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Modified resource allocation for management of tracheostomy patients
A strategy to maintain service quality

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BACKGROUND

- The incidence of tracheostomies has been rapidly increasing with the rising demand for intensive care services.
- Growing recognition of the complex expectations and needs of tracheostomy patients calls for improved resource allocation.
- There are no validated outcome models to ensure the quality of tracheostomy care. Most models base the outcome indicators on serious complications.
- The quality of care maintained relies on vigorous assessment and management of the tracheostomy care team. This quality of care needs to be maintained even when the resource allocation of the tracheostomy team is limited or reduced.

PROBLEM STATEMENT

- In a busy acute care hospital, intensive care service provision is often constrained by the availability of human resource.
- There is a pressing need to develop a model for resource allocation to maintain and assess the quality of tracheostomy care.

OBJECTIVES

- To ascertain the safety of the risk stratification model by comparing the risk profile before and after introduction of step-down strategy, and the cost-effectiveness of the approach.

METHODOLOGY

- Development of risk assessment model for tracheostomy patients admitted to Changi General Hospital in Year 2016 and classifications of patients to three groups A , B and C.
  - **A**: At risk, normal tracheostomy patients
  - **B**: High risk patients, with red flags; require 2-hourly suctioning with thick yellowish/green secretions; transient desaturation that resolves after intervention; new admissions; with score > 18 (Table 1)
  - **C**: Chronic patients, with tracheostomy for > 3 months; on Room Air
- Staged reduction in resource allocation, reducing frequency of visits to A, B and C groups of patients (Table 2).

Table 2. Resource allocation for tracheostomy care

Mon	Tue	Wed	Thur	Fri	Weekend/PH
A	C	A	C	A	B
B	B	B	B	B	B
Period 1: 01 Jan 2016 to 30 Jun 2016					
Mon	Tue	Wed	Thur	Fri	Weekend/PH
A		C		A	B
B	B	B	B	B	B
Period 2: 01 Jul 2016 to 31 Dec 2016					

- Comparison of quality of care before and after resource allocation changes (over 2 six-monthly periods).
- Endpoints measured during the two periods: (i) Distribution of groups, (ii) Effect on workload, and (iii) Clinical outcomes
- Improvement: **Category B → A**
  Deterioration: **Category A → B**, **Category C → B**
- Cost-savings derived from the model (charging according to complexity) was analysed.

Table 1. Risk assessment tool scoring

Score	1	2	3
Reason for insertion	Respiratory wean	Neurological problem	Upper airway obstruction
Cuffed tube	Uncuffed tube	Deflated cuff	Cuffed
Secretions	Suction required 4 hourly or more with clear secretions	Suction required every 3 hours with yellow/green thick secretions	Suction required hourly or more often with thick and/or blood stained/blood clots
Respiratory/ cardiovascular stability	No evidence of desaturation or bradycardia	Transient desaturation that resolves after intervention	Sustained desaturation or evidence of bradycardia
Communication	Alert and able to summon assistance		Unable to summon assistance
Humidification	Swedish nose or trachphone	Cold water humidification and/or nebulizerzs	Hot water humidification and/or parvolex nebulizers
Inner tube	Permanent inner Shilley/Tracho	Temporary inner (Portex)	No inner tube
Patient dependency (with tube)	Self caring	Self caring under supervision	Dependent

Score 8-12: At Risk, Score 13-17: High Risk, Score > 18: Very High Risk

RESULTS

Table 3. Distribution in status at presentation of the cases

Status at presentation	Before, n (%)	After, n (%)
A	37 (33.0)	22 (24.4)
B	72 (64.3)	64 (71.1)
C	1 (0.9)	2 (2.2)
D	2 (1.8)	2 (2.2)
Total	112 (100)	90 (100)

Table 4. Proportion of change in status

Change	Before, n (%)	After, n (%)
A to A	655 (31.1)	739 (33.8)
A to B	26 (1.2)	16 (0.8)
A to C	6 (0.3)	6 (0.3)
B to A	57 (2.7)	52 (2.4)
B to B	1044 (49.5)	1113 (50.9)
B to C	1 (0.05)	0 (0.0)
C to A	1 (0.05)	0 (0.0)
C to B	0 (0.0)	0 (0.0)
C to C	317 (15.0)	258 (11.8)
Total	2210	2329

