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EVALUATION OF NURSES' KNOWLEDGE AND PRACTICES REGARDING TRACHEOSTOMY CARE: AN ANALYTICAL CROSS-SECTIONAL STUDY

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ABSTRACT

Objective: To assess the knowledge and practices of nurses regarding the care of patients who have undergone tracheostomy.
Methods: This cross-sectional study, conducted from January to June 2024 at Kishwar Fazal Teaching Hospital, Sheikhupura assessed 80 nurses' tracheostomy care knowledge and practices using a detailed questionnaire. Participants were selected based on convenience sampling. Chi-square test, independent sample t-test, and ANOVA test were used to analyze the association between demographic variables and the knowledge and practices of nurses regarding tracheostomy care.
Results: During the study, 80 nurses were recruited. 82.5% were females and 17.5% were males, with 35% of the population under the age of 25 years. 48.8% of the nurses were graduates with a majority (27.5%) having experience ranging from 5 to 10 years. It was found that 88.75% of nurses had satisfactory knowledge, and 93.61% had satisfactory practices regarding tracheostomy care. However, 55% of the nurses had poor

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knowledge about the management of tracheostomized patients. There was a significant relationship between years of experience and knowledge regarding tracheostomy care.

Conclusion: Nurses' performance and knowledge regarding tracheostomy care were satisfactory. However, knowledge regarding the management of tracheostomy patients was unsatisfactory. Further research with larger samples and simulation-based assessments is recommended to better evaluate the knowledge and performance of nurses regarding tracheostomy care.

INTRODUCTION:

Tracheostomy is one of the most frequent procedures in intensive care unit (ICU) patients. It stands as a time-honored surgical intervention, tracing its roots back to ancient times. Artifacts from ancient Egypt bear witness to the practice, including depictions of tracheostomy dating back to 3600 BC [1]. The essence of this intervention lies in its ability to provide a secure airway for patients afflicted with upper respiratory tract obstructions, where the establishment of an airway becomes paramount [2]. More than a quarter of mechanically ventilated patients undergo tracheostomies [3]. Several advantages support this choice over the traditional method of endotracheal intubation, which involves inserting a tube through the mouth or nose and down the throat [4,5].

A multidisciplinary team must efficiently carry out the post-operative care for tracheostomy, whether it is an emergency or an elective procedure. Nurses play a crucial role in tracheostomy care by maintaining airway patency, preventing complications, influencing safety, and providing knowledge to patients and their family members [6–8]. It is possible to promptly identify and effectively manage complications associated with tracheostomy care, estimated to be around 30%, with adequate knowledge and adept handling [9]. However, there needs to be more standardized education for tracheostomy care. This lack of proper guidelines is based on subjective knowledge, which may cause tracheostomy care to differ among nurses [10]. The result has been a troubling lack of awareness among a significant portion of nursing staff. An alarming number of nurses exhibit inadequate knowledge and practice in this area [11,12].

Findings from a study underscore the alarming prevalence of inadequately trained nursing personnel in the provision of care for patients with tracheostomies [13]. A substantial majority (68%) exhibited an unsatisfactory level of knowledge regarding the care of patients with tracheostomies. Similarly, a significant portion (70%) demonstrated an inadequate level of practice in this domain. Furthermore, findings revealed that 60% of the nurses harbored negative attitudes towards tracheostomy care [14]. Despite having adequate knowledge, researchers in Pakistan concluded that the nurse's performance in tracheostomy care was weak. We also observed the absence of standardized guidelines for nurses working in the ICU [15]. Thus we did this research to ascertain the level of knowledge and practice of nurses of Kishwar Fazal Teaching Hospital regarding tracheostomy care.

Materials and Methods:

We conducted this cross-sectional study at Kishwar Fazal Teaching Hospital, Sheikhupura, from January 2024 to June 2024. The institutional review board of Amna Inayat Medical and Educational Complex, Sheikhupura provided ethical clearance. We

respected the participants' rights to secrecy, privacy, self-determination, and fair treatment. We used convenience sampling to recruit 80 nurses. We calculated the sample size with a 95% confidence interval and a 5% margin of error using OpenEpi. Sample size

n = [DEFF*Np(1-p)]/[(d2/Z21-α/2*(N-1)+p*(1-p)]. Population= 100.

