and the most recent research.[47] Future research should look at the association between nurse self-efficacy in pain management and knowledge enhancement, taking into consideration cultural differences.

Acknowledgements

We sincerely appreciate the invaluable support and contributions of the SSMC Nursing Education Center. We also wish to acknowledge Emma Hutton, Senior Charge Nurse/Unit Manager, SSMC; Bhuvaneswari Ramasamy, Pain Management Nurse, SSMC; and Bronya Benjamen, Pain Management Nurse, SSMC, for their significant involvement in the current study. Additionally, we extend our gratitude to the primary authors of the KASRP and PMSEQ for developing and providing the tools.

Authors contributions

Abdullah Obaid was responsible for the methodology design, investigation, and supervision. He also prepared the original draft of the manuscript. Ms. Fatima Mah contributed to data collection and resource management. Mr. Basel Shroof assisted with data collection and investigation. Mr. Malek Alnajar conducted the formal analysis, validation, and contributed to manuscript review and editing. All authors read and approved the final manuscript.

Funding

Not applicable.

Conflicts of Interest Disclosure

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

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Association for Health Sciences and Education. The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

Provenance and peer review

Not commissioned; externally double-blind peer reviewed.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

Open access

Copyrights

References

[1] Cohen SP, Vase L, Hooten WM. Chronic pain: an update on burden, best practices, and new advances. The Lancet. 2021; 397: 2082–97. PMid:34062143 https://doi.org/10.1016/S0140-6736(21)00393-7

[2] Moonesinghe S, Aresu G, Bampoe S, et al. Perioperative Quality Improvement Programme Annual Report 2018-19. R Coll Anaesth. 2019.

[3] Yong RJ, Mullins PM, Bhattacharyya N. Prevalence of chronic pain among adults in the United States. Pain. 2022; 163(2): e328–e332. PMid:33990113 https://doi.org/10.1097/j.pain.0000000000002291

[4] Fayaz A, Croft P, Langford RM, et al. Prevalence of chronic pain in the UK: a systematic review and meta-analysis of population studies. BMJ Open. 2016; 6(6): e010364. PMid:27324708 https://doi.org/10.1136/bmjopen-2015-010364

[5] Shoqirat N, Mahasneh D, Al-Khawaldeh O, et al. Postoperative Patients in Jordan: Pain Prevalence, Characteristics, Beliefs, and Satisfaction. Pain Manag Nurs. 2019 Jun 1; 20(3): 239–44. PMid:31097373 https://doi.org/10.1016/j.pmn.2018.12.004

[6] Nalamachu SR, Robinson RL, Viktrup L, et al. Multimodal treatment patterns for osteoarthritis and their relationship to patient-reported pain severity: a cross-sectional survey in the United States. J Pain Res. 2020; 13: 3415–3425. PMid:33380823 https://doi.org/10.2147/JPR.S285124

[7] Hadi MA, McHugh GA, Closs SJ. Impact of Chronic Pain on Patients' Quality of Life: A Comparative Mixed-Methods Study. J Patient Exp. 2019; 6(2). PMid:31218259 https://doi.org/10.1177/2374373518786013

[8] Michaelides A, Zis P. Depression, anxiety and acute pain: links and management challenges. Vol. 131, Postgraduate Medicine. Taylor and Francis Inc. 2019. p. 438–44. PMid:31482756 https://doi.org/10.1080/00325481.2019.1663705

[9] Othman WM, Al-Atiyyat N. Knowledge, perceived barriers, and practices of oncology nurses regarding cancer pain management. Electron J Gen Med. 2022 Dec 1; 19(6). https://doi.org/10.29333/ejgm/12337

[10] Panlican A, Pasay-an E, Gonzales F, et al. A survey on the knowledge and attitude on pain management among nurses employed in the government hospitals. Saudi J Heal Sci. 2020; 9(2): 97. https://doi.org/10.4103/sjhs.sjhs_100_20

[11] Grommi S, Vaajoki A, Voutilainen A, et al. Effect of Pain Education Interventions on Registered Nurses' Pain Management: A Systematic Review and Meta-Analysis. Pain Manag Nurs. 2023 Aug 1; 24(4): 456–68. PMid:37032260 https://doi.org/10.1016/j.pmn.2023.03.004

[12] Türker Ö, Şanlı D. Surgical Patients' Evaluation of Pain Management Quality and Surgical Nurses' Pain-Related Knowledge and Attitudes. Pain Manag Nurs. 2024 Oct 1; 25(5): 459–66. PMid:38600012 https://doi.org/10.1016/j.pmn.2024.03.012

[13] Bouya S, Balouchi A, Maleknejad A, et al. Cancer Pain Management Among Oncology Nurses: Knowledge, Attitude, Related Factors, and Clinical Recommendations: a Systematic Review. Vol. 34, Journal of Cancer Education. Springer New York LLC; 2019. p. 839–46. PMid:30315497 https://doi.org/10.1007/s13187-018-1433-6

