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Critical Care Nurses Knowledge, Practice, and Associated Factors Regarding Non-pharmacological Pain Management in Tertiary Care Hospitals, Pakistan

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ABSTRACT

Pain ranks as one of the top three symptoms experienced globally, particularly concerning for patients in critical care units (CCU). It is managed through both pharmacological means (medications) and various non-pharmacological therapies, which help reduce medication side effects. **Objectives:** To evaluate the knowledge and practices of nurses in critical care regarding non-pharmacological pain management (NPPM) and the factors influencing their practices. **Methods:** The study design was cross-sectional analytical and was conducted among critical nurses from July to September 2024. The sample size of the participants was 184. They were extracted as strata from the study setting, and then the convenience sampling technique was used for data collection. Data were collected through a structured questionnaire, while data was analyzed through SPSS version 27.0, and informed consent was taken from each participant. The study was approved by the ethical review committee. **Results:** The total participants of the study were 184, where female were n=98 (53.3%), nurses in the age group 24-29 were 132 (71.1%), and those having the qualification of a 3-year Registered Nurse (RN) diploma were n=115 (62.4%). The results show that a higher number of nurses have poor knowledge (n=91, 49.5%) and average practices (n=80, 43.5%). Factors such as no official policy, no experience in critical care, and no NPPM use affect nurses' knowledge and practices. **Conclusions:** On the basis of results, the study established that extensive education and intervention are required to implement the NPPM in the regular practices of nurses for better outcomes.

INTRODUCTION

Pain is defined by the International Association for the Study of Pain as an unpleasant sensory and emotional experience linked to actual or potential tissue damage [1]. It is also recognized as existing whenever the patient claims it does. In critically ill patients, pain is associated with adverse physiological and psychological outcomes and negatively affects their quality of life upon discharge from the ICU [2]. Despite advancements in pain assessment and management in critical care, addressing pain in these patients remains a challenging issue. The prevalence of pain globally is rising, with the IASP estimating that one in five people experience pain and one in ten are diagnosed with chronic pain [3]. According to international human rights law, receiving appropriate and efficient pain management is a basic human right and a critical first step in improving the patient's quality of life [4]. Pain management has emerged as a major healthcare issue and an important field of research in recent decades. Despite the significant growth of the body of knowledge, the availability of guidelines, technological advancements,

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and pharmacologic and non-pharmacologic pain treatment approaches, all forms of pain are still underestimated and under-treated [5]. Additionally, pain management not only promotes patient comfort by reducing their suffering, but also reduces hospital stay and enhances wound healing. In the health care sector, pain is mostly treated through medication such as analgesics, while pain is caused through physical and psycho-social factors; therefore, sometimes it does not respond to medication, a wide range of alternatives should be available for the management of pain, which should include non-pharmacological therapies that effectively manage pain [6]. Non-pharmacological pain management is an alternative type of therapy to treat and manage pain, that contain neuro-stimulation, counseling, comfort, and physical therapies [7]. The effectiveness of non-pharmacological pain relief techniques has been recognized due to their lower side effects and complications. However, challenges persist globally, primarily attributed to care provider attitudes and knowledge gaps. Research indicates that non-drug pain management methods can reduce pain perception and distress, enhance coping abilities, and empower patients and families [8]. Nurses are responsible for the care of hospital patients; they play a vital role in the monitoring and treatment of pain while enhancing patient comfort and minimizing the suffering of pain, that required knowledge and practice regarding the management of pain [9]. Effective pain management requires healthcare providers, especially nurses, to have a strong understanding and positive outlook concerning pain management. Nurses, who interact most frequently with patients, play a crucial role in pain assessment, greatly influencing patient experiences during hospitalization [10]. Pakistan's healthcare system, particularly public hospitals, struggles with overcrowding, staff shortages, and restricted access to advanced medications [11]. Non-pharmacological pain interventions, such as relaxation techniques and music therapy, are effective, low-cost, and safe, particularly for critically ill patients who cannot communicate their pain verbally. Despite strong global evidence favoring these techniques, nurses primarily depend on medications, and non-drug methods are seldom used.

