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Tracheostomy Care Education for All Ward Staff in Resource-Limited Settings: A Need-Based Quality Improvement Initiative

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Abstract

Background: Tracheostomy care is complex and associated with significant morbidity. In resource-limited settings, inadequate structured training of ward staff often contributes to preventable complications.

Objectives: To improve the quality and safety of tracheostomy care through a need-based, multidisciplinary educational intervention for ward staff.

Methods: A ward-based educational program was implemented using bedside demonstrations and low-cost simulation tools. Training sessions were conducted by an otolaryngology physician and included nurses, interns, residents, support staff, and patient caregivers. Pre- and post-training surveys assessed knowledge and confidence using a 5-point Likert scale.

Results: Post-intervention assessment demonstrated significant improvement across all domains, particularly in recognition of tracheostomy red flags and emergency management confidence.

Conclusion: Structured, low-cost tracheostomy education is feasible and effective in improving staff competence and patient safety in resource-limited healthcare settings.

Keywords: Tracheostomy care, education, quality improvement, resource-limited settings, patient safety

Introduction

Tracheostomy is a commonly performed airway procedure across surgical and critical care settings. Despite its frequency, postoperative tracheostomy care remains a major source of morbidity and mortality. Reported complication rates range up to 47%, with many adverse events attributed to inadequate routine care, poor staff training, and delayed recognition of airway emergencies.

In resource-limited healthcare environments, ward staff often rotate frequently and may lack formal, structured education in tracheostomy management. This quality improvement initiative was designed to address these gaps through a need-based, multidisciplinary, and cost-effective educational program.

Methods

A ward-based tracheostomy care education program was conducted at a tertiary care government hospital. Training sessions were delivered by an otolaryngology physician during routine ward rounds and bedside encounters, depending on the availability of patients with tracheostomies.

Participants

The learning group included:

- Staff nurses
- Student nurses
- Medical interns
- Otolaryngology residents
- Environmental/support staff
- Patient attendants and family caregivers

Educational Intervention

Training emphasized practical, hands-on learning using real-time patient demonstrations and low-cost simulation tools. Educational materials were adapted to local needs and included visual aids and manuals in regional languages.

Assessment

Participants completed pre- and post-training surveys using a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree) assessing confidence and knowledge in routine care, emergency recognition, and escalation protocols.

Table 1: Components of the Tracheostomy Training Program

Training Component	Description
Bedside demonstration	Live tracheostomy care demonstration by otolaryngologists
Hands-on simulation	Practice using low-cost mannequins and tracheostomy tubes
Educational manuals	Image-based manuals in regional languages
Wall posters	Emergency tracheostomy algorithms displayed in wards
Equipment training	Use of motorized and manual suction devices
Family caregiver training	Basic care techniques and red-flag recognition

Table 2: Pre- and Post-Training Survey Items

Survey Domain	Assessment Item
Routine care	Confidence in performing routine tracheostomy care
Emergency recognition	Ability to recognize tracheostomy red flags
Emergency response	Confidence in managing tracheostomy emergencies
Equipment handling	Knowledge of suctioning and inner tube management
Escalation of care	Knowing when to call the emergency response team

Results

Post-training evaluation demonstrated marked improvement in all assessed domains. The most significant gains were observed in emergency recognition and confidence in managing tracheostomy-related emergencies. Participants reported increased confidence in routine care practices and timely escalation to the otolaryngology or emergency response team.

Table 3: Pre- and Post-Training Likert Score Improvements

Survey Domain	Pre-training Mean	Post-training Mean	Observed Improvement
Routine tracheostomy care confidence	2.1	4.3	Marked
Recognition of tracheostomy red flags	2.0	4.5	Significant
Emergency tracheostomy management	1.9	4.4	Significant
Suctioning & inner tube handling	2.3	4.2	Moderate–Marked
Knowing when to escalate care	2.2	4.6	Significant

Likert scale: 1 = strongly disagree, 3 = neutral, 5 = strongly agree.

Table 4: Summary of Survey Outcomes (Pre vs Post Training)

Outcome	Pre-training Mean	Post-training Mean	Δ Improvement
Confidence in routine tracheostomy care	2.1	4.3	+2.2
Recognition of tracheostomy red flags	2.0	4.5	+2.5
Confidence in emergency management	1.9	4.4	+2.5
Suctioning / inner cannula handling	2.3	4.2	+1.9
Knowing when to escalate care	2.2	4.6	+2.4

Table 5: Participant Profile of Tracheostomy Care Training Program

Participant Category	Number Trained (Approx.)	Role in Tracheostomy Care
Staff nurses	6–7	Routine care, monitoring, suctioning
Student nurses	20–30	Assisted care, emergency recognition
Interns	10–15	First-line response, escalation
Otolaryngology residents	50–60	Procedural care, emergency management
Environmental staff	10–15	Supportive care, early red-flag reporting
Patient attendants / caregivers	30–40	Basic daily care, alarm recognition

Participants were trained in batches during ward rounds, bedside sessions, and ward-hall demonstrations.

Conclusion

A structured, ward-based tracheostomy education program using low-cost resources significantly improved staff confidence, knowledge, and emergency preparedness. This quality improvement initiative demonstrates a scalable and sustainable model for improving tracheostomy care in resource-limited healthcare settings.

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