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Original Research Article

KNOWLEDGE AND PRACTICE OF NURSES REGARDING CHEST DRAIN MANAGEMENT

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Abstract: *Chest drain management is a vital component of critical care nursing, requiring comprehensive knowledge and adherence to evidence-based practices. In resource-limited settings like Pakistan, gaps in nursing competencies pose challenges to patient safety and outcomes. This study aimed to assess the knowledge and practices of ICU nurses regarding chest drain management in tertiary care hospitals.* ***Methods:*** *A descriptive cross-sectional study was conducted among 120 ICU nurses in Lahore, Pakistan. Participants were selected using convenience sampling. Data were collected through a validated structured questionnaire covering demographic information, knowledge, and practices. Statistical analysis was performed using SPSS version 26, employing descriptive and inferential statistics.* ***Results:*** *While 90.6% of nurses demonstrated correct knowledge about chest drain insertion sites, only 11.1% were aware of specific indications such as pneumothorax and hemothorax. Infection prevention practices were inadequate, with only 13.7% adhering to proper protective measures. Practices such as patient positioning and dressing changes were also suboptimal, with adherence rates of 10.3% and 7.7%, respectively. Advanced qualifications and greater experience were associated with higher competency levels ($p < 0.05$).* ***Conclusion:*** *The study identified significant gaps in knowledge and practices related to chest drain management among ICU nurses in Pakistan. Targeted training programs, competency assessments, and enhanced institutional policies are essential to address these deficiencies, improve patient outcomes, and ensure adherence to international standards in critical care nursing.*

Keywords: Chest Drain Management, ICU Nurses, Critical Care Nursing, Infection Prevention, Nursing Practices

Introduction

Chest drain management is a critical component of patient care in intensive care units (ICUs), particularly for patients with thoracic injuries, pleural effusions, or postoperative complications following cardiothoracic surgery. Effective management requires nurses to possess a comprehensive understanding of the indications, procedures, and infection control measures associated with chest drains. Despite its importance, gaps in knowledge and adherence to standard practices among nurses in resource-limited settings like Pakistan pose challenges to patient safety and outcomes (1, 2).

In Pakistan, ICU nurses face unique challenges, including high patient-to-nurse ratios, limited training opportunities, and a lack of standardized protocols for chest drain management. Studies in other low- and middle-income countries have shown that inadequate knowledge and practices in chest drain management can lead to complications such as infections, pneumothorax, and prolonged hospital stays (3, 4). A study conducted by Ahmed et al. in a tertiary care hospital in Karachi revealed that only 60% of nurses were aware of the proper techniques for chest drain insertion and maintenance (5).

Globally, adherence to evidence-based practices in chest drain management has been linked to better patient outcomes. For example, research in South Africa highlighted that structured training programs significantly improved nurses' skills in handling chest drains and reduced complications (6). Similarly, a study in India emphasized the need for regular competency assessments to enhance knowledge and adherence to safety protocols (7). However, in Pakistan, cultural and systemic barriers, such as hierarchical communication and limited access to professional development, continue to hinder the implementation of best practices (8). The role of ICU nurses in chest drain management extends beyond technical procedures; it also involves patient education, pain management, and monitoring for potential complications. A systematic review by Gupta et al. demonstrated that nurses with advanced training in chest drain care were more likely to recognize early signs of complications and take timely corrective actions (9). In the context of Pakistan, where healthcare resources are often constrained, equipping ICU nurses with the necessary knowledge and skills is crucial to improving patient outcomes and reducing the burden on healthcare facilities. This study aims to assess the knowledge and practices of ICU nurses regarding chest drain management in tertiary care hospitals in Lahore. By identifying gaps and associated factors, the findings will contribute to the development of targeted training programs and policies to enhance the quality of care provided in ICUs.

Methodology

The study utilized a descriptive cross-sectional design to assess the knowledge and practices of ICU nurses regarding chest drain management in tertiary care hospitals. This design was selected to capture a comprehensive overview of the current competencies and adherence to standards among nurses working in critical care settings.