This study aimed to assess the level of knowledge, attitude, and associated factors among nurses working in the critical care unit regarding non-pharmacological management of pain.

METHODS

The cross-sectional descriptive research design was adopted to examine the knowledge and practice of nurses in the area of non-pharmacological pain management in the critical care unit of three major hospitals: a private tertiary teaching hospital in Islamabad (Shifa International Hospital, Islamabad) and two tertiary care hospitals in Peshawar (Hayatabad Medical Complex and Rehman Medical Institute, Peshawar). Ethics approval was granted by Shifa International Hospital, Islamabad (IRB # 246-24), with permission from participating hospitals. Confidentiality was maintained, and informed consent was obtained in writing. The study was conducted between July and September 2024, while the population of the study included registered nurses who work in adult ICUs, CCUs, HDUs, and step-down units and were directly engaged in patient care. The following were the eligibility criteria: nurses having at least three months of experience in critical care were included, but not nursing managers and nurses on leave. Utilizing the online software Open-Epi with the sample size formula, the required sample size was estimated using the following parameters: 5% marginal error and 95% confidence interval (alpha = 0.05), the sample size calculated was 154. Then additionally, a 20% attrition rate was incorporated to account for potential non-responses. Consequently, the final sample size of the study was 184 participants [12]. The sample size formula is: n = N . Z2 . p . (1-p)/e2 . (N-1) + Z2 . p . (1-p). For 20% attrition rate: To account for potential non-response or dropouts, increase the sample size by 20%: nfinal = n ÷ (1–attrition rate) = 154 ÷ (1–0.2) = 154÷0.8=192. Rounded to nearest feasible number, the adjusted sample size = 184. To ensure that every critical care unit within the three hospitals had an equal opportunity for inclusion. The stratification of the participants was made as 94 taken from 131 total nurses from Shifa International Hospital, Islamabad, 49 out of 53 from HMC, and 51 out of 70 nurses from RMI, through a formula of proportionate sample size of ICUs, CCUs, HDUs, and step-down units [13], that are calculate below: nh = Nh/N × n. nh = sample size for stratum h, Nh = population size for stratum h, N = total population size, n = overall sample size. The data was collected in two sections: section (a) contain demographic data while section (b) knowledge questionnaire that contain 10 questions with dichotomous response of correct/incorrect, participant having (<6 points) were considered poor knowledge, (6-7.99 points) were average score, and (8-10 points) were good knowledge [14]. The practices were evaluated through 13 items having a Likert scale from "not at all" to "always. Participants who scored 80% or above were considered good practices, those who scored 60–79% were considered average practices, and those who scored 60% or less were considered poor practices [14]. The study established content validity through high indices (CVI = 0.99) from two ICU nurse educators, two ICU specialists, and one pain management physician. Reliability testing showed a Cronbach alpha of 0.73 based on a pilot sample. Data were analyzed using SPSS version 27.0, calculating descriptive statistics for categorical variables (frequency

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and percentages) and continuous data (mean and standard deviation). An ordinal logistic regression test was applied to evaluate factors associated with critical care nurses' knowledge and practices regarding non-pharmacological pain measures.

RESULTS

The total number of participants were 184, where majority of the participants were age group 24-29 years 132 (71.7%), female nurses 98 (53.3%), 3 years diploma 115 (62.5%), 1-5 years' experience 108 (58.7%), working in MICU/MHDU 84 (45.7%), no training regarding NPPM n-128 (69.6%), and having ratio 1:2 patient were 77 (41.8%) (Table 1).

