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NURSE RELATED FACTORS ASSOCIATED WITH ADHERENCE TO TRACHEOSTOMY CARE GUIDELINES AMONG CRITICAL CARE NURSES AT KENYATTA NATIONAL HOSPITAL
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NURSE RELATED FACTORS ASSOCIATED WITH ADHERENCE TO TRACHEOSTOMY CARE GUIDELINES AMONG CRITICAL CARE NURSES AT KENYATTA NATIONAL HOSPITAL

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ABSTRACT

***Objective*: To establish nurse related factors associated with adherence to tracheostomy care guidelines among critical care nurses in Kenyatta National Hospital.**
***Design*: Analytical cross-sectional**
***Setting*: Kenyatta National Hospital Critical care unit**
***Subjects*: Critical care unit nurses**
***Main outcome measures*: Adherence level to tracheostomy care guidelines and Nurse related factors affecting adherence to tracheostomy care guidelines.**
***Results*: A total of 79 nurses were involved in the study. The mean age of the nurses was 39.1 years. Assessment for adherence to tracheostomy care guidelines using an observational checklist revealed that 18 nurses (95% CI: 14.1% to 33.6%) adhered to the guidelines while 61 nurses (95% CI: 66.4% to 85.9%) did not. Additionally, 43(54.4%) nurses who formed a majority had positive attitude towards tracheostomy care audit. Among the nursing factors associated with adherence, knowledge of the nurses on tracheostomy care guidelines was significantly associated with adherence (OR 3.45: 95% CI: 1.03-12.11; P=0.026). Nurses who were knowledgeable on tracheostomy care guidelines were three times likely to adhere to the guidelines than those who were not.**
***Conclusion*: Majority of the nurses did not adhere to tracheostomy care guidelines on observation. Additionally, most of the nurses had positive attitude towards the tracheostomy care guidelines and knowledge of tracheostomy care guidelines among the nurses was associated with adherence to the guidelines.**

INTRODUCTION

Tracheostomy placement is indicated for acute respiratory failure and for traumatic or neurologic insults which leads to airway or mechanical ventilation support. Tracheostomy care is a routine procedure done in critical care units. This care should be performed through adhering to evidence based tracheostomy care guidelines. Globally adherence to tracheostomy care guidelines differs considerably among nurses and it is affected by various factors[1].

Evidence based tracheostomy care guidelines give information on frequency of changing stoma dressing, techniques of suctioning and amount of pressure to be used for suctioning. The type of humidifying systems to be applied and regulation of tracheostomy cuff pressures are also important parts of care. The guidelines also give information on the process of weaning after successful ventilatory support[2].

In Kenya the ministry of health collaborates with various institutions to publish such guidelines. In the absence of national guidelines, hospitals or qualified health workers can develop the guidelines based on scientific evidence. There is not enough information on adherence level to tracheostomy care guidelines in the country or factors affecting the adherence level. Studies from Sudan have established the importance of all stakeholders in provision of healthcare to work with the government to facilitate adherence to the guidelines and establish factors affecting adherence[3].

For adherence of tracheostomy care guidelines to be optimal critical care unit nurses must have the requisite characteristics. Nurses should be adequately prepared from training and at their workplaces to adequately follow the guidelines[4].

MATERIALS AND METHODS

Study design, setting and population: This was an analytical cross- sectional study. It was carried out at the general intensive care unit in Kenyatta National Hospital located in Nairobi Kenya. This is the largest teaching and referral hospital in East and central Africa. The study population was small and thus the researcher carried out a census that included a target population of 79 critical care unit nurses. The study therefore did not involve sampling. The inclusion criteria for this study were all nurses stationed at the general intensive care unit. The exclusion criteria included student trainees who are normally not routinely involved in provision of tracheostomy care.

Data collection and procedures: A similar coded self-administered questionnaire and observational checklist for each participant was used to collect data. Observation on adherence to tracheostomy care guidelines was done when nurses were performing tracheostomy care. To eliminate biasness nurses were observed without their knowledge. The guidelines for adherence were adopted from scientific databases such as PubMed and Cinahl published across various platforms for use including government websites[5]. Knowledge of the guidelines was assessed using a set of 17 questions derived from the evidence-based protocols adopted in the study. Data on attitude was collected through filling a structured questionnaire. Pre-testing of the data collection tools was done with ten nurses at the neurological intensive care unit in Kenyatta National Hospital to ensure validity. Data was then collected from 8th September 2020 to 30th November 2020.