The questionnaire comprised four sections including demographic data, knowledge of tracheostomy care steps (7 questions), tracheostomy care practices (16 questions), and knowledge regarding the management of tracheostomized patients (11 questions).

This study included all nurses working at the selected university hospitals, regardless of their age, gender, years of experience, or level of education. The study excluded all those who did not fill out the questionnaire and those who did not consent.

We used IBM SPSS Statistics for Windows, Version 27 for data analysis. We organized the data by category and described it using charts and percentages. We also implemented ANOVA, independent T-test, and chi-square to examine the potential correlation between the knowledge and practices of tracheostomy care and the demographic details. A p-value of less than 0.05 was considered statistically significant.

Results:

80 participants were included in the study, of which more than two-thirds (82.5%) were female and the rest were male (17.5%). Regarding education, most participants (48.8%) had completed their Bachelor of Science in Nursing (BSN), rest were in their first year (22.5%), second year (3.8%), third year (8.8%), and fourth year (3.8%). 12.5% held a postgraduate degree in Master of Science in Nursing (MSN). In terms of professional experience, the study results show that more than one-fourth (27.5%) of the nurses had work experience ranging from 5 to 10 years, while one-fourth (25%) had work experience from 1 to 5 years. The demographic profile of participants in this study is given in Table 1.

The steps considered necessary when performing tracheostomy care, along with the percentage of respondents who indicated "Yes", "No", or "Maybe" for each step are given in Supplementary Table 1. We calculated the total score to be 14. A score of 12 or more was greater than 85%, considered satisfactory knowledge; a score of 11 or less made up less than 85%, regarded as unsatisfactory knowledge (Figure 1). The Chi-square test showed a significant association between experience and participants' knowledge of tracheostomy care (Supplementary Table 2).

The results about the practices of the nurses regarding tracheostomy care were categorized as "Always", "Sometimes", or "Never". Only nurses who had performed tracheostomy care before, i.e., 47 nurses were asked to fill this section (Supplementary Table 2). The total score of nurses' practices of tracheostomy was calculated to be 32. A score of 28 or greater, was greater than 85%, considered satisfied knowledge, and a score of 27 or less, was less than 85%, considered unsatisfied knowledge (Figure 2) The Chi-square test revealed no significant association between demographic characteristics and practices of nurses (Supplementary Table 4).

The last section of the questionnaire assessed participants' understanding of the management of tracheostomized patients, with responses categorized as "True", "False", or "I have no idea" (Supplementary Table 3). The mean ± standard deviation of the total correct answers was 5.61±1.70. We compared the nurses' demographic data with the total correct answers selected by the nurses with their mean and standard deviation. Independent T-test and ANOVA test were applied to calculate the p-value. The p-value was greater than 0.05, which shows no relationship between nurses' demographic

data and knowledge about the management of tracheostomy patients (Supplementary Table 4).

Discussion:

Tracheostomy care is a critical global health issue because of the increasing number of patients undergoing this procedure. Nurses play an important role in tracheostomy patient care but their lack of knowledge has led to several fatalities [16]. By providing proper care and following best practices, nurses can significantly improve the quality of care for individuals with tracheostomies. This study aims to evaluate the nursing staff's knowledge and practices regarding tracheostomy care and patient management to identify gaps and serve as a valuable reference for designing nursing curricula.

Among the 80 participants included in the study, 82.5% were female. This observation may be supported by the higher proportion of female nurses in Pakistan. This is consistent with a study by Mungan et al. [5], where 88% of the nurses were female. However, this disagreed with Ibrahim et al. [17], who reported that more than half of the nurses were male. In this study, the majority (35%) of the participants were aged under 25, and 26.3% were between 25 and 30 years of age. This finding is consistent with a study by Beshay et al.[14], where the majority of the nurses were between 20 and 30 years old. Contrarily, most of the participants fell within the age range of 31–40 years in a study by Gaterega et al. [11]. In terms of education, most of the studied nurses (48.8%) had a bachelor's degree, in congruence with Gaterega et al. [11] and Mungan et al. [5]. In the present study, 27.5% of the nurses had 5–10 years of working experience, and 25% had 1–5 years of working experience.