The study population consisted of ICU nurses from tertiary care hospitals in Lahore, Pakistan. A total of 120 participants were recruited through convenience sampling, ensuring representation across different ICUs, including

medical and surgical units. Inclusion criteria required nurses to have at least one year of experience in ICU settings and direct involvement in managing patients with chest drains. Nurses who were on extended leave or not directly involved in patient care were excluded from the study.

Data collection was conducted using a structured questionnaire developed based on existing guidelines and validated by a panel of clinical experts. The questionnaire comprised three sections: demographic information, knowledge assessment, and practice evaluation. The demographic section included variables such as age, gender, marital status, educational qualification, years of experience, and department of employment. The knowledge section assessed understanding of chest drain indications, insertion sites, infection prevention measures, and pain management protocols. The practice section evaluated adherence to standard procedures, including patient positioning, dressing changes, and infection control practices.

Ethical approval was obtained from the institutional review board of the participating hospitals prior to data collection. Participants were informed about the study objectives, and written informed consent was obtained. They were assured of the confidentiality of their responses and their right to withdraw from the study at any time.

Data collection was conducted over four weeks during nurses' shifts to minimize disruptions to patient care. Trained research assistants distributed the questionnaires and provided clarifications where necessary. Completed questionnaires were reviewed for accuracy and completeness before data entry.

Data analysis was performed using SPSS version 26. Descriptive statistics, such as frequencies and percentages, were used to summarize demographic characteristics, knowledge levels, and practices. Chi-square tests were employed to identify associations between demographic variables and knowledge or practice scores. The reliability of the questionnaire was assessed using Cronbach's alpha, which yielded a value of 0.82, indicating good internal consistency.

Results

This study assessed the knowledge and practices of ICU nurses regarding chest drain management in tertiary care hospitals in Lahore, Pakistan. A total of 120 ICU nurses participated in the study. The majority (64.1%) were aged between 26–30 years, and most were female (80.3%). A significant proportion of nurses (67.5%) had 1–5 years of professional experience, and the most common qualification was Post RN (59%). Nurses predominantly worked in surgical ICUs (45.3%). These details are summarized in Table 1.

The majority of participants demonstrated limited knowledge of key aspects of chest drain management. For example, while 90.6% correctly identified the correct intercostal space for chest drain insertion, only 11.1% were aware of specific indications such as pneumothorax and hemothorax. Furthermore, only 13.7% of nurses adhered to appropriate infection prevention measures, such as wearing caps, goggles, and masks while managing chest drains. Detailed responses are shown in Table 2.

The assessment of practices revealed significant gaps in adherence to protocols. Only 10.3% of nurses appropriately positioned patients for effective drainage. Dressing changes were inconsistently performed, with only 7.7% adhering to hospital policy. These findings highlight critical areas requiring improvement. Detailed results are presented in Table 3.

The findings indicate that while nurses demonstrated good knowledge in some areas, such as correct intercostal space for chest drain insertion and pain management techniques, significant gaps exist in infection control measures and adherence to hospital protocols. These results underscore the urgent need for targeted training and policy interventions to improve knowledge and practices in chest drain management. Enhanced training programs focusing on infection prevention and patient positioning can bridge the observed gaps, ensuring better patient outcomes in ICU settings.

Table 1: Demographic Characteristics of Participants

Variable	Category	Frequency (n)	Percentage (%)
Age	21–25 years	24	20.5
	26–30 years	75	64.1
	31–35 years	15	12.8
	36–40 years	3	2.6
Gender	Male	23	19.7
	Female	94	80.3
Marital Status	Single	29	24.8
	Married	88	75.2
Experience	1–5 years	79	67.5
	6–10 years	35	29.9
	10–15 years	3	2.6
Qualification	Diploma in Nursing	29	24.8
	Post RN	69	59.0
	BSN (Generic)	19	16.2
Department	Medical ICU	39	33.3
	Surgical ICU	53	45.3
	Other ICUs	25	21.4

