

Knowledge of Tube Blockage and Its Management among Intensive Care Staff Nurses of Different Experiences

Karim Habib Md Reazaul*, Yunus Md**, Dey Samarjit***

Author's Affiliation:

*Assistant Professor,
Department of
Anaesthesiology, Andaman
and Nicobar Island Institute of
Medical Sciences & GB Pant
Hospital, Port Blair, India, Ex-
Resident, Department of
Anaesthesiology and Critical
Care, NEIGRIHMS, Shillong,
India. **Additional Professor
of Anaesthesiology and In-
charge Head of the
Department of Emergency
Medicine and Traumatology,
***Assistant Professor,
Department of
Anaesthesiology, Critical Care
& Pain Medicine, North
Eastern Indira Gandhi
Regional Institute of Health
and Medical Sciences,
Shillong, India.

Corresponding Author:

Habib Md Reazaul Karim,
Department of Anaesthesiology,
Andaman and Nicobar Island
Institute of Medical Sciences &
GB Pant Hospital, Port Blair,
India. Pin- 744104.
E-mail:
drhabibkarim@gmail.com

Abstract

Context: Tube blockage is a common airway accident in intensive care unit (ICU) and can even be fatal. Nursing staff are the first line care giver in ICU. *Aims:* The present study was designed to assess the knowledge of tube blockage and ascertain nursing professionals' knowledge of life-saving management strategies in such patients. *Settings and Design:* After approval from the institute, this cross-sectional study was conducted in a tertiary care hospital in December 2014. *Methods and Material:* A questionnaire was handed over to the staff nurses for data collection and scoring was done. The staff was divided into two groups based on their ICU experience duration. Knowledge score was expressed in percentage and percentile scale. *Statistical Analysis used:* Unpaired t test was used for measuring central tendencies, dispersion and comparisons. Fisher's exact was used for comparison and a p value < 0.05 was considered significant. *Results:* 17 staff members (77.27%) finished and submitted the questionnaire. The mean \pm standard deviation (SD) percentile score of knowledge was 50.0 ± 28.42 . 10 (58.82%) staff were having ICU experience of more than 2 years at the time of assessment. 52.94% of the responders had poor knowledge. The mean percentile knowledge score of the experienced group was significantly higher than the relatively inexperienced group (63.53 ± 26.93 versus 30.67 ± 17.96 ; p 0.013). *Conclusions:* Knowledge related to tube blockage and management is relatively lower in ICU staff. Targeted education and training should be given to the newly recruited and rotational staff to ensure patient safety.

Keywords: Tracheostomy/Endotracheal Tube; Tube Blockage; Tube Blockage/Management; Intensive Care Unit.

Introduction

Tracheal intubation using endotracheal tube or tracheostomy tube is needed for many reasons in intensive care unit (ICU) and even for ongoing airway management in many patients. Tube blockage is a common airway accident in ICU and is a medical emergency [1]. It can even lead to fatal outcome if not detected and responded on time [2]. The 4th National Audit Project on major complications of airway management in United Kingdom has concluded that the majority of significant tracheostomy related complications results from displaced or blocked tracheostomy tubes [3]. Nursing staffs are the first line

care giver in ICU and it is imperative that professional nursing staff should have adequate knowledge to suspect tube blockage and thus start early and effective management strategy to prevent fatality. The present study was designed to assess the knowledge of tube blockage (when you suspect that the tube is probably blocked?) and to ascertain nursing professionals' knowledge of life-saving management strategies for the patient with tube blockage.

