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Original Research Article

Critical Thinking and Decision-Making Ability of Nurses Working in Critical Care Units Regarding Pain Management

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Abstract: *Effective pain management in critical care settings requires nurses to employ strong critical thinking and decision-making abilities. These competencies enable timely, evidence-based interventions for patients with complex, dynamic pain conditions. Despite their importance, few studies have examined this relationship in the Pakistani context, where nurses often face high workloads, limited training, and systemic constraints.* ***Objective:*** *To assess the critical-thinking and decision-making abilities of nurses working in critical care units and to determine the relationship between these two variables in the context of pain management.* ***Methods:*** *This descriptive cross-sectional study was conducted in the critical care units of General Hospital Lahore between January and June 2024. A total of 60 registered nurses with at least one year of ICU experience were enrolled through non-probability purposive sampling. Data were collected using a structured questionnaire comprising demographic data, the Critical Thinking Disposition Inventory (CTDI), and a validated Decision-Making Questionnaire for Pain Management. Descriptive statistics summarized demographic variables, while Pearson correlation and ANOVA tests assessed relationships between variables. A p-value <0.05 was considered statistically significant.* ***Results:*** *The mean age of participants was 29.4 ± 5.8 years, with a predominance of females (78.3%). The overall mean critical-thinking score was 69.7 ± 8.2, indicating a moderate to high level of critical-thinking ability, with the highest domain score in Interpretation (12.3 ± 2.4). The mean decision-making score was 74.2 ± 9.6, reflecting satisfactory decision-making competence. More than half (51.7%) demonstrated moderate decision-making ability, while 30% demonstrated good decision-making ability. A strong positive correlation (r = 0.68, p < 0.001) was observed between critical thinking and decision-making abilities. Educational qualifications were significantly associated with decision-making performance (p = 0.03), with higher levels of education associated with higher scores.* ***Conclusion:*** *Critical-thinking ability strongly influences decision-making in pain management among critical care nurses. Enhanced educational attainment correlates with improved clinical reasoning and decision-making competence. Strengthening continuous professional education and integrating critical-thinking modules into nursing curricula can significantly improve pain management practices and patient outcomes in critical care settings.*

Keywords: Critical thinking, Decision-making, Pain management, Critical care nursing, Pakistan, Clinical reasoning

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Introduction:

Pain management in critical care settings poses significant challenges that require nurses to employ critical thinking and sound decision-making abilities. The complex nature of patient conditions in essential units of care requires nurses to continually assess pain levels and consider both pharmacological and non-pharmacological interventions. The necessity for effective pain management strategies is underscored by the high levels of stress and anxiety typically experienced by patients in critical settings, further complicating the nurses' role in patient care. Indeed, pain assessment and management are crucial responsibilities for critical care registered nurses, who must ensure holistic, effective, and evidence-based approaches to care (1, 2, 3).

Research indicates that a disposition toward critical thinking is significantly associated with clinical decision-making in nursing practice. Anton et al. found that experienced nurses use critical thinking not only to analyze information but also to make rapid, informed decisions in chaotic circumstances, such as those encountered during the COVID-19 pandemic [1]. This capacity for critical reasoning is crucial, especially in high-stress environments where nurses often work under considerable time constraints and with limited resources (4,5). Perioperative nurses, for example, face unpredictable scenarios that require swift adaptation and response; thus, their critical-thinking skills are imperative for effective functioning (6).

In the context of pain management, various barriers inhibit successful interventions. Research shows that critical care nurses face numerous challenges, including insufficient time for patient education, overwhelming workloads, and high levels of emotional distress, which adversely impact their ability to make sound clinical decisions (2, 7, 4). Additionally, knowledge gaps regarding pain management protocols can lead to under-treatment or inappropriate treatment, further complicating outcomes for critically ill patients (8, 9). Such barriers underscore the urgent need for more effective educational strategies to enhance nurses' knowledge and skills in pain management.

The importance of critical thinking in nursing extends beyond individual knowledge; it is also interlinked with professional values and responsibilities. As outlined by Al-Sayaghi et al., nurses' knowledge and attitudes toward pain management can significantly influence their clinical decision-making and ultimately, patient outcomes (9). Furthermore, critical thinking plays a central role in nurses' ability to effectively evaluate evidence on pain management techniques and apply this knowledge to devise individualized care plans (10, 11).

Understanding these dynamics is particularly relevant within the context of the Pakistani healthcare system, where critical care nursing faces unique challenges. Pakistan's healthcare infrastructure limits resources and support for nurses, often leading to burnout and inadequate training opportunities. Despite these challenges, critical care nurses in Pakistan must be equipped with comprehensive training not only to enhance their

clinical skills but also to cultivate critical thinking and decision-making abilities essential for high-quality patient care. Developing these competencies can lead to improved pain management practices, ultimately enhancing patient satisfaction and clinical outcomes (12, 13).