The majority of nurses (88.8%) had satisfactory knowledge of tracheostomy care. Our study revealed a significant positive correlation between knowledge and experience. Nurses with 5–10 years of experience achieved the highest scores. There was no significant correlation between knowledge and gender, age, or education, which is in congruence with a study by Gaterega et al. [11]. Ibrahim et al. [17] also reported that there was no significant association between knowledge and gender or age, but there was a significant relationship with education. In contrast, Abu-Sahyoun et al. [12] showed a significant association between knowledge and age, education, or experience. Participants obtained the lowest scores on questions related to cleaning the stoma, using goggles and masks, and pain management for patients who have undergone tracheostomies.

In the current study, the majority of participants (93.6%) demonstrated a satisfactory level of tracheostomy care practices. These results were in line with Zeb et al. [18], who indicated good practices among most of the participants. These results disagreed with those of Beshay et al. [14], who reported that two-thirds of the nurses had an unsatisfactory level of practice. There was no significant relationship between demographic variables and level of practice. Gaterega et al. [11], who also reported no significant relationship between demographic characteristics and level of practice, supported these findings. Questions related to cleaning the cannula (44.6%) and maintaining humidity (70.2%) received the lowest scores.

The current study observed that nurses' knowledge about the management of tracheostomized patients was unsatisfactory. Most of the nurses (55%) had poor knowledge. This finding was in line with Ibrahim et al. [17] which also reported poor knowledge in more than half of the participants. This study suggests that nurses require additional knowledge about tracheostomy care to effectively prevent and manage complications. Our results indicate that nurses' knowledge about tracheostomy management is not associated with gender, age, education, or

experience. These findings are per Mungan et al. [5]. We found no statistically significant differences in the total correct answers based on gender (p = 0.275), age (p = 0.333), education (p = 716), and experience (p = 0.445). Our study highlights the necessity of developing tracheostomy care guidelines.

The limitations of this study includes a small sample size, which limits its generalizability. Our study relied on convenience sampling, including only nurses who volunteered. Therefore, volunteer bias could potentially influence our findings. The study's reliance on self-reporting might introduce the possibility of information and recall bias. Our study included a higher percentage of females due to the gender distribution in hospitals. Also, we focused solely on theoretical assessments of nurses, as this study's design lacked direct observation of nurses' performance. A simulation-based exam would have provided more accurate findings in terms of real-world practice.

Replicating a similar study with a large sample size, incorporating both simulation-based exams and theoretical assessments, would provide a more precise evaluation of tracheostomy care knowledge and practice levels. A study with a teaching intervention is advisable to enhance the knowledge, competence, and understanding of nurses caring for patients with tracheostomies. It is critical to design educational programs and interventions to improve nurses' knowledge and practices in caring for tracheostomized patients. Interventional strategies include evidence-based knowledge [19], informative posters, anatomic diagrams, bedside lectures [20], online tutorials combined with simulation-based training [21], and hands-on training [22]. Some studies suggest incorporating tracheostomy care into basic life support (BLS) courses to emphasize the importance of maintaining airway patency [23].

Conclusion:

This study highlights significant gaps in nurses' knowledge and practices regarding tracheostomy care, emphasizing the need for comprehensive educational programs. Despite satisfactory overall practice levels, critical deficiencies in certain areas persist. The findings underscore the importance of standardized tracheostomy care guidelines and suggest that enhanced training could improve patient outcomes. We recommend further research with larger samples and simulation-based assessments to better evaluate and address these educational needs.