Table 2: Knowledge of Chest Drain Management

Question	Yes (n)	Yes (%)	No (n)	No (%)
Chest drain insertion in 2nd or 6th intercostal space	106	90.6	11	9.4
Pneumothorax and hemothorax as indications	13	11.1	104	88.9
Use of cap, goggles, and mask for infection control	16	13.7	101	86.3
Positioning to minimize chest drain-related pain	112	95.7	4	3.4
Dressing changes as per hospital policy	9	7.7	108	92.3

Table 3: Practices of Chest Drain Management

Practice	Yes (n)	Yes (%)	No (n)	No (%)
Positioning for air/fluid drainage	12	10.3	105	89.7
Dressing changes as per hospital protocol	9	7.7	108	92.3

Discussion

This study evaluated the knowledge and practices of ICU nurses regarding chest drain management in tertiary care hospitals in Lahore, Pakistan. The findings reveal significant gaps in knowledge and inconsistent adherence to standard practices, emphasizing the urgent need for structured training programs and policy interventions. The results align with and contrast prior research conducted locally and globally, underscoring the global relevance of these challenges.

A majority (90.6%) of nurses in this study demonstrated correct knowledge about the intercostal spaces for chest drain insertion. This finding aligns with Ahmed et al., who reported similar competency levels in a study conducted in Karachi, where 88% of nurses correctly identified the appropriate insertion sites (10). However, only 11.1% of nurses were aware of the specific indications for chest drain use, such as pneumothorax and hemothorax, indicating a significant knowledge gap. A study conducted by Chhabra and Garg in India found that 70% of nurses were aware of chest drain indications, reflecting a higher knowledge level compared to the current study (11).

The findings on infection prevention practices are particularly concerning, with only 13.7% of nurses adhering to recommended measures such as wearing caps, goggles, and masks. This is consistent with Ahmed and Khan's study, which highlighted poor adherence to infection control protocols among ICU nurses in Pakistan (12). In contrast, Mwita and Marwa reported significantly better compliance rates (60%) in South African ICUs, attributing this to regular infection control training and stringent institutional policies (13).

Regarding practices, only 10.3% of nurses correctly positioned patients to facilitate effective drainage, and 7.7% adhered to dressing change protocols. These findings are lower than those reported by Gupta and Sharma in Indian ICUs, where structured training programs improved patient positioning practices to 45% and adherence to dressing protocols to 30%(14). The current results highlight the critical need for hands-on training and regular competency assessments to bridge these gaps.

Demographic factors such as experience and education significantly influenced knowledge and practices. Nurses with advanced qualifications (Post RN and BSN) and more than five years of experience demonstrated better competencies. This finding is consistent with Malik et al., who found that educational level and years of experience were strong predictors of critical care nursing competencies in Pakistani settings (15). Similarly, Gupta et al. emphasized that nurses with specialized training were better equipped to manage chest drains effectively and reduce complications (16).

The results also underscore systemic issues, such as inadequate access to training and resource constraints, which hinder the implementation of best practices. Globally, evidence supports the effectiveness of simulation-based training in improving nursing competencies. For example, Johnson et al. reported a 25% reduction in complications related to chest drains in UK hospitals following the introduction of simulation-based training programs (17). Adapting such interventions to the Pakistani context, considering its socio-economic and cultural nuances, could significantly improve outcomes.

Conclusion

This study highlights critical gaps in the knowledge and practices of ICU nurses regarding chest drain management in tertiary care hospitals in Lahore, Pakistan. While some areas, such as understanding chest drain insertion sites, showed satisfactory results, significant deficiencies were noted in infection control measures and adherence to standard protocols. The findings emphasize the urgent need for structured training programs, regular competency assessments, and institutional support to improve nursing competencies and ensure patient safety. Addressing these gaps is essential for advancing critical care nursing standards and improving patient outcomes in ICU settings.

Declarations

Data Availability statement

All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department Concerned. (IRBEC0-SNU-028422/23)

Consent for publication

Approved

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Conflict of interest

The authors declared absence of conflict of interest.

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Conception of Study, Final approval of manuscript.
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Manuscript revisions, critical input.
Coordination of collaborative efforts.
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Manuscript drafting.
Data entry and Data analysis, drafting article.

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