[14] Alnajar MK, Shudifat R, Mosleh SM, et al. Pain Assessment and Management in Intensive Care Unit: Nurses' Practices, Perceived Influencing Factors, and Educational Needs. Open Nurs J. 2021 Oct 7; 15(1): 170–8. https://doi.org/10.2174/1874434602115010170

[15] Alzghoul BI, Abdullah NAC. Pain Management Practices by Nurses: Application of the Self-Efficacy Theory. Glob J Health Sci. 2020 Jul 6; 12(9): 44. https://doi.org/10.5539/gjhs.v12n9p44

[16] Achaliwie F, Wakefield AB, Mackintosh-Franklin C. Does Education Improve Nurses' Knowledge, Attitudes, Skills, and Practice in Relation to Pain Management? An Integrative Review. Pain Manag Nurs. 2023 Jun 1; 24(3): 273–9. PMid:36608996 https://doi.org/10.1016/j.pmn.2022.12.002

[17] Bandura A. Self-efficacy: Toward a unifying theory of behavioral change. Psychol Rev. 1977 Mar; 84(2): 191–215. PMid:847061 https://doi.org/10.1037//0033-295X.84.2.191

[18] Bandura A, Freeman WH, Lightsey R. Self-efficacy: The exercise of control. J Cogn Psychother [Internet]. 1999 Jan 1 [cited 2024 Jun 16]; 13(2): 158–66. https://doi.org/10.1891/0889-8391.13.2.158

[19] Chiang LC, Chen HJ, Huang L. Student Nurses' Knowledge, Attitudes, and Self-Efficacy of Children's Pain Management: Evaluation of an Education Program in Taiwan. J Pain Symptom Manage. 2006 Jul 1; 32(1): 82–9. PMid:16824988 https://doi.org/10.1016/j.jpainsymman.2006.01.011

[20] Stanley M, Pollard D. Relationship between knowledge, attitudes, and self-efficacy of nurses in the management of pediatric pain. Pediatr Nurs. 2013; 39(4): 165–71.

[21] Schwarzer R, Luszczynska A. Self efficacy. In: Handbook of positive psychology assessment. 2008. p. 207–17.

[22] Parvizy S, Tarvirdinasab S, Raznahan R, et al. The effect of pain management training in workshop on the knowledge, attitude and self-efficacy of pediatric nurses. J Fam Med Prim Care. 2020; 9(6): 2880. PMid:32984143 https://doi.org/10.4103/jfmpc.jfmpc_92_20

[23] Tosun N, Yeşilyurt T. The knowledge and attitudes of nursing students about pain management. Fenerbahçe Univ J Health Sci. 2024; 4(1): 38–52. https://doi.org/10.56061/fbujohs.1238378

[24] Darawad M, Alnajar MK, Abdalrahim MS, et al. Cancer pain management at oncology units: comparing knowledge, attitudes and perceived barriers between physicians and nurses. J Cancer Educ.

2019; 34(2): 366–74. PMid:29288475 https://doi.org/10.1007/s13187-017-1314-4

[25] Yuan L. Effect of Educational Interventions for Improving the Nurses' Knowledge, Attitude, and Practice of Pediatric Pain Management: A Aystematic Review and Meta-Analysis. Pain Manag Nurs. 2024 Aug 1; 25(4): e271–8. PMid:38702258 https://doi.org/10.1016/j.pmn.2024.04.005

[26] El-Aqoul A, Obaid A, Jarrah I, et al. Effectiveness of Education Program on Nursing Knowledge and Attitude toward Pain Management. Asia-Pacific J Oncol Nurs. 2020 Oct 1; 7(4): 382–8. PMid:33062835 https://doi.org/10.4103/apjon.apjon_17_20

[27] Youngcharoen P, Piyakhachornrot C. Online Learning to Improve Nurses' Knowledge, Attitudes, and Self-Efficacy About Managing Postoperative Pain in Older Adults. Pain Manag Nurs. 2024 Jun 1; 25(3): 249–57. PMid:38492991 https://doi.org/10.1016/j.pmn.2024.02.007

[28] Ibrahim SA, Reynolds KA, Poon E, et al. The evidence base for US Joint Commission hospital accreditation standards: cross sectional study. BMJ. 2022; 377: e063064. PMid:35738660 https://doi.org/10.1136/bmj-2020-063064

[29] Rahman MA, Hanna J, Zein B El, et al. A Nonrandomized Pretest Posttest Study on the Impact of an Educational Pain Management Program on Nurses' Knowledge and Attitudes Regarding Pain in a Middle Eastern Country. Pain Manag Nurs. 2022 Jun 1; 23(3): 324–9. PMid:34389238 https://doi.org/10.1016/j.pmn.2021.07.003

[30] Salim NA, Joshua R, AbuBaker NA, et al. Effect of a Nursing In-Service Education Program on Nurses' Knowledge and Attitudes towards Pain Management in a Governmental Hospital in the United Arab Emirates: Experimental Random Assignment Study. Dubai Med J. 2019 Oct 3; 2(4): 146–52. https://doi.org/10.1159/000503560