Table 1: Demographic Data of the Participants (n=184)

Description	Frequency (%)
Age of Participants	
18-23	23 (12.5%)
24-29	132 (71.7%)
30-35	25 (13.6%)
More than 35	4 (2.2%)
Total	184 (100%)
Gender	
Male	86 (46.7%)
Female	98 (53.3%)
Total	184 (100%)
Qualification	
Diploma In Nursing (RN)	115 (62.5%)
Degree (Post RN/BSN)	69 (37.5%)
Years of Experience	
<1 Year	62 (33.7%)
1-5 Years	108 (58.7%)
6-10 Years	14 (7.6%)
Total	184 (100%)
Working Area	
MICU/MHDU	84 (45.7%)
SICU/SHDU	61 (33.2%)
CCU	39 (21.2%)
Total	184 (100%)
Training Regarding NPPM	
No	128 (69.6%)
Yes	56 (30.4%)
Seminar	10 (5.4%)
Workshop	17 (9.2%)
Nursing Education Services	29 (15.8%)
Total	184 (100%)
Nurse-Patient-Ratio	
1:1	77 (41.8%)
1:2	87 (47.3%)
1:3	20 (10.9%)
Total	184 (100%)

The majority of participants demonstrated poor knowledge (49.5%), followed by average knowledge (36.4%), and good knowledge (14.1%) regarding NPPM. A significant number of nurses (64.1%) recognized NPPM's role in reducing muscle tension and pain, while 54% understood its role in inflammation, and 58.7% identified the types of therapies used in NPPM (Figure 1).

Figure 1: Overall knowledge of the critical care nurses

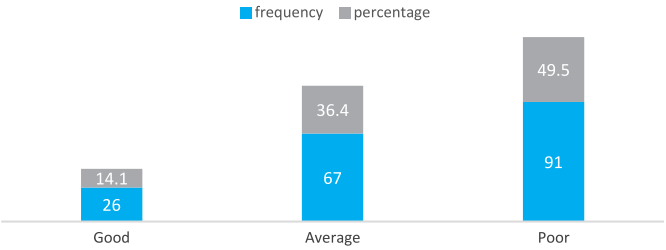

Figure 1: Overall, Knowledge Level (n=184)

43.5% of critical care nurses demonstrated average practices, while 40.8% had poor practices, and only 15.8% exhibited good practices. The study found that 48.4% of nurses practiced positioning for patient comfort, 41.3% used breathing techniques and guided imagery occasionally, and 40.2% employed therapeutic touch regularly. Additionally, 48.2% frequently recited holy verses for patients, and 45% used hot and cold packs sometimes (Figure 2).

Figure 2: Practices of nurses regarding NPPM

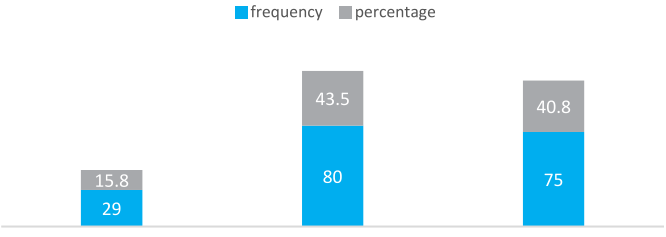

Figure 2: Overall Practices of Nurses Regarding NPPM (n=184)

Ordinal regression analyzed the predictors of knowledge about NPPM, showing that "poor knowledge" (B = -0.205, p=0.439) was not significant, while "average knowledge" (B=1.719, p<0.001) was significant. The lack of policy for non-pharmacological interventions and its absence did not impact knowledge. Significant predictors included "Human Resource Availability (Not sure)" (B = -1.285, p = 0.016), indicating reduced knowledge, while other resource availability and technique effectiveness were not significant.