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Table 1: Demographic Variables

Demographic Variables	Percentage (Frequency)
Gender	
Female	82.5% (n=66)
Male	17.5% (n=14)
Age	
Under 25	35% (n=28)
25-30	26.3% (n=21)
30-35	25% (n=20)
35-40	12.5% (n=10)
Over 40	1.3% (n=1)
Education	
First Year, BSN	22.5% (n=18)
Second Year, BSN	3.8% (n=3)
Third Year, BSN	8.8% (n=7)
Fourth Year, BSN	3.8% (n=3)
Graduated, BSN	48.8% (n=39)
Postgrad, MSN	12.5% (n=10)
Experience	
No experience	15% (n=12)
Less than 1 year	15% (n=12)
1-5 years	25% (n=20)
5-10 years	27.5% (n=22)
10-15 years	6.3% (n=5)
Over 15 years	11.3% (n=9)

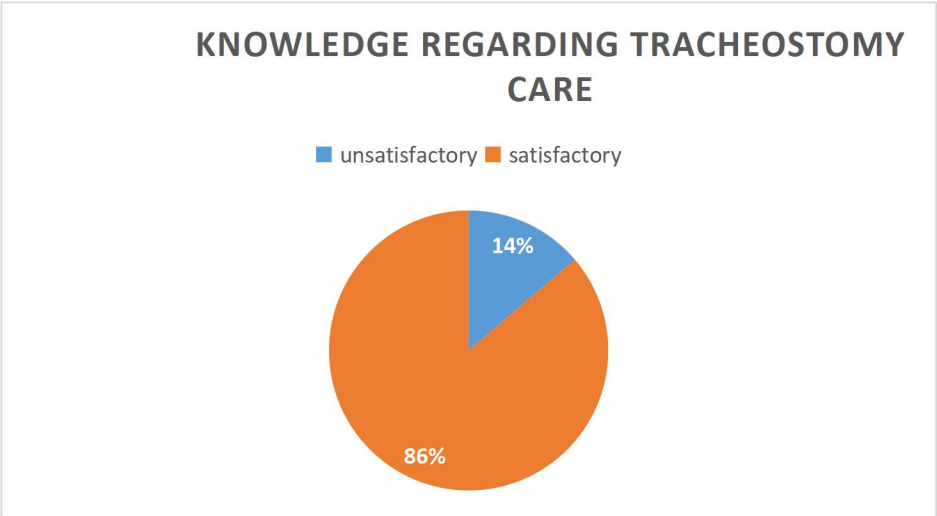

Figure 1: Total Satisfactory and Unsatisfactory Level of Nurses' knowledge regarding tracheostomy care (n=80)

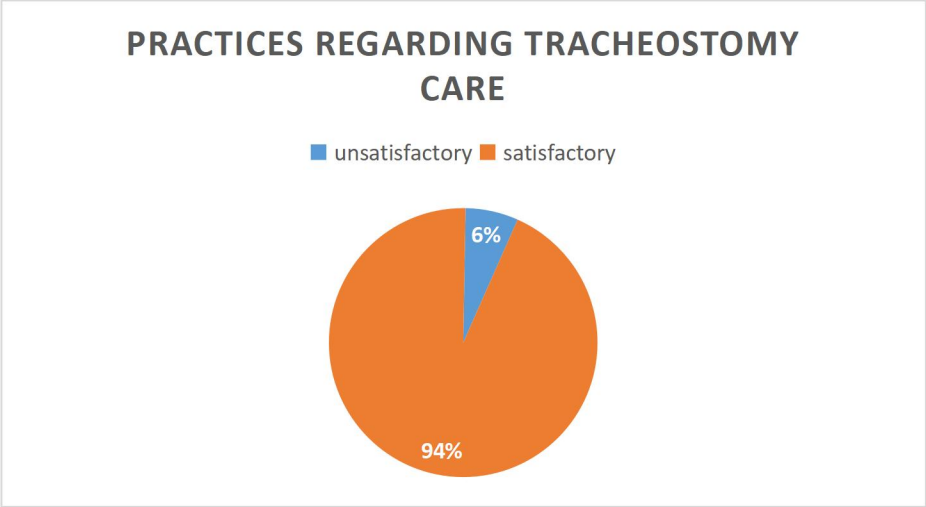

Figure 2: Total Satisfactory and Unsatisfactory Level of Nurses' practices regarding tracheostomy care (n=47)