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# Evaluation of knowledge of healthcare professionals regarding tracheostomy care: a cross-sectional study at a tertiary care hospital in Pakistan

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## Abstract

**Background** Tracheostomy is considered the oldest and the most effective operative procedure for patients admitted to intensive care units and in emergencies. The study's objective was to evaluate healthcare providers' knowledge regarding tracheostomy care.

**Results** All healthcare professionals directly involved in the provision of care to patients with tracheostomy were included and asked to fill out the questionnaire. The response rate was 87.63%. Out of 50, the mean comfort score was 37.69. 70.6% of participants reported having a comfort score equal to or more than 70%. Out of 10, the mean score was 5.29. Only 20.9% of participants were able to score equal to or more than 70%. The results demonstrate that healthcare professionals' knowledge of tracheostomy care was below par. Only those who were experienced in this field were able to score above average.

**Conclusion** The assessment of knowledge in tracheostomy care highlights the significance of ongoing education and training in the healthcare field. As medical practices evolve, it is imperative for healthcare providers to stay updated with the latest guidelines and techniques to provide the highest standard of care.

**Keywords** Tracheostomy, Knowledge, Complications, Awareness, Healthcare workers

## Background

Tracheostomy is considered the oldest, most effective operative procedure for patients admitted to intensive care units (ICU) and in emergencies. It is used widely for critically ill patients with respiratory failure requiring mechanical ventilation due to upper respiratory blockage, endotracheal tube installed for more than 7 days,

and those requiring frequent suctioning for the pulmonary toilet [1, 2].

The use of tracheostomy has been significantly increasing internationally such that it is performed on about 1/3rd of the patients requiring prolonged mechanical ventilation support admitted in the ICU [3]. A study from the University of Pittsburgh School of Medicine indicated that 34% of the patients on mechanical ventilation for more than 48 h underwent tracheostomy [4]. In 2006, there were about 6.5 million people living in the USA with a tracheostomy [5]. Data from different countries gave insight into the use of tracheostomy. For example, a survey conducted in the UK revealed that around 50–200 tracheostomies are performed in ICUs every year [6].

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The indications, optimal timings, and ideal technique for tracheostomy make it clinically challenging for healthcare workers [7]. Even slight nursing mismanagement of these patients can be life-threatening, making it a high-risk-low incidence skill, requiring special nursing knowledge, care, and unit [8]. Even though the significance of tracheostomy is a notable subject and the use of tracheostomy in patients is expanding, there is an absence of standardized knowledge, practice, and guideline-based tracheostomy care [9].

Effective tracheostomy care includes the knowledge of the type and size of the tube, cleaning of the inner canula, suctioning, and removal of the secretions, dressing, and wound care of the stoma.

With the growing advancement in the field of medicine and the introduction of more unobtrusive methods to maintain air passage, serious patients suffering from prolonged respiratory failure are still in dire need of urgent airway intubation which is maintained by tracheostomy. Healthcare workers are always the first line who comes in direct contact with patients having tracheostomy. If healthcare workers are knowledgeable and well-versed regarding the management of tracheostomy, not only they can handle their patients in a better way to avoid severe complications but also be able to provide training to carers looking after the patients at home. The study's objective was to evaluate healthcare providers' knowledge regarding tracheostomy care.

## Methods

After obtaining prior approval from the institutional ethical review board a cross-sectional study was conducted in the ICU, emergency, medical, and surgical wards of Ziauddin University Hospital Karachi, Pakistan over 6 months from January 2022 to June 2022. All healthcare professionals including doctors and nurses directly involved in the provision of care to patients with tracheostomy and agreed to participate in the study were included. Participants with incomplete questionnaires or missing data were excluded.

The participants were asked to fill out the questionnaire, which was taken from the literature, an objective knowledge quiz used in a study conducted in tertiary intensive care units of Turkey [9] and a tracheostomy self-assessment subjective questionnaire that used a 5-point Likert scale, based on the questionnaire used by Dorton et al. in 2014 [10].

Data were entered and analyzed using SPSS version 25. Mean scores and standard deviations were reported for quantitative variables whereas frequencies with percentages were reported for the qualitative variables. The chi-square test was used to calculate the associations with

the objective knowledge score. A  $p$  value of 0.05 was considered significant.

## Results

The response rate was 87.63%. A total of 186 participants were approached, of which 170 agreed to participate and filled out the questionnaire. 7 responses were excluded due to incomplete responses to the questionnaire. A total of 163 participants were included in the study.

Most of the participants (44.8%) were between 26 and 30 years of age. Eight-three (50.9%) participants were male while 80 (49.1%) participants were female. Out of 163 participants, 97 (59.5%) were doctors followed by 66 (40.5%) nurses. Details of the characteristics of the participants are given in Table 1.

**Table 1** Characteristics of participants

Characteristics	Frequency (n)	Percentage (%)
Age		
Less than or equal to 25 years	52	31.9
26 to 30 years	73	44.8
31 to 35 years	19	11.7
More than 35 years	19	11.7
Gender		
Male	83	50.9
Female	80	49.1
Profession		
Nurses	66	40.5
Doctors	97	59.5
Department		
Intensive care unit	35	21.5
Medical ward	55	33.7
Surgical ward	47	28.8
Emergency	26	16
Level of experience		
Less than 1 year	53	32.5
1 to 3 years	46	28.2
3 to 5 years	25	15.3
5 to 10 years	20	12.3
More than 10 years	19	11.7
Perception of knowledge		
Insufficient	20	12.3
Average	65	39.9
Good	64	39.3
Very good	14	8.6
Frequency of dealing with a tracheostomy		
Everyday	4	2.5
Twice or thrice a week	9	5.5
Once a week	33	20.2
Once a month	117	71.8

Comfort level as related to tracheostomy dealing was assessed based on the self-assessment questionnaire. Out of 50, the mean comfort score was 37.69 (SD  $\pm$  6.65, range 22 to 50). One hundred fifteen (70.6%) participants, including nurses working in the ICU and with vast experience, reported having a comfort score equal to or more than 70% as compared to 48 (29.4%) individuals who reported comfort scores less than 70%.