Table 2: Associated Factors with Knowledge

Parameters	Estimate (B)	SD Error	Wald	df	p-value	(95% CL) OR
Threshold						
Poor Knowledge	-0.205	0.265	0.598	1	0.439	(0.72 -0.31) 0.81
Average Knowledge	1.719	0.304	31.97	1	p <0.001*	(1.12 - 2.31) 5.58

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Hospital Lacks Policy of NPPM						
Not sure	0.742	0.423	3.080	1	0.079	(0.92 – 4.81) 2.10
No	0.358	0.350	1.045	1	0.307	(0.72 – 2.84) 1.43
Yes	–	–	–	0	–	–
Availability of Sufficient Human Resources (Nurses)						
(Not sure)	-1.285	0.534	5.792	1	0.016*	(0.10 – 0.79) 0.28
(No)	-0.389	0.389	0.997	1	0.318	(0.32 – 1.45) 0.68
Yes	–	–	–	0	–	–
Effectiveness of the Techniques						
(Not Sure)	0.306	0.479	0.409	1	0.523	(0.53 – 3.47) 1.36
(No)	-0.458	0.309	2.200	1	0.138	(0.35 – 1.16) 0.63
Yes	–	–	–	0	–	–

p-values * means statistical significance.

The study presents factors influencing critical care nurses' practices related to non-pharmacological pain management (NPPM). Ordinal regression analysis indicates that increased workload (-1.591, p =0.006), absence of hospital policy (-1.031, p=0.012), and lack of interdisciplinary collaboration (-1.061, p=0.008) negatively predict the use of NPPM techniques. Other factors, like time management and resource availability, were not significant predictors (Table 3).

Table 3: Association of Practice with Factor Variables

Parameters	Estimate (B)	SD Error	Wald	df	p-value	(95% CL) OR
Threshold						
Poor Practice	-1.978	0.513	14.840	1	p<0.001*	(0.72 – 0.31) 0.14
Average Practice	0.489	0.496	0.972	1	0.324	(1.12 – 2.31) 1.63
Time Management						
Not sure	1.314	1.192	1.215	1	0.270	(0.36 – 38.4) 3.72
No	-0.533	0.383	1.934	1	0.164	(0.28 – 1.24) 0.59
Yes	0	–	–	0	–	–
Workload						
(Ref= No)	0	–	–	0	–	–
(Yes)	-1.591	0.584	7.414	1	0.006*	(0.06 – 0.64) 0.20
Hospital Lacks Policy of NPPM						
(Not sure)	-0.821	0.516	2.527	1	0.112	(0.16 – 1.21) 0.44
(Yes)	-1.031	0.410	6.337	1	0.012*	(0.16 – 0.80) 0.36
No	0	–	–	0	–	–
Availability of Sufficient Human Resources (Nurses)						
(Not sure)	-0.735	0.535	1.889	1	0.169	(0.17 – 1.37) 0.48
(Yes)	-0.095	0.426	0.049	1	0.824	(0.39 – 2.10) 0.91
No	0	–	–	0	–	–
Severity of Pain						
(Not sure)	-0.516	0.846	0.373	1	0.541	(0.21 – 1.14) 0.60
(Yes)	0.112	0.349	0.104	1	0.747	(0.57 – 1.79) 1.12
No	0	–	–	0	–	–
Patient Cooperation						
(Not sure)	0.394	0.750	0.276	1	0.599	(0.10 – 1.86) 1.49
(Yes)	-0.743	0.369	4.060	1	0.044*	(0.23 – 0.98) 0.48
No	0	–	–	0	–	–
Opposite Gender						
(Not sure)	-2.246	1.176	3.646	1	0.056	(0.45 – 1.59) 0.11
(Yes)	-0.136	0.349	0.151	1	0.698	(0.81 – 1.54) 0.87
No	0	–	–	0	–	–
Effectiveness of the Technique						
(Not sure)	-0.839	0.554	2.290	1	0.130	(0.19 – 0.84) 0.43
(Yes)	0.245	0.327	0.564	1	0.453	(0.39 – 1.88) 1.28
No	0	–	–	0	–	–
Availability of the NPP Control Tool						
(Not sure)	-0.155	0.459	0.114	1	0.735	(0.10 – 1.74) 0.86
(Yes)	0.100	0.365	0.075	1	0.784	(0.60 – 1.81) 1.11
No	0	–	–	0	–	–
Nurses' Autonomy in NPPM Decision						
(Not sure)	-0.463	0.591	0.613	1	0.434	(0.16 – 0.69) 1.28
(Yes)	0.128	0.373	0.117	1	0.733	(0.16 – 0.76) 0.35
No	0	–	–	0	–	–
Inter-Disciplinary Collaboration						
(Not sure)	0.246	0.478	0.265	1	0.607	(0.69 – 1.18) 1.28
(Yes)	-1.061	0.399	7.084	1	0.008*	(0.16 – 0.76) 0.35
No	0	–	–	0	–	–

