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RESEARCH ARTICLE

EFFECTIVENESS OF PROTOCOLS ON TRACHEOSTOMY CARE AMONG STAFF NURSES WORKING IN CRITICAL CARE UNITS: A QUASI-EXPERIMENTAL STUDY

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ABSTRACT

Background: Tracheostomy care requires consistent nursing knowledge and competent practice to maintain airway safety and reduce preventable complications. Standardized protocols can support nurses in performing routine care, stoma care, and suctioning in a consistent manner. **Aim:** To assess the effectiveness of protocols on tracheostomy care on the knowledge and practice of staff nurses working in critical care units. **Methods:** A quantitative, quasi-experimental one-group pretest-posttest design was used. Sixty staff nurses working in critical care areas of Narayana General Hospital and Narayana Super Specialty Hospital, Nellore, were selected by non-probability convenience sampling. Knowledge was assessed using a 35-item self-administered questionnaire and practice using a 20-item observational checklist. The tracheostomy care protocol addressed routine care, stoma care, and suctioning. Pretest assessment was followed by protocol teaching and demonstration, and posttest assessment was conducted after 7 days. Descriptive statistics, paired t-test, Karl Pearson correlation, and chi-square test were used. **Results:** The mean knowledge score increased from 21.01±6.79 in the pretest to 28.90±3.80 in the posttest (paired $t=7.89$, $df=59$, $p<0.05$). The mean practice score increased from 10.90±4.70 to 15.70±2.80 (paired $t=6.80$, $df=59$, $p<0.05$). In the posttest, 76.6% of nurses had adequate knowledge and 81.7% demonstrated good practice. The reported posttest correlation between knowledge and practice was strong ($r=1.00$). **Conclusion:** The findings indicate that protocol-based teaching and demonstration were associated with significant improvement in nurses' knowledge and practice of tracheostomy care. Standardized tracheostomy care protocols may be useful as part of continuing nursing education and critical-care practice.

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INTRODUCTION

Tracheostomy is a surgical opening into the trachea through which a tracheostomy tube is inserted to provide an alternative airway. The procedure is used when airway obstruction, prolonged ventilatory support, or inadequate airway clearance requires an artificial airway. Because the tracheostomy tube bypasses the normal upper airway, careful nursing management is essential. Tracheostomy care includes assessment of the stoma, maintenance of aseptic technique, suctioning, inner-cannula care, tube and tie management, dressing, and documentation. The study protocol used for the present investigation was based on the American Association of Respiratory Care protocol and addressed routine care, stoma care, and suctioning. The supplied protocol includes patient identification and explanation, hand hygiene, stoma assessment, suctioning, sterile technique, inner-cannula care, tie changes, gauze placement, emergency equipment availability, and documentation. Variations in knowledge and clinical practice can compromise patient safety. The study therefore examined whether structured protocol-based teaching and demonstration could improve staff nurses' knowledge and observed practice of tracheostomy care.

OBJECTIVES

- To assess the knowledge and practice of protocols on tracheostomy care among critical care unit staff nurses.
- To determine the effectiveness of the protocols by comparing pretest and posttest knowledge and practice scores.

- To determine the relationship between knowledge and practice scores.
- To determine the association between selected demographic variables and posttest knowledge and practice.

MATERIALS AND METHODS

Design and setting: A quantitative approach with a quasi-experimental one-group pretest-posttest design was used. The study was conducted in the critical care units of Narayana General Hospital and Narayana Super Specialty Hospital, Nellore. The source document describes the hospital as a 1450-bed facility and the selected critical care areas as having 120 beds.

Participants and sampling: The sample comprised 60 staff nurses working in critical care areas, including ICU/SICU, Neuro and Neuro-surgery ICU, postoperative units, and emergency/HDU areas. Nurses who were willing to participate and met the stated inclusion criteria were included; nurse-in-charges were excluded. Non-probability convenience sampling was used.

Intervention: The protocol was based on the American Association of Respiratory Care tracheostomy-care protocol and covered routine care, stoma care, and suctioning. The teaching intervention included explanation of the practice guidelines and demonstration of tracheostomy care on patients. The reported intervention duration was approximately one hour, followed by posttest assessment after a 7-day interval.

Measures: Knowledge was measured with a 35-item self-administered questionnaire. Knowledge scores were classified as poor (0–8), inadequate (9–17), moderate (18–26), and adequate (27–35). Practice was measured using a 20-item observational checklist scored 1 for yes and 0 for no; practice was classified as poor (0–6), average (7–13), and good (14–20). The questionnaire and checklist addressed routine care, stoma care, and suctioning.

Validity and reliability: Content validity was established by three experts from the medical-surgical nursing department, and their suggestions were incorporated. Reported split-half reliability coefficients were r=0.99 for the knowledge questionnaire and r=1.00 for the practice observational checklist.

