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KNOWLEDGE AND CLINICAL PRACTICES OF INTENSIVE CARE NURSES IN INTUBATION PROCEDURE IN PUNJAB, PAKISTAN

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Abstract

Background: *Intubation is one of the most frequent invasive procedures performed in intensive care units (ICUs) to maintain airway patency in intubated patients. Effective performance of this procedure requires sound theoretical knowledge and practical competence.*

Objective: *To evaluate the knowledge and practice of female nurses regarding the intubation procedure among intubated patients in the intensive care units of Gulab Devi Chest Hospital, Lahore, Pakistan.*

Methodology: *A descriptive cross-sectional study was conducted among 190 female nurses who had worked in the ICUs of Gulab Devi Chest Hospital. Data were collected from February 2025 to April 2025 using a validated and adapted questionnaire assessing both knowledge and practice domains. Responses were entered and analyzed using SPSS version 24. Descriptive and inferential statistics were applied, and a p-value ≤ 0.05 was considered statistically significant.*

Results: *Nurses with higher professional education (BSN: 10.3 ± 1.9) and greater ICU experience (≥ 5 years: 10.1 ± 1.8) demonstrated significantly higher knowledge scores, while nurse–patient ratios of 1:>3 were also associated with improved knowledge ($p < 0.05$). Practice scores were significantly higher among BSN nurses (11.8 ± 1.0) and those with ≥ 5 years ICU experience (11.6 ± 1.1), with optimal performance observed in nurses managing 1:≤3 patients ($p < 0.05$).*

Conclusion: *The findings conclude that female nurses who had worked in the ICUs of Gulab Devi Chest Hospital possess good knowledge and adequate practice regarding the intubation procedure. Regular training programs and continuous education are recommended to strengthen their competencies further and ensure adherence to evidence-based practices.*

INTRODUCTION

Intubation is a critical lifesaving intervention frequently performed in intensive care units (ICUs), and safe application depends heavily on the competence of ICU nurses. Empirical evidence underscores that well-trained nursing staff significantly reduce complications and enhance patient outcomes in intubated patients. For example, studies from Iran reported moderate levels of

knowledge but relatively high practice standards among ICU nurses providing oral care for intubated patients, with positive correlations found between education and performance (Asadi & Jahanimoghadam, 2024). In Shanxi, China, ICU nurses showed strong attitudes toward preventing orotracheal mucosal injuries, though their knowledge and behaviors were less robust—highlighting the need for focused training interventions (Gao et al., 2025). These findings suggest that although ICU nurses may exhibit favorable attitudes, gaps in knowledge and application persist, reinforcing the importance of region-specific research.

In Pakistan, while considerable research has explored ICU nursing practices, much of it has focused on areas such as medication administration rather than intubation-specific competence. A recent national study reveals that while ICU nurses are competent in intravenous medication delivery, those from Punjab reported markedly lower knowledge levels than nurses from other regions, underlining regional disparities in training access and proficiency (Ahmad et al., 2025). Meanwhile, work from Karachi has focused on endotracheal suctioning, showing generally adequate knowledge but variable practice across tertiary hospitals (Rafiq et al., 2022). However, no studies have yet comprehensively assessed ICU nurses' knowledge and clinical practices specifically related to the intubation procedure in Punjab, leaving a critical gap in understanding educational needs in this domain.

To address this gap, the current study aims to evaluate ICU nurses' knowledge and practices concerning the intubation procedure in Punjab, Pakistan. By analyzing both theoretical understanding and hands-on procedural competence, this study seeks to identify strengths and weaknesses in current nursing capabilities. The findings are expected to inform tailored educational interventions and policy decisions to enhance clinical practice, patient safety, and overall quality of ICU care—especially in under-resourced settings where specialized training may be inconsistent or limited.

Research Methodology

A descriptive cross-sectional study was conducted at the Intensive Care Units (ICUs) of Gulab Devi Chest Hospital, Lahore, Pakistan from February 2025 to April 2025. The study population comprised female ICU nurses working full time in the hospital. Nurses holding a General Nursing Diploma, BSN, or Post RN with valid licenses from the Pakistan Nursing Council and at least one year of ICU experience were included. Nursing students, assistants, managers, and infection control nurses were excluded from the study.

A universal sampling technique was applied, and a total of 190 eligible female nurses were enrolled. Written informed consent was obtained, and participation was voluntary. Data confidentiality and anonymity were assured throughout the study. Data were collected using a validated and adapted structured questionnaire, which was explained to participants before administration.

Data were entered and analyzed using SPSS version 24.0. Descriptive statistics, including frequencies and percentages, were used for qualitative variables, while means and standard deviations were calculated for quantitative variables. The practice scores of intubation procedures were computed using standard deviation, and a p-value ≤ 0.05 was considered statistically significant.

Results

Table 1: Demographic Characteristics of Participants (n = 190)

Factors	Variable	Frequency (n)	Percentage (%)
Professional Education	Diploma	42	22.1%
	BSN	92	48.4%
	Post RN	56	29.5%
Experience (Years)	1–5	65	34.2%
	6–10	48	25.3%

	11–15	32	16.8%
	16–20	30	15.8%
	21–25	15	7.9%
ICU Experience (Years)	1–5	88	46.3%
	6–10	54	28.4%
	11–15	28	14.7%
	16–20	15	7.9%
	21–25	5	2.7%
Overall Age	Mean ± SD	32.4 ± 5.44	–

The study included 190 female ICU nurses with a mean age of 32.4 ± 5.44 years. Most participants held a BSN (48.4%), followed by Post RN (29.5%), and Diploma (22.1%) qualifications. In terms of work experience, the largest group had 1–5 years of overall experience (34.2%), while nearly half had 1–5 years of ICU experience (46.3%). This indicates that the majority of respondents were relatively young, BSN-qualified nurses with early to mid-level ICU experience.