The symbol "*" means statistical significance

DISCUSSION

In Pakistan, there are limited studies on NPPM, while study focused on the nurses' domain are rare that evaluated nurses' awareness and practice; therefore, this study was conducted to explore the level of awareness and practices of critical care nurses regarding NPPM. Moreover, the study also examined the factors that affect the level of knowledge and practices among critical care nurses. The study indicated that a majority of nurses (49.5%) had poor knowledge regarding NPPM, with 36.4% having average knowledge and only 14.1% demonstrating good knowledge. The lack of awareness appears linked to the absence of NPPM coverage in their curriculum, particularly among diploma nurses. Contrasting results were noted in Nigeria, where higher knowledge levels were reported, likely due to formal education, and over half of Ethiopian nurses were found to possess the necessary expertise [15-17]. Additionally, 69.6% of participants in this study lacked NPPM training, highlighting the need for structured educational initiatives [18]. Regular training and practical sessions are essential for enhancing nurses' NPPM skills. In the present study, 43.5% of critical care nurses in this study showed average practices of NPPM that suggest improvement in the practices of CCN, 40.8% poor practices, and only 15.8% strong practice, and 48.4% of nurses encouraged patients to recite Holy Verses. The average and poor level indicated that NPPM is very beneficial for the patient, but it requires skills, knowledge and support from regulatory authorities and the government. These results are comparable with those of [4], who stated that their lack of expertise and experience

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led to irregular NPPM use. Similar to this, a significant obstacle in this study was a lack of awareness and training. The most popular strategy (48.4% "always") was positioning, which is consistent with a study that found it to be a favored method because of its ease of use [19, 20]. On the other hand, methods such as temperature regulation and massage were used less frequently, which is in line with, who found low utilization rates of 18.8% and 23.4%, respectively [15]. The present study revealed that due to the recent transition from study to practice, the nurses aged 18-23 years not only have good knowledge but also have good practices that are associated with their education. Factors such as a shortage of staff and a higher number of patients, a lack of NPPM policy, and poor interaction in the form of organizational barriers affect their implementation. In other studies, education was associated with practices, while duty ward, qualification, years of experience, and knowledge had different associations, but limited time and patient workload were major barriers among nurses [20]. Moreover, it was also revealed by a study that socio-demographic data affects the level of awareness but has a low impact on practices; therefore, it is recommended to explore systematic issues that affect the transition of knowledge into practices [19].

CONCLUSIONS

This study examined critical care nurses' knowledge and practices regarding (NPPM) in tertiary care hospitals, revealing generally low levels of both knowledge and average practice. Diploma holders exhibited lower practice levels compared to degree holders. Identified challenges to effective NPPM included high workloads, absent hospital policies, poor interdisciplinary teamwork, and insufficient knowledge. The study suggests that targeted educational interventions and institutional policy changes are necessary to enhance NPPM implementation and improve patient outcomes. Future research should focus on these elements across various demographics and settings.

Authors Contribution

Conceptualization: BU, AZ
Methodology: BU, SFK, SI
Formal analysis: SFK
Writing review and editing: SI

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

All the authors declare no conflict of interest.

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