The knowledge related to tracheostomy was assessed by using an objective assessment questionnaire. Out of 10, the mean score was 5.29 (SD  $\pm$  1.72, range 0 to 10). Only 34 (20.9%) participants were able to score equal to or more than 70% whereas the remaining 129 (79.1%) participants scored below 70%. The level of experience was significantly associated with knowledge score. No significant association of profession, department, frequency of dealing with a tracheostomy, and perception of knowledge with knowledge score was noticed.

There are a few limitations of our study that should be considered. Firstly, it is a single-center study, and the results of this study cannot be generalized. Also, the participants were on duty when they were approached to fill out the questionnaire, which could have led to inaccurate responses. Lastly, this study doesn't consider the direct perception of the participant's performance; hence, the precision of the results in terms of real-time practice is of concern.

## Discussion

This study displays the effectiveness and comfort of practicing tracheostomy in a tertiary care setting using a needs-based assessment and it also focuses on the knowledge of healthcare professionals about specific care instruments. In many cases, tracheostomy is considered a crucial life-saving procedure that has grown in popularity and gained more specific indications [11].

Firstly, the aim of this study was to assess the comfort level of healthcare workers in dealing with tracheostomy patients based on a self-assessment questionnaire. The study aimed to identify the factors that impact the comfort level of healthcare workers and to determine the mean comfort score for the participants. In our study, the mean comfort score was 37.69 out of 50, with 70.6% of participants reporting a comfort score equal to or more than 70%, and 29.4% reported a comfort score less than 70% which means that the findings suggest that there is a positive association between the comfort level of healthcare professionals and certain factors such as profession (nurses, doctors), level of experience, work setting (ICU), frequency of dealing with a tracheostomy, and perception of knowledge. Regarding tracheostomy care education, the findings of this study

are not in line with some earlier publications. A study published in 2014, in Saudi Arabia noted a disturbingly low comfort among those with high exposure to tracheostomy management. Overall, 26.8% of participants rated their comfort level in tracheostomy tube change as 'fair or poor, 35.2% as excellent, and another 38% as good [12]. Another study by Smith-Miller assessed the baseline comfort level and knowledge of ICU nurses before and after a tracheotomy in-service education session. She concluded that the baseline comfort level was low (5.95 on a scale of 10) and that the baseline knowledge of the nurses was limited (an average score of 53%). She reported that the comfort level of the nurses had no correlation with the level of education or experience of the nurse, but that the comfort level significantly improved after the formal educational session on tracheostomies [13]. A study published by H. Dorton mentioned that these findings are not only limited to nurses, but other healthcare workers share an overall low level of comfort with caring for patients with a tracheotomy, and all have similar knowledge deficiencies [10].

Our study showed a significant association between comfort level and experienced nurses, those working in ICU, those dealing with tracheostomy more frequently, and those reporting a higher perception of knowledge. This study's finding is consistent with an article published in 2019 demonstrating an overall increased comfort level regarding tracheostomy care in the ICU [14].

Assessment of knowledge related to tracheostomy was assessed by using an objective assessment questionnaire. In our study, the level of nurses' knowledge of tracheostomy care was found below expectations, accounting for only 20.9% of participants who were able to score equal to or more than 70% whereas the remaining 79.1% of participants scored below 70%. This finding was inconsistent with the results of a study published by Mungan et al. where the proportion of the right answer in total was 56% and only 46.4% of the healthcare workers (nurses) answered above 70% [9]. Our study showed a significant association between the level of experience and the knowledge score.

Our study addresses the gaps in knowledge and practice, education and training programs that focus on best practices for tracheostomy care should be provided to healthcare workers. Furthermore, regular evaluation of the knowledge of healthcare workers related to tracheostomy care is essential to ensure that patients receive safe and effective care. Education and training programs, combined with adequate resources, can help address any gaps in knowledge and practice and reduce the risk of complications and adverse outcomes [15].

## Conclusion

The results demonstrate that healthcare professionals' knowledge of tracheostomy care was below par. Only those who were experienced in this field were able to score above average.

This study indicates the importance of the continuous and consistent need for educational programs related to tracheostomy care for healthcare professionals. To close this knowledge gap, it is extremely important to identify the deficiencies and training requirements of the healthcare professionals involved in tracheostomy care and design educational programs from a specialty-specific standpoint.

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## Authors' contributions

AS and RD conceived the idea of the manuscript. AS, RD, and AMK performed the literature search. AS, RD, and AMK wrote the manuscript. RS analyzed the data. MW and MI performed revision and supervised the project. All authors read and approved of the final manuscript.

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## Availability of data and materials

All the data including the questionnaires has been kept safe in the department. The data cannot be shared openly to protect the study participants' privacy.

## Declarations

### Ethics approval and consent to participate

This study has been approved by the ethics committee of Ziauddin University Hospital, Karachi. The reference number is 0010621RDY4.

### Consent for publication

Not applicable.

### Competing interests

The authors declare that they do not have any competing interests.

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