

Knowledge of Open Suctioning Techniques Among Intern Nurses Posted in Intensive Care Units at a Tertiary Care Hospital: A Descriptive Study

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ABSTRACT

Background: Open suctioning is an important airway-management procedure for mechanically ventilated patients. Safe practice requires knowledge of indications, preparation, infection prevention, suction pressure, procedural steps, monitoring, complications, and post-procedure care. Intern nurses may have varying levels of clinical exposure and therefore require assessment of their knowledge before independent practice. **Objective:** To assess the knowledge of intern nurses posted in the intensive care unit (ICU) regarding suctioning techniques in mechanically ventilated patients at Sharda Hospital, and to describe their knowledge levels and selected participant characteristics. **Methods:** A quantitative descriptive design was used among 100 intern nurses posted in the ICU at Sharda Hospital. Participants were selected by convenience sampling. Data were collected using a structured questionnaire addressing demographic/professional characteristics and knowledge of open suctioning techniques. A pilot study was conducted among 10 intern nurses. Data were summarized using frequencies, percentages, mean and standard deviation. The thesis also reports chi-square analyses examining associations between perception categories and selected demographic/professional variables. **Results:** Most participants were aged 20–22 years (71%), female (63%), and B.Sc. Nursing interns (85%). Sixty-seven percent had 1–3 months of ICU exposure, 66% reported formal training, and 77% had previously performed open suctioning. The mean knowledge score was 39.80 ± 3.45 (range 33–48). Seventy-seven participants (77%) were categorized as having adequate knowledge and 23 (23%) as having moderate knowledge; none were categorized as having inadequate knowledge. The mean perception score was 35.20 ± 2.96 (range 30–43), with 85% having positive perception and 15% moderate perception. The reported chi-square analyses found no statistically significant association between perception category and age, gender, qualification, ICU area, ICU duration, formal training, knowledge source, previous open suctioning, frequency of suctioning, or protocol availability (all $p > 0.05$). **Conclusion:** Most intern nurses in this study demonstrated adequate knowledge of open suctioning techniques, although a substantial subgroup had moderate knowledge. Continued bedside teaching, demonstration and return-demonstration, supervised practice, simulation, and regular competency assessment may support consistent and safe practice. The findings should be interpreted within the limits of the single-site convenience sample and the fact that practical performance was not assessed.

Keywords: open suctioning, endotracheal suctioning, mechanical ventilation, intensive care unit, intern nurses, knowledge, critical care nursing, airway management

INTRODUCTION

Mechanical ventilation provides respiratory support for critically ill patients but can interfere with normal airway clearance. Artificial airways such as endotracheal tubes and tracheostomies bypass normal protective mechanisms and may contribute to retention of airway secretions. Suctioning is therefore an important component of airway management in selected mechanically ventilated patients. However, suctioning can also produce adverse effects when performed

incorrectly, including hypoxemia, airway trauma, bleeding, bronchospasm and hemodynamic changes.

The dissertation underlying this manuscript emphasizes patient assessment before suctioning, aseptic technique, appropriate suction pressure, pre-oxygenation, monitoring, and appropriate post-procedure care. It also identifies intern nurses as a group transitioning from classroom learning to clinical practice, making assessment of their baseline knowledge relevant to nursing education and patient safety. The

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study was conducted at Sharda Hospital, a tertiary teaching hospital where nursing interns receive ICU exposure.

The study was guided conceptually by Ludwig von Bertalanffy's General Systems Theory. Demographic and clinical experience factors were considered inputs; questionnaire-based assessment and scoring represented the process; and categorized knowledge levels represented the output. The stated primary objective was to assess knowledge of suctioning techniques among ICU intern nurses. Secondary objectives were to determine knowledge categories and examine associations with selected demographic variables.

METHODS

Study design and setting

A quantitative descriptive research design was used. The study was conducted among intern nurses posted in the ICUs of Sharda Hospital, Greater Noida, Uttar Pradesh, India.

Participants and sampling

The study included 100 intern nurses. Convenience sampling was used. Eligibility included intern nurses at Sharda Hospital who were available and willing to participate during data collection. Nurses who were absent or unwilling to participate were excluded. The dissertation states that the study focused on knowledge rather than direct assessment of clinical performance.