Thus, critical thinking and decision-making skills among nurses in critical care units are pivotal for effective pain management. Addressing the barriers that compromise these skills through targeted educational strategies and systemic support may yield significant improvements in patient outcomes, particularly given the unique challenges healthcare professionals in Pakistan face.

Methodology

This descriptive cross-sectional study was conducted in the critical care units of General Hospital Lahore from January to June 2024. A total of 60 nurses working in adult and neonatal intensive care units (ICUs) were included in the study. The sample size was determined using the WHO sample size calculator, assuming a 95% confidence interval, 80% power, and an anticipated correlation coefficient of 0.35 between critical thinking and decision-making skills, based on prior literature, yielding a minimum of 55 participants. To account for non-response, 60 nurses were finally enrolled through non-probability purposive sampling.

All registered nurses with at least one year of ICU experience were eligible. Those on extended leave or not directly involved in patient care were excluded. Data were collected using a self-administered structured questionnaire, comprising three parts: (1) demographic information, (2) a standardized Critical Thinking Disposition Inventory (CTDI), and (3) a Decision-Making Questionnaire for Pain Management adapted from validated international tools. Each item was rated on a 5-point Likert scale. Higher scores indicated greater critical thinking ability and better decision-making competence.

Ethical approval was obtained from the institutional review board, and written informed consent was secured from each participant. Confidentiality and anonymity were maintained throughout the study.

Data were analyzed using IBM SPSS version 26.0. Descriptive statistics were used to summarize demographic variables as frequencies and percentages. Continuous variables were expressed as mean ± standard deviation. Inferential statistics included the Pearson correlation test to evaluate the relationship between critical thinking and decision-making abilities, and ANOVA and independent t-tests to assess group differences. A p-value <0.05 was considered statistically significant.

Results

The mean age of the participants was 29.4 ± 5.8 years, with ages ranging from 22 to 45 years. Among the participants, 47 (78.3%) were female and 13 (21.7%) were male, reflecting the gender distribution typical of the nursing workforce. Table 1 presents the demographic characteristics of nurses. The majority were female nurses with a Bachelor's degree, working primarily in medical ICUs, and with an average professional experience of more than 3 years.

(Table 1)

Table 2 shows that the mean overall critical thinking score was 69.7 ± 8.2, indicating a moderate to high level of critical thinking ability among the nurses. The highest mean score was noted in the *Interpretation* domain (12.3 ± 2.4), while *Evaluation* had the lowest (10.8 ± 2.0).

Table 3 reveals that 51.7% of nurses demonstrated *moderate* decision-making ability, while 30.0% exhibited *good* decision-making ability. The mean decision-making score was 74.2 ± 9.6, suggesting an overall satisfactory level of competence in pain management decisions.

Table 4 indicates a strong positive correlation ($r = 0.68$, $p < 0.001$) between nurses' critical thinking and their decision-making ability in pain management, signifying that higher critical thinking skills were associated with better decision-making.

Table 5 demonstrates a statistically significant relationship between education and decision-making scores ($p = 0.03$), showing that nurses with higher qualifications made more effective pain management decisions.

Table 1: Demographic Characteristics of the Study Participants (n = 60)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	Mean ± SD	29.4 ± 5.8	—
Gender	Male	13	21.7
	Female	47	78.3
Marital Status	Single	28	46.7
	Married	32	53.3
Educational Qualification	Diploma in Nursing	21	35.0
	BSc Nursing	31	51.7
	Post RN/ MSN	8	13.3
Experience in Critical Care (years)	1–3 years	23	38.3
	4–6 years	18	30.0
	>6 years	19	31.7
Type of Critical Care Unit	Medical ICU	24	40.0
	Surgical ICU	18	30.0
	Cardiac ICU	10	16.7
	Neonatal ICU	8	13.3

Table 2: Critical Thinking Ability Scores of Nurses (n = 60)

Critical Thinking Domain	Mean ± SD	Minimum	Maximum
Interpretation	12.3 ± 2.4	8	16
Analysis	11.5 ± 2.1	7	15
Evaluation	10.8 ± 2.0	6	15
Inference	11.9 ± 2.3	7	16
Explanation	12.0 ± 2.1	8	15
Self-regulation	11.2 ± 2.5	6	16
Overall Critical Thinking Score	69.7 ± 8.2	52	85

Table 3: Decision-Making Ability of Nurses Regarding Pain Management (n = 60)