Data collection and analysis: Permission was obtained from the hospital authorities and relevant department heads. Participants were informed about the study and consent was obtained. Pretest knowledge and practice were assessed, followed by protocol teaching and demonstration; the same instruments were used for posttest assessment after 7 days. Data were analyzed using frequency, percentage, mean, standard deviation, paired t-test, Karl Pearson correlation coefficient, and chi-square test.

RESULTS

A total of 60 staff nurses participated. The sample was predominantly female (75.0%), aged 21–30 years (83.3%), educated to B.Sc. Nursing level (70.0%), working in ICU/SICU (43.3%), and having 0–5 years of experience (81.6%).

Table 1. Sociodemographic characteristics of staff nurses (N=60)

Characteristic	Category	N	%
Gender	Male	15	25.0
	Female	45	75.0
Age	21–30 years	50	83.3
	31–40 years	10	16.7
Education	ANM	0	0.0
	GNM	18	30.0
	B.Sc. Nursing	42	70.0
Department	ICU & SICU	26	43.3
	Neuro & Neuro-surgery ICU	15	25.0
	Postoperative unit	10	16.7
	Emergency & HDU	9	15.0
Experience	0–5 years	49	81.6
	6–10 years	11	18.4

Table 2. Distribution of knowledge and practice levels before and after the protocol intervention (N=60)

Outcome	Level	Pretest n (%)	Posttest n (%)
Knowledge	Poor	4 (6.7)	0 (0.0)
	Inadequate	8 (13.3)	0 (0.0)
	Moderate	39 (65.0)	14 (23.3)
	Adequate	9 (15.0)	46 (76.6)
Practice	Poor	10 (16.7)	0 (0.0)
	Average	32 (53.3)	11 (18.3)
	Good	18 (30.0)	49 (81.7)

After the intervention, the proportion of nurses with adequate knowledge increased from 15.0% to 76.6%, while the proportion demonstrating good practice increased from 30.0% to 81.7%.

Table 3. Pretest–posttest comparison and knowledge–practice correlation

Measure	Pretest Mean±SD	Posttest Mean±SD	Paired t	Df	Significance	Posttest r
Knowledge (0–35)	21.01±6.79	28.90±3.80	7.89	59	p<0.05	—
Practice (0–20)	10.90±4.70	15.70±2.80	6.80	59	p<0.05	1.00

The study reported statistically significant improvement in both knowledge and practice after administration of the protocols. The posttest knowledge–practice relationship was reported as strong (r=1.00). In the association analysis, posttest knowledge was significantly associated with age, education, and experience, while no significant association was reported with sex or department. Posttest practice was significantly associated with education and experience, while no significant association was reported with sex, age, or department.

DISCUSSION

The principal finding was improvement in both knowledge and observed practice following protocol-based teaching and demonstration. The increase in the mean knowledge score from 21.01 to 28.90 and the increase in the mean practice score from 10.90 to 15.70 indicate improvement across both measured domains. The categorical findings similarly show a shift toward adequate knowledge and good practice. The findings are consistent with the rationale of standardized tracheostomy-care protocols described in the study materials. The protocol emphasizes systematic patient identification, explanation of care, hand hygiene, stoma assessment, suctioning, sterile technique, inner-cannula management, tie changes, protection of the stoma, availability of emergency equipment, and documentation. Such standardization provides nurses with a structured sequence for performing care.

The reported strong posttest correlation between knowledge and practice suggests that better knowledge was accompanied by better observed practice in this sample. However, because the study used a one-group pretest-posttest design without a concurrent control group, the findings should be interpreted as evidence of improvement associated with the intervention rather than definitive proof of causality.

Strengths and Limitations

- The study assessed both knowledge and directly observed practice rather than knowledge alone.
- The intervention was based on a structured tracheostomy-care protocol covering routine care, stoma care, and suctioning.
- The study used a one-group pretest-posttest design and convenience sampling; therefore, absence of a control group limits causal inference.
- The sample was limited to staff nurses working in selected critical care areas of one hospital setting, limiting generalizability.

CONCLUSION

Within the limitations of the study design, protocol-based teaching and demonstration were associated with significant improvement in staff nurses' knowledge and practice of tracheostomy care. The findings support the use of structured tracheostomy-care protocols and continuing education to promote consistent nursing practice in critical care settings.

Implications for Nursing Practice: Regular in-service education, competency-based demonstrations, and periodic observation or audit of tracheostomy care may help reinforce standardized practice. The protocol can be used as an educational and practice-support document for nurses caring for patients with tracheostomies.

Recommendations

- Replicate the study with a larger sample and a control or comparison group.
- Conduct multicenter studies to improve generalizability.
- Use repeated follow-up assessments to determine whether knowledge and practice improvements are sustained.
- Integrate standardized tracheostomy-care protocols into continuing nursing education and competency assessment.

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