Data analysis: Data analysis was performed using Rstudio version 1.4.1103. Descriptive

Statistics was used to describe frequencies, means and percentages of adherence level and nurse related factors affecting adherence. Adherence to tracheostomy care guidelines was dichotomized with a cut off of 80 %[6]. A cut off of 75% was used while assessing knowledge[7]. Fishers test and Chi-square test were used to test for association between nurse related factors and observed adherence level to tracheostomy care guidelines. The threshold for Statistical significance in the study was set at a P value of < 0.05 with a 95% confidence interval. Odds ratios were also generated.

Ethical considerations: This study was given clearance by Kenyatta National Hospital-University of Nairobi ethical review committee under registration P198/03/2020 after submission of the proposal. The National Commission of Science, technology and information in Kenya also gave a research license to conduct the study under registration NACOSTI/P/20/6590. All the information in the study was held in strict confidentiality through assigning codes to the questionnaires. Signed informed consent was gained from the participants to collect data and no harm was present during the study period. Directives by the Kenyan government on prevention of transmission of COVID-19 during the study were also followed.

RESULTS

Socio-Demographic Characteristics:

The study participants consisted of 79 nurses stationed at the critical care unit. Mean age of the participants was 39.1 years and a mean experience of 13.3 years. A total of 23 (29.1 %) nurses were male while 56 (70.9 %) were female. Majority of the nurses 60 (75.9%) had trained up to higher national diploma level. In relation to specialty training, 70 (88.6 %) nurses had been trained on critical care nursing while 9(11.4%) had no specialized training in critical care. In terms of cadre, senior nursing officers were the majority at 39(49.4%).

Table 1

Socio-demographic characteristics of the nurses

Socio – Demographics	Characteristic	n (%)
Gender	Male	23 (29.1)
	Female	56 (70.9)
Education	Diploma	3 (3.8)
	Higher Diploma	60 (75.9)
	Degree	14 (17.7)
	Masters	2 (2.6)
Specialty Training	Critical care nursing	70 (88.6)
	Not trained on critical care	9 (11.4)
Cadre	Nursing Officer III	6 (7.6)
	Nursing Officer II	21 (26.6)
	Nursing Officer I	8 (10.1)
	Senior Nursing Officer	39 (49.4)
	Assistant Chief Nursing Officer	5 (6.3)
Age	Years Mean(±SD)	39.1 (7.1)
Experience	Years Mean(±SD)	13.3 (6.8)
	Total	79

n=number of respondents, %= percentage of respondents, SD= standard deviation

Adherence to Tracheostomy Care Guidelines:
An observational checklist was used to find out the observed adherence level towards tracheostomy care guidelines among the nurses. The nurses were observed whether they were following the guidelines when performing tracheostomy care. The table below illustrates the findings on observation

Table 2
Observation of tracheostomy care guidelines among nurses

	Guideline	Performed n (%)	Not Performed n (%)
	Clinical assessment of the airway for patency	79 (100.0)	0 (0.0)
	Suctioning when clinically indicated	31 (39.2)	48 (60.8)
	Applying aseptic technique when performing tracheostomy suctioning	78 (98.7)	1 (1.3)
	Using closed system catheter for suctioning patients on mechanical ventilation	0 (0.0)	79 (100.0)
	Dividing the inner tracheostomy tube diameter by two then multiplying the result by three to get the French gauge of suction catheter	5 (6.3)	74 (93.7)
	Maintaining suctioning pressure between 100mmHg-120mmHg	3 (3.8)	76 (96.2)
	Suctioning for less than 15 seconds	40 (50.6)	39 (49.4)
	Pre oxygenate prior to performing suctioning	21 (26.6)	58 (73.4)
	Instilling normal saline routinely to liquefy secretion	76 (96.2)	3 (3.8)
	Humidifying air using a humidifier system or heat moisture exchange filter	78 (98.7)	1 (1.3)
	Referring swallowing difficulties to speech and language therapists for Screening	9 (11.4)	70 (88.6)
	Checking 8 hourly to maintain cuff pressure between 15cmHg-25cmHg unless patient's condition indicates otherwise	6 (7.6%)	73(92.4%)
	Inspecting the inner cannula 6 hourly and reinserting it after cleaning according to manufacturer's instruction	8 (10.1	71 (89.9)
	Changing the stoma dressing and tapes daily or whenever it has been soiled	70 (88.6)	9 (11.4)
	Planning and clearly documenting weaning, while evaluating the decision with other health care team members	34 (43.0)	45 (57.0)
	Carrying out weaning gradually	78 (98.7)	1 (1.3)

n=number of respondents, %= percentage of respondents

A score of 1 was awarded for each of the 16 interventions that was done by the nurses and a score of zero for each intervention not done. The maximum attainable score from the 16 observed items was therefore 16. This was used to compute the percentage score on observed adherence for each of the nurses. Percentage adherence score was then dichotomized with a cut off of 80 % based on the model of adherence to therapeutic regimens by Haynes (1976). A total of 18 (22.8%; 95% CI 14.1% to 33.6%) nurses adhered

to the guidelines while more than three quarters (77.2%; 95% CI: 66.4% to 85.9%) of the nurses did not adhere. Figure 1 below shows the adherence level.