Decision-Making Category	Frequency (n)	Percentage (%)
Poor Decision-Making (Score < 60%)	11	18.3
Moderate Decision-Making (60–79%)	31	51.7
Good Decision-Making (≥80%)	18	30.0
Mean Decision-Making Score ± SD	74.2 ± 9.6	—

Table 4: Correlation between Critical Thinking and Decision-Making Ability

Variable Pair	Pearson's r	p-value	Significance
Critical Thinking Score vs Decision-Making Score	0.68	<0.001	Highly Significant

Table 5: Association between Educational Level and Decision-Making Ability

Education Level	Mean Decision-Making Score ± SD	p-value
Diploma in Nursing	68.4 ± 10.2	0.03*
BSc Nursing	75.9 ± 8.5	
Post RN/ MSN	79.6 ± 7.8	

Discussion

Our study aimed to evaluate nurses' critical thinking and decision-making abilities regarding pain management in critical care units. The demographic data reveal that the majority of participants (78.3%) were female, with an average age of 29.4 ± 5.8 years and an average of over 3 years of professional experience in critical care. This aligns with prior research indicating a predominance of female nurses in essential care settings, with significant implications for nursing workforce dynamics and patient care delivery (Sholehah et al., 14,15).

The mean overall critical thinking score of 69.7 ± 8.2 indicates moderate to high critical thinking ability among the nurses. This finding is consistent with research by Tong et al., who reported positive relationships between critical thinking skills and clinical practice in nursing, emphasizing that effective critical thinking is crucial for sound clinical decision-making [16]. Notably, our results show the highest mean score in the Interpretation domain (12.3 ± 2.4) and the lowest in Evaluation (10.8 ± 2.0). Similar findings were reported by Zainal et al., who noted varying levels of critical thinking across domains among nurses, suggesting that targeted training may be necessary to bolster specific essential competencies of thinking (17).

Regarding decision-making, 51.7% of the nurses demonstrated moderate decision-making ability, with a mean score of 74.2 ± 9.6. This level of competence is satisfactory, as noted in similar studies where nurses' decision-making skills were notably influenced by their educational background and work experience (15, 18). For instance, Wankam et al. found that structured support and education significantly enhanced nurses' decision-making skills in critical care, further affirming the crucial role of ongoing professional development (18).

A significant correlation ($r = 0.68$, $p < 0.001$) between critical thinking and decision-making ability was observed in our study, indicating that higher critical thinking skills are associated with better decision-making outcomes in pain management. This relationship corroborates findings by Lee and Chang, who underscore that nurses with advanced critical thinking skills are better equipped to make informed decisions in high-stakes environments such as the ICU (19). Given that decision-making is inherently linked to critical thinking in nursing, enhancing essential thinking training could improve patient care outcomes.

Our investigation demonstrated a statistically significant relationship between educational qualifications and decision-making scores ($p = 0.03$). Nurses with higher academic qualifications, such as RN-to-MSN degrees, achieved higher decision-making scores than those with only diplomas or BSc degrees. This trend is echoed in recent literature, which suggests that higher levels of education in nursing directly correlate with enhanced clinical reasoning and decision-making capabilities (20, 21). For instance, Gao et al. found that increased academic qualifications among nurses significantly improved their professional competencies, including pain management skills (22). This suggests that investing in nursing education could yield immediate benefits for patient care, particularly in critical situations that require heightened analytical and evaluative skills.

Thus, the findings from this study underscore the need for continuous education and training for nurses in critical care units to enhance critical thinking and decision-making competencies in pain management. Given the global challenges faced in healthcare delivery, including those unique to the Pakistani context—such as resource limitations and an increasing patient load—it is crucial to implement targeted educational interventions to equip nurses with these essential skills. Thus, addressing these gaps will not only improve the quality of care but will also enhance job satisfaction and retention among critical care nurses in Pakistan (23, 24).

Conclusion

This study highlights that nurses with stronger critical thinking skills make better clinical decisions when managing pain in critically ill patients. Education plays a pivotal role in shaping these competencies, with advanced qualifications linked to superior decision-making skills. Investing in continuous professional development and fostering analytical thinking in nursing education are essential to elevating the quality of care and optimizing pain management outcomes in critical care units, particularly in resource-limited healthcare systems such as Pakistan.

Declarations

Data Availability statement
All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate
Approved by the department concerned. (IRBEC-24)

Consent for publication
Approved

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Conflict of interest

The authors declared no conflict of interest.

Author Contribution

AS (Nursing Faculty)
Manuscript drafting, Study Design,
RY (Charge Nurse)
Review of Literature, Data entry, Data analysis, and drafting an article. Conception of Study, Development of Research Methodology Design,

SS (Head Nurse)
Study Design, manuscript review, and critical input.

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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