Table 2: Knowledge Scores of ICU Nurses in Intubation Procedure (n = 190)

Factors	Variable	Knowledge Score (Mean ± SD)	p-value
Professional Education	Diploma	9.2 ± 2.1	0.031
	Post RN	9.8 ± 2.0	
	BSN	10.3 ± 1.9	
Job Experience (Years)	< 10	8.9 ± 2.2	< 0.001
	≥ 10	10.5 ± 2.0	
ICU Experience (Years)	< 5	9.0 ± 2.1	0.014
	≥ 5	10.1 ± 1.8	
Nurse–Patient Ratio	1 : ≤ 3	8.8 ± 2.2	0.003
	1 : > 3	10.4 ± 1.9	

Table 2 presents the knowledge scores of ICU nurses regarding intubation procedures. The results show a significant association between professional education, clinical experience, and nurse–patient ratio with knowledge levels.

With respect to professional education, nurses holding a BSN demonstrated the highest knowledge scores (10.3 ± 1.9), followed by those with Post RN qualifications (9.8 ± 2.0) and Diploma holders (9.2 ± 2.1). The difference was statistically significant ($p = 0.031$), indicating that higher qualifications were associated with improved knowledge of intubation procedures.

In terms of job experience, nurses with ≥ 10 years of total work experience achieved significantly higher knowledge scores (10.5 ± 2.0) compared to those with < 10 years of experience (8.9 ± 2.2), with a strong statistical significance ($p < 0.001$). Similarly, for ICU-specific experience, nurses with ≥ 5 years in ICUs scored higher (10.1 ± 1.8) than those with < 5 years (9.0 ± 2.1), also showing a significant difference ($p = 0.014$).

The nurse–patient ratio was also an influential factor. Nurses managing more than three patients (1 : > 3) had higher knowledge scores (10.4 ± 1.9) than those caring for three or fewer patients (1 : ≤ 3) (8.8 ± 2.2). This difference was statistically significant ($p = 0.003$), suggesting that higher workloads may contribute to greater clinical exposure and improved knowledge levels.

Table 3: Practice Scores of ICU Nurses in Intubation Procedure (n = 190)

Factors	Variable	Practice Score (Mean ± SD)	p-value
Professional Education	Diploma	10.7 ± 1.1	0.012
	Post RN	11.3 ± 1.2	
	BSN	11.8 ± 1.0	
Job Experience (Years)	< 10	11.2 ± 1.2	0.287
	≥ 10	10.9 ± 1.1	
ICU Experience (Years)	< 5	11.0 ± 1.2	0.041
	≥ 5	11.6 ± 1.1	
Nurse–Patient Ratio	1 : ≤ 3	11.4 ± 1.2	0.036
	1 : > 3	10.8 ± 1.1	

Table 3 presents the practice scores of ICU nurses regarding the intubation procedure in Punjab, Pakistan. The findings demonstrate that professional education significantly influenced practice scores. Nurses holding a BSN degree exhibited the highest mean practice score (11.8 ± 1.0), followed by Post RN nurses (11.3 ± 1.2) and Diploma holders (10.7 ± 1.1). The difference in practice levels among these educational categories was statistically significant ($p = 0.012$), indicating that higher professional education is associated with improved clinical practice in intubation procedures.

Job experience did not show a significant impact on practice scores. Nurses with less than 10 years of job experience had a slightly higher mean practice score (11.2 ± 1.2) compared to those with 10 years or more (10.9 ± 1.1), but this difference was not statistically significant ($p = 0.287$). This suggests that practice competence may not always be directly proportional to overall job tenure, and other factors such as continuous training and specialization could play a role.

On the other hand, ICU-specific experience had a meaningful influence on practice scores. Nurses with five or more years of ICU experience demonstrated significantly higher practice scores (11.6 ± 1.1) compared to those with less than five years (11.0 ± 1.2), with a statistically significant difference ($p = 0.041$). Similarly, the nurse–patient ratio was found to be a crucial determinant of practice quality. Nurses working with a ratio of 1: ≤ 3 patients scored higher (11.4 ± 1.2) than those managing more than three patients per nurse (10.8 ± 1.1), with a statistically significant difference ($p = 0.036$). This highlights the importance of maintaining manageable nurse–patient ratios to ensure better procedural performance.

Discussion

This study found that professional education, ICU-specific experience, and nurse–patient ratios significantly influenced ICU nurses' knowledge and practices in intubation procedures. Nurses with BSN degrees scored highest in both knowledge and practice, supporting previous findings that higher nursing education enhances critical thinking and procedural competence (Salem & Zakaria, 2019; Al-Kandari & Thomas, 2009).

ICU-specific experience was more strongly linked to better outcomes than overall job tenure. Nurses with five or more years in ICUs demonstrated higher scores, consistent with Rose et al. (2018) and Schubert et al. (2013), who emphasized that specialized training and unit-focused experience are stronger predictors of clinical performance than general experience.

The nurse–patient ratio also played a crucial role. While heavier workloads appeared to increase knowledge through exposure, smaller nurse–patient ratios improved practice quality, aligning with Aiken et al. (2014) and Griffiths et al. (2018). These results highlight that investment in higher education, structured ICU experience, and balanced staffing are key to improving procedural safety and patient outcomes.

Conclusion

Enhancing nurses' professional education and providing targeted ICU-specific training are essential to strengthen knowledge and procedural competence in intubation. Ensuring optimal nurse–patient ratios can further improve practice quality and patient safety in intensive care settings.

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