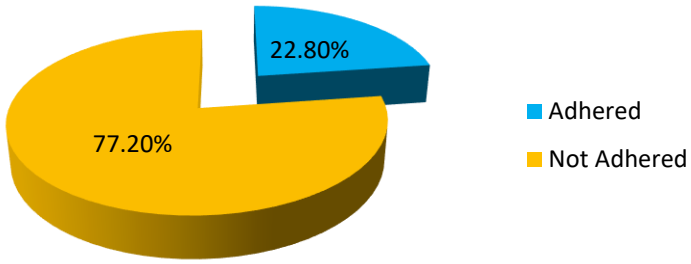

Figure 1: Adherence to tracheostomy care guidelines

Knowledge of Tracheostomy Care Guidelines among the Nurses:

A set of evidence-based tracheostomy care guidelines questions was used to test knowledge of the tracheostomy care guidelines. A total of 26(32.9 %; 95% CI 22.7% to 44.4%) nurses were knowledgeable on tracheostomy care guidelines while 53 (67.1 %; 95% CI: 55.6% to 77.3%) were not knowledgeable.

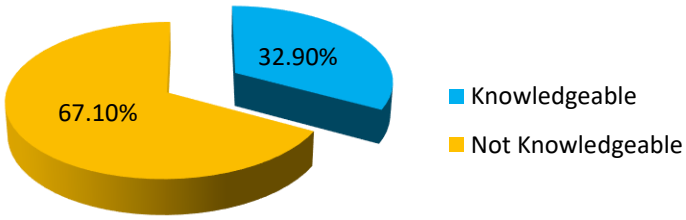

Figure 2: Knowledge of tracheostomy care guidelines among the nurses

Attitude towards Tracheostomy Care Guidelines among the Nurses:

Majority of the nurses had positive attitude towards tracheostomy care guidelines. On the aspect of workload and tracheostomy care, 55(69.5%) nurses had a positive attitude while on tracheostomy care audit 43 (54.4%) nurses were positive. Additionally on spending time searching for tracheostomy care guidelines 71(89.9%) nurses were positive about it whereas 54(68.4%) nurses were positive on adapting to new tracheostomy care guidelines.

Bivariate Analysis between Nurse Related Factors with Adherence to Tracheostomy Care Guidelines:

Table 3

Bivariate analysis between nurse related factors with adherence to tracheostomy care guidelines

	Category	Adherence		OR (95 % CI)	P Value
		No (n = 61)	Yes (n = 18)		
SOCIO-DEMOGRAPHIC FEATURES					
Gender	Male	19 (23.0)	4 (22.2)	1.57 (0.42, 7.45)	0.564
	Female	42 (77.0)	14 (77.8)		
Education	Cert, Dip, H. Dip	47 (77.0)	16 (88.9)	0.42 (0.04, 2.18)	0.338
	Degree, Masters	14 (23.0)	2 (11.1)		
Training	Critical Care Nursing	54 (88.5)	16 (88.9)	0.96 (0.09, 5.79)	1.000
	No CCN Training	7 (11.5)	2 (11.1)		
Cadre	Nursing Officers I, II $ III	28 (45.9)	7 (38.9)	1.33 (0.41, 4.63)	0.788
	Senior Nursing Officer	33 (54.1)	11 (61.1)		
Age	Mean in years (Std Dev)	38.8 (7.4)	40.1 (6.0)	1.03 (0.95, 1.11)	0.500
Experience	Mean in years (Std Dev)	12.7 (6.5)	15.3 (7.7)	1.06 (0.98, 1.14)	0.164
KNOWLEDGE					
Knowledge	Knowledgeable Not knowledgeable	16 (22.2) 45 (73.8)	10 (55.6) 8 (44.4)	3.45(1.03,12.11)	0.026
ATTITUDE					
Workload	Neutral	3 (4.9)	1 (5.6)	6.33 (0.21, 94.44)	0.232
	Negative	39 (63.9)	16 (88.9)	7.79 (1.42, 45.85)	0.054
	Positive	19 (31.1)	1 (5.6)		
Tracheostomy care Audit	Neutral	8 (13.1)	1 (5.6)	0.89 (0.65, 1.24)	0.499
	Negative	32 (52.5)	11 (61.1)	1.03 (0.84, 1.27)	0.749
	Positive	21 (34.4)	6 (33.3)		
Time to search for evidence based tracheotomy care guidelines	Neutral	3 (4.9)	0 (0.0)	0.82 (0.44, 1.52)	0.521
	Negative	54 (88.5)	17 (94.4)	1.04 (0.70, 1.54)	0.842
	Positive	4 (6.6)	1 (5.6)		
Adoption of new tracheostomy care guidelines	Neutral	13 (21.3)	0 (0.0)	0.92 (0.67, 1.27)	0.610
	Negative	37 (60.7)	17 (94.4)	1.26 (0.97, 1.63)	0.078
	Positive	11 (18.0)	1 (5.6)		