[31] Sucu Çakmak NC, Çalışkan N. Evaluation of the effectiveness of the web-based chronic pain management training program developed for nursing students: Triple-blind randomized controlled trial. Nurse Educ Pract. 2024 May 1; 77: 103985. PMid:38754282 https://doi.org/10.1016/j.nepr.2024.103985

[32] Kang H. Sample size determination and power analysis using the G*Power software. J Educ Eval Health Prof [Internet]. 2021 Jul 30 [cited 2024 Jun 16]; 18: 17. PMid:34325496 https://doi.org/10.3352/jeehp.2021.18.17

[33] Ferrell B, McCaffery M. Knowledge and Attitudes Survey Regarding Pain, Revised. 2014.

[34] Macindo JRB, Soriano CAF, Gonzales HRM, et al. Development and psychometric appraisal of the Pain Management Self-Efficacy Questionnaire. J Adv Nurs. 2018 Aug 1; 74(8): 1993–2004. PMid:29633327 https://doi.org/10.1111/jan.13582

[35] Rezaei H, Saeed AFM, Abdi K, et al. Translation and validation of the farsi version of the pain management self-efficacy questionnaire. J Pain Res. 2020; 13: 719–27. PMid:32308471 https://doi.org/10.2147/JPR.S246077

[36] Keen A, McCrate B, McLennon S, et al. Influencing Nursing Knowledge and Attitudes to Positively Affect Care of Patients with Persistent Pain in the Hospital Setting. Pain Manag Nurs. 2017 Jun 1; 18(3): 137–43. PMid:28528935 https://doi.org/10.1016/j.pmn.2017.04.002

[37] Makhlouf SM, Pini S, Ahmed S, et al. Managing Pain in People with Cancer—a Systematic Review of the Attitudes and Knowledge of Professionals, Patients, Caregivers and Public. J Cancer Educ. 2020 Apr 1; 35(2): 214–40. PMid:31119708 https://doi.org/10.1007/s13187-019-01548-9

[38] Al-Atiyyat N, Salim NA, Guo JW, et al. Evaluating the quality of pain management satisfaction among oncology patients in a hospital setting: psychometric properties of the Arabic version of Pain Care Quality Survey. JCO Glob Oncol. 2023; 9: 1–10. PMid:38096464 https://doi.org/10.1200/GO.23.00012

[39] Toba HA, Samara AM, Zyoud SH. Nurses' knowledge, perceived barriers, and practices regarding cancer pain management: A cross-sectional study from Palestine. BMC Med Educ. 2019 May 23; 19(1). PMid:31122222 https://doi.org/10.1186/s12909-019-1613-z

[40] Ayoub NM, Jibreel M, Nuseir K, et al. A Survey of Knowledge and Barriers of Healthcare Professionals toward Opioid Analgesics in Cancer Pain Management. Int J Clin Pract. 2022; 2022: 1136430. PMid:35685510 https://doi.org/10.1155/2022/1136430

[41] Salim NA, Tuffaha MG, Brant JM. Impact a pain management program on nurses' knowledge and attitude toward pain in United Arab Emirates: Experimental-four Solomon group design. Appl Nurs Res. 2020 Aug 1; 54. PMid:32650886 https://doi.org/10.1016/j.apnr.2020.151314

[42] Khader KA. Effect of Educational Programs on Knowledge and Attitudes of Surgical Nurses Regarding Pain in Taif Hospitals. 2016; 4(April): 256–9.

[43] Kahsay DT, Pitkäjärvi M. Emergency nurses' knowledge, attitude and perceived barriers regarding pain Management in Resource-Limited Settings: Cross-sectional study. BMC Nurs. 2019; 18(1). PMid:31832015 https://doi.org/10.1186/s12912-019-0380-9

[44] Thirlwall A, Kuzemski D, Baghestani M, et al. 'Every day is a challenge': Expatriate acculturation in the United Arab Emirates. Int J Cross Cult Manag. 2021; 21(3): 430–51. https://doi.org/10.1177/14705958211039071

[45] Abubaker NA, Salim NA, Joshua R, et al. Registered nurses' perception about pain management of hospitalized patients in one of the governmental hospitals in Dubai, UAE: a cross-sectional study. Dubai Med J. 2019; 2(3): 102–6. https://doi.org/10.1159/000502175

[46] Al-Atiyyat N, Salim NA, Tuffaha MG, et al. A Survey of the Knowledge and Attitudes of Oncology Nurses toward Pain in United Arab Emirates Oncology Settings. Pain Manag Nurs. 2019 Jun 1; 20(3): 276–83. PMid:30527855 https://doi.org/10.1016/j.pmn.2018.08.005

[47] Al Ameri M, Shanbhag NM. Developing and implementing postoperative pain management guidelines for breast cancer surgery: a leadership perspective. Cureus. 2023; 15(12): e50951. https://doi.org/10.7759/cureus.50951