Fig. 1 Distribution of status at presentation

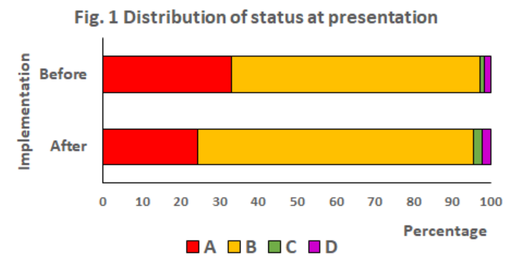
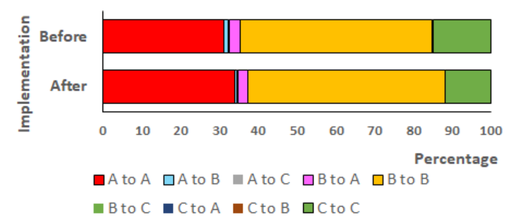
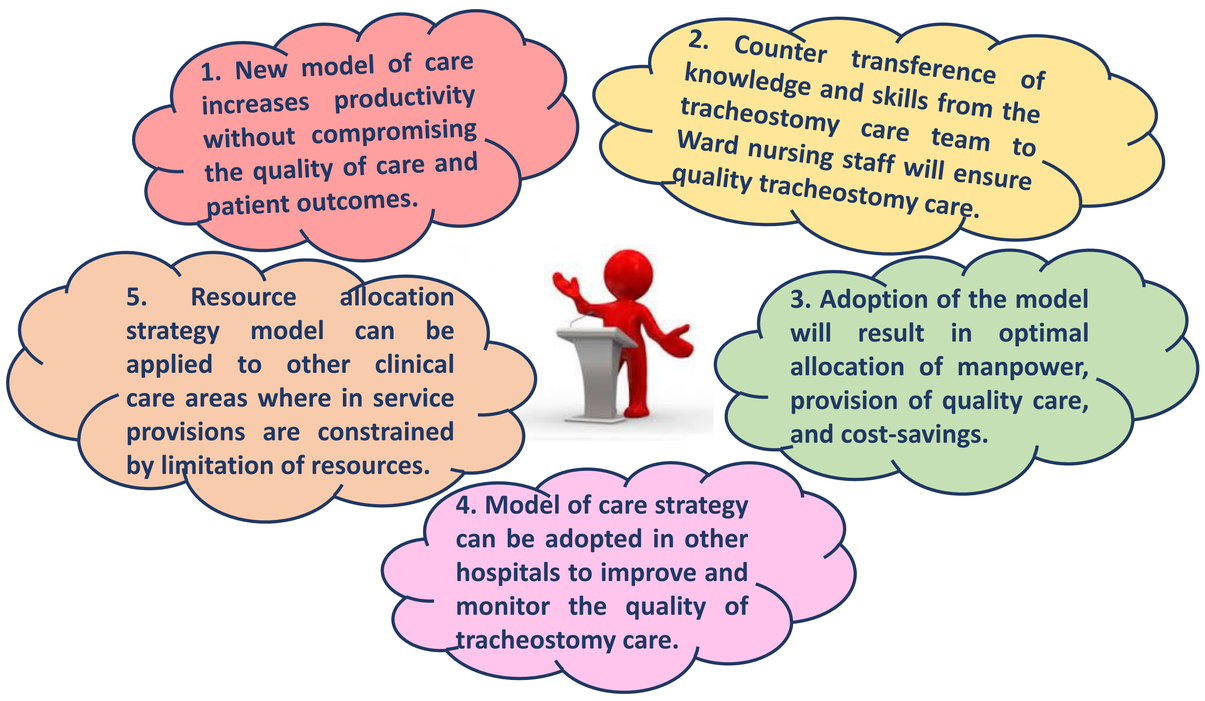


Fig. 2 Proportion of change in status



- There was a total of 4748 tracheostomy days with 118 unique patients and 170 admissions.
- Distribution in status at presentation before and after implementing the step-down strategy was comparable (Fig. 1, Table 3).
- The number of tracheostomy days increased by 5.3% in the second half of the study period.
- A higher percentage of patients remained in the normal group (A to A) post-decrease in frequency of visits by the tracheostomy team (Fig. 2, Table 4).
- Despite a reduction in visits by the tracheostomy team, there was no significant worsening of tracheostomy days pre- and post-implementation (51.5% and 52.3%, respectively; p=0.597).
- The quality of tracheostomy patient care was maintained in spite of an increase in volume of patients and workload.

CONCLUSION



New model of care with modified resource allocation for management of tracheostomy patients