Data collection instrument

A structured questionnaire was used. The instrument included demographic/professional characteristics

and multiple-choice knowledge items related to open suctioning, including indications, preparation, safety precautions, procedural steps, infection control and complications. The dissertation also reports a perception component using a Likert-type scale and items concerning participants' experience with open suctioning. Content validation and expert review were documented in the dissertation, and a pilot study involving 10 intern nurses was conducted before the main study.

Data analysis

Descriptive statistics included frequency, percentage, mean, standard deviation, minimum and maximum scores. The reported inferential analysis used chi-square tests to examine associations between perception category and selected demographic/professional variables at a 5% significance level.

Ethical and administrative considerations

The dissertation includes institutional permission documentation for conducting the study at Sharda Hospital and a statement that confidentiality would be maintained. The manuscript does not add ethical approval details that were not explicitly documented in the available study text.

RESULTS

Distribution of Participants According to Demographic and Professional Variables:

Table 1 profiles the 100 participants across the selected demographic and professional variables, with frequencies paired to their corresponding percentages.

Table 1: Frequency and Percentage Distribution of Participants According to Demographic Variables (N=100)

Characteristic	Category	n (%)
Age	20–22 years	71 (71.0)
	23–25 years	25 (25.0)
	Above 25 years	4 (4.0)
Gender	Male	37 (37.0)
	Female	63 (63.0)
Qualification	B.Sc. Nursing	85 (85.0)
	P.B.B.Sc. Nursing	9 (9.0)
	M.Sc. Nursing	6 (6.0)
ICU area	Medical ICU	21 (21.0)

Characteristic	Category	n (%)
	Surgical ICU	29 (29.0)
	Cardiac ICU	19 (19.0)
	Neuro ICU	31 (31.0)
ICU duration	<1 month	18 (18.0)
	1–3 months	67 (67.0)
	>3 months	15 (15.0)
Formal training	Yes	66 (66.0)
	No	34 (34.0)
Knowledge source	Classroom teaching	59 (59.0)
	Workshop/CME	11 (11.0)
	Self-learning	27 (27.0)
	Other	3 (3.0)
Previously performed open suction	Yes	77 (77.0)
	No	23 (23.0)
Protocol available	Yes	63 (63.0)
	No	14 (14.0)
	Not aware	23 (23.0)

The largest group was aged 20–22 years. Most participants were female and were B.Sc. Nursing interns. Neuro ICU had the largest representation among ICU areas. Two-thirds reported 1–3 months of ICU exposure, and approximately two-thirds reported formal training. Classroom teaching was the most commonly reported knowledge source. More than three-quarters had previously performed open suctioning, while 23%

had not. Although 63% reported that a protocol was available, 23% were not aware of whether a protocol was available.

Overall Knowledge Score Regarding Open Suctioning Techniques

In table no. 2. Knowledge was scored through the structured questionnaire, and the resulting distribution summarised by mean, standard deviation, and range.

Table 2: Knowledge Score of Intern Nurses

Measure	Mean $\pm$ SD	Minimum	Maximum
Knowledge total score	39.80 $\pm$ 3.45	33	48
Perception total score	35.20 $\pm$ 2.96	30	43

Seventy-seven participants (77%) were categorized as having adequate knowledge, 23 (23%) as having moderate knowledge, and none as having inadequate knowledge. For perception, 85 participants (85%) had

positive perception and 15 (15%) had moderate perception; no participant was categorized as having negative perception.

Table 3: Perception Score of Intern Nurses

Variable	Mean	Standard Deviation (SD)	Minimum	Maximum
Perception Total Score	35.20	2.96	30	43

Perception averaged 35.20 $\pm$ 2.96 across a range of 30 to 43 — again indicating variation between individuals while remaining firmly in the upper half of the scale.