Materials and Methods

After obtaining the approval from the institute's

research review board, the present study was conducted in a tertiary care hospital ICU during the month of December, 2014. The participants of the study were verbally informed about the purpose of the evaluation and consent for publication without revealing personal identity was taken. A questionnaire, containing a set of questions having maximum marks of eight, was distributed among the staff nurses. The data thus collected was scored and evaluated by a single evaluator as per predefined marks distribution. The staff was divided into two groups based on their durations of ICU experiences (viz. experienced group: having > 2 years of ICU experience and relatively inexperienced: < 2 years of ICU experience). Knowledge score was expressed in percentage and percentile scale. Absolute number was converted to percentile scale online using <https://www.easycalculation.com/statistics/percentile-rank.php>. The knowledge score was categorized as very good (> 75%), good (> 60 – 75 %), fair (45–60%) and poor (< 45%) based on the percentage score. Unpaired t-test was used for measuring central tendencies, dispersion and comparisons. INSTAT software (Graphpad Software Inc; La Zolla, CA, USA) was used for the purpose and p value < 0.05 was considered statistically significant.

Results

Twenty two staff members were approached for the proposed study and 17 (77.27%) of them completed and submitted the questionnaire. The mean \pm standard deviation \pm SD (95% confidence interval – CI) percentage and percentile score of knowledge was 45.58 ± 22.93 (57.38 – 33.79) and 50.00 ± 28.42 (64.61 – 35.38) respectively for the entire cohort. Nine out of 17 staffs were having poor knowledge. None of the relatively inexperienced group had good knowledge as per score based grouping for this study (Table 1). 85.71% of relatively inexperienced staff were having poor knowledge as compared to 30% of the experienced staff (p 0.049).

A total of 10 (58.82%) members were having ICU experiences more than 2 years at the time of assessment. The mean percentile knowledge score of the experienced group was significantly higher than the relatively inexperienced group (63.53 ± 26.93 versus 30.67 ± 17.96 ; p 0.013). The measures of dispersion and central tendencies of knowledge score, percentiles for experienced and relatively inexperienced are shown in Table 2.

Table 1: Score base knowledge divisions and experience based groups compared using Fishers' exact test

Groups	Score base knowledge division n (%)			
	Very good	Good	Fair	Poor
Experienced	2 (20)	2 (20)	3 (30)	3 (30)
Relatively inexperienced	0	0	1 (14.29)	6 (85.71)
p value	--	--	--	0.0498
Relative Risk (RR)				2.85
95% CI of RR				1.05 – 7.72
Entire cohort	2 (11.76)	2 (11.76)	4 (23.51)	9 (52.94)

(n – absolute number, CI – confidence interval)

Table 2: Measures of central tendencies and dispersion of knowledge percentile among the groups tested using unpaired t test

Knowledge Percentile	Experienced	Relatively Inexperienced
Range	94.12 – 20.59	64.71 – 20.59
Median (50 th percentile)	64.71	20.59
Mean	63.53	30.67
Standard deviation	26.96	17.96
95% confidence interval	82.81 – 44.24	47.28 – 14.06
Two tailed p value		0.0133

Discussion

Tube blockage is one of the commonest airway accidents in ICU [1]. A blocked tube in ICU is regarded as a human error related critical event. It is usually because of thick inspissated secretions and

kinking. This accounts for 7.40% of tube related errors in ICU [4]. Tube blockage related airway emergency may occur at any time. It may be life threatening for the patient and thus is challenging for the staff. Intensive Care Society standards and practice guideline states that any professional staff working in situations where tracheostomy patients are

managed must be competent to assess and initiate management in an event of an airway emergency[5]. An epidemiological study has shown that 30.56% (11 out of 36) of the tube accidents were preventable [2].

Tube blockage in the ICU needs emergency response from the health care provider. To provide professional care for this emergency, it is very much essential to have a good knowledge. However, a previous study has shown that health care providers have poor knowledge on tracheostomy tube related emergencies. The study conducted in a developed country (UK) reported a mean score of knowledge for tracheostomy tube related emergencies as 45.1% among junior doctors [6]. Although, junior residents are the first responders of emergency call, it is the staff nurses who are the first line professional care giver and informer to the residents or duty doctors. So, knowledge of staff nurse on this very important condition is essential. The present study was therefore conducted to assess the knowledge of staff nurses. The result is however comparable to the result of the previous study. 52.94% of the staffs were having poor knowledge. When the staff was divided based on experiences and then compared, it was found that 85.71% of relatively inexperienced staff was having poor knowledge. Although the relatively inexperienced group was defined as experience < 2 years, actually they were having few months of experience only as they were rotated between ward and ICU during the mentioned experience. This very high percentage of poor knowledge is probably because of this. A previous study using standardized education module resulted in significant increase in provider knowledge and confidence in tracheostomy tube care. They concluded that such standardized education module is essential in academic hospital medical centers where care providers frequently rotated [7]. Similar results were also shown in a survey conducted among critical care medicine trainee, concluding that specific training improved performance in dealing with tracheostomy emergencies [8].