Distribution of Participants According to Knowledge Category

Table 4: Distribution of Participants According to Knowledge Category

Variable	χ^2	df	p-value
Age	0.504	2	0.777
Gender	0.068	1	0.794
Qualification	0.126	2	0.939
ICU area	1.44	3	0.696
ICU duration	0.962	2	0.618
Formal training	1.26	1	0.261
Knowledge source	1.10	3	0.778
Performed open suction	2.88	1	0.090
Frequency of open suction	1.94	3	0.584
Protocol available	1.09	2	0.581

As per the table no 4. None of the reported associations between perception category and the selected variables reached statistical significance at $p < 0.05$. The closest reported association was previous performance of open suction ($p = 0.090$), which remained above the prespecified 0.05 threshold.

DISCUSSION

The present study found that most participating intern nurses had adequate knowledge of open suctioning techniques, with a mean knowledge score of 39.80 ± 3.45 and 77% categorized as adequate. The finding suggests a generally satisfactory level of theoretical knowledge within this single hospital sample. At the same time, 23% of participants had moderate knowledge, indicating that adequate knowledge was not uniform across the group.

A substantial proportion of participants had formal training and previous experience with open suctioning. The study therefore highlights the potential importance of structured education and clinical exposure in preparing interns for airway-management procedures, although the descriptive design does not establish a causal relationship between training or experience and knowledge.

The literature reviewed in the dissertation consistently emphasizes assessment before suctioning, infection prevention, appropriate suction pressure, pre-oxygenation, monitoring, and avoidance of unnecessary or poorly performed suctioning. Previous studies cited in the dissertation also support continuing education, structured teaching, feedback, simulation and supervision as approaches to strengthen nurses' knowledge and clinical practice.

The perception findings were similarly favorable: 85% of participants had positive perception and 15%

had moderate perception. The chi-square analyses did not identify significant relationships between perception and the demographic or clinical variables examined. These findings suggest that positive perception was present across the participant groups rather than being concentrated in a particular demographic or exposure category.

Importantly, the dissertation contains a methodological reporting discrepancy. Its original objective and parts of the abstract refer to associations between knowledge scores and demographic variables, whereas the detailed inferential table reports chi-square tests between perception category and selected variables. The dissertation itself states that statistical values needed to establish knowledge-demographic associations were not provided. Accordingly, this manuscript reports the available inferential results as perception associations and does not claim that demographic variables were statistically associated with knowledge.

Implications for nursing practice and education

The findings support continued reinforcement of open suctioning knowledge during ICU orientation and internship. Recommended educational measures in the dissertation include demonstrations and return-demonstrations, supervised bedside practice, simulation-based learning, workshops, accessible ICU protocols/checklists, and periodic competency assessment. Experienced nurses may supervise interns until they demonstrate sufficient readiness to perform procedures safely.

For nursing administration, the dissertation recommends ensuring availability of suctioning equipment and supplies, providing standard protocols, and routinely assessing interns' knowledge and skills. Future

research could include multiple hospitals, larger samples, and direct observation of practical suctioning performance.

Limitations

The study was limited to intern nurses posted in the ICU of one hospital and used convenience sampling, limiting generalizability. The sample size was 100. The study assessed knowledge rather than actual suctioning performance. Responses depended on participants' understanding of the questionnaire and willingness to provide accurate answers. Finally, the descriptive design does not establish cause-and-effect relationships.

CONCLUSION

In this study of 100 ICU intern nurses at Sharda Hospital, 77% demonstrated adequate knowledge of open suctioning techniques and 23% demonstrated moderate knowledge, with no participant classified as having inadequate knowledge. The mean knowledge score was 39.80 ± 3.45 . Most participants had positive perception of open suctioning, and the reported perception-demographic association tests were not statistically significant. The findings support continued structured education, supervised clinical learning and periodic competency assessment, while recognizing that the study measured knowledge and perception rather than observed clinical performance.

Declarations

Funding: No funding information was reported in the dissertation.

Conflict of interest: No conflict-of-interest statement was reported in the dissertation.

Data availability: The dissertation contains the study findings; a separate public dataset was not reported.

Ethics statement: Institutional permission documentation is included in the dissertation. Specific ethics committee approval details were not available in the extracted study text and should be inserted if applicable before journal submission.

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