The present study is limited due to the fact that the sample size is small and is a single centre study. Since an ICU do not have many staffs, future multicentre study will help in making better conclusions.

Conclusion

To conclude, the knowledge of tube blockage and its management is relatively poor among nursing staff and more so among inexperienced and newly

rotated staffs. This poses a significant patient safety concern. Regular teaching and learning sessions with practical demonstrations are needed to address this issue.

Acknowledgement

We acknowledge the help provided by Ms. Billsheba Nengnong, in-charge of staffs of the ICU where the study was conducted.

Conflict of Interest: None

Key Messages

Knowledge of tube blockage and initial management is poor among ICU staff nurses; more so in relatively inexperienced. Targeted educational module should be implemented in ICU where staffs are rotated.

References

1. Chatterjee A, Islam S, Divatia JV. Airway accidents in an intensive care unit. *Indian J Crit Care Med* 2004; 8:36-9.
2. Kapadia FN, Bajan KB, Raje KV. Airway accidents in intubated ICU patients: An epidemiological study. *Crit Care Med* 2000; 28:659-64.
3. Cook TM, Woodall N, Frerk C. On behalf of the Fourth National Audit Project. Major complications of airway management in the UK: Results of the 4th National Audit Project of the Royal College of Anaesthetists. *Br J Anaesth* 2011; 106:617-31.
4. Kaur M, Pawar M, Kohli JK, Mishra S. Critical events in intensive care unit. *Indian J Crit Care Med* 2008; 12:28-31.
5. Bodenham A, Bell D, Bonner D, Branch F, Dawson D, Morgan P et al., for the Council of the Intensive Care Society. Standards for the care of adult patients with a temporary Tracheostomy; Standards and Guidelines. United Kingdom: Intensive Care Society; 2014 Jun 12 [cited 2016 Dec 16] Available from: <http://www.ics.ac.uk/AsiCommon/Controls/BSA/Downloader.aspx?iDocumentStorageKey=5b70a7af-c79c-4e49-bca1-648b98c06598&iFileTypeCode=PDF&iFileName=ICS%20Tracheostomy%20Standards%20>.
6. Findlay G, Abbas Y. Management of tracheostomy-related emergencies: An audit of junior doctors' knowledge and skills. *J Cardiothorac Surg* 2015; 10 (Suppl1):A278. doi:10.1186/1749-8090-10-S1-A278.

7. Yelverton JC, Nguyen JH, Wan W, Kenerson MC, Schuman TA. Effectiveness of a standardized education process for tracheostomy care. *Laryngoscope* 2015; 125:342-7. doi: 10.1002/lary. 24821.
8. Nizam AA, Ng SC, Kelleher M, Hayes N, Carton E. Knowledge, Skills and Experience Managing Tracheostomy Emergencies: A Survey of Critical Care Medicine trainees. *Ir Med J* 2016; 109(9):471.

Red Flower Publication Pvt. Ltd.

Presents its Book Publications for sale

- | | |
|--|---------------------|
| 1. Breast Cancer: Biology, Prevention and Treatment | Rs.395/\$100 |
| 2. Child Intelligence | Rs.150/\$50 |
| 3. Pediatric Companion | Rs.250/\$50 |

Order from

Red Flower Publication Pvt. Ltd.

48/41-42, DSIDC, Pocket-II

Mayur Vihar Phase-I

Delhi - 110 091(India)

Phone: Phone: 91-11-45796900, 22754205, 22756995, Fax: 91-11-22754205

E-mail: sales@rfppl.co.in