OR Odds ratio, CI= confidence interval, P= probability, n=number of participants

The results of the bivariate analysis show that, there was no significant association between socio-demographic characteristics and attitude of the nurses with adherence to the tracheostomy care guidelines. There was however a statistically significant association

between adherence and knowledge (OR 3.45; CI: 1.03-12.11; P=0.026). Nurses who were knowledgeable on tracheostomy care guidelines were 3.45 times more likely to adhere to tracheostomy care guidelines than those who were not knowledgeable.

DISCUSSION

In this study majority of the nurses did not adhere to tracheostomy care guidelines on observation. This finding does not support that of a study conducted by Mosazade in Iran who also established majority of the nurses adhered to tracheostomy care guidelines when observed. In this study pre-oxygenation prior to performing suctioning was performed by 26.6% of the nurses while in Mosazade's it was performed by more than half of the sample size. Use of a closed system suction was performed by none of the nurses in this study while in Mosazade's study it was performed by 85.7% of the nurses[8]. These observations might have been influenced by different levels of technology and types of work equipments.

This study revealed that age of the nurses does not affect adherence to tracheostomy care guidelines. This finding supports a study done previously in Kenya by Barako who established age is not a significant factor to application of guidelines. In terms of training this study showed no association between specialized critical care training and adherence to tracheostomy care guidelines which is in contrast to findings by Nizam in Ireland who found critical care training was associated with adherence to tracheostomy care guidelines. There was no association between years of experience among the cadres of nurses and adherence to tracheostomy care guidelines. Pritchett in USA got contrary findings where experienced cadre of senior nursing officers were significantly associated to compliance to tracheostomy care guidelines[9, 10, 11]. This could have been contributed by differences in use of research-based evidence in specialized training in the different settings. A culture of not following guidelines by experienced nurses because of lack of routine audits may have also contributed to non-adherence in this study. Majority of the nurses were not knowledgeable on tracheostomy care guidelines. This finding is consistent to that by Dhaliwal from India who found 43% of nurses were knowledgeable while 57% were not knowledgeable. Knowledge of tracheostomy care guidelines was significantly associated with adherence to tracheostomy care guidelines in this study. This finding is also similar to that by Dhaliwal who established a positive correlation between knowledge and adherence[12]. This demonstrates knowledge provides the rationale to guide practice in the correct way

Nurses in this study reported to have positive attitude on workload and tracheostomy care audit. That finding does not support a study conducted in Kazakhstan by Pulatova who established nurses had negative attitude[13]. This difference might have been due to the manner in which audits and employment of nurses is done in the two countries. If victimization is present in audits negative attitudes will likely develop. Similarly, employment without considering nurse to patient ratios will likely lead to negative attitudes.

CONCLUSION

Overall based on the results most nurses in the critical care unit did not adhere to tracheostomy care guidelines when observed. The nurse related factor associated to adherence was knowledge on tracheostomy care guidelines. Knowledgeable nurses were

more likely to adhere to the guidelines than those who were not. Furthermore, majority of the nurses had positive attitude towards adherence to tracheostomy care guidelines. They viewed tracheostomy care audit, sufficient workload and adopting new tracheostomy care guidelines as good strategies leading to adherence to the guidelines.

RECOMMENDATIONS

The study recommends that nurses should be trained on tracheostomy care guidelines so that their practice is up to date on the current evidence. The guidelines should then be made available in the critical care units. Knowledge of the guidelines can be learned in a problem-based manner through seminars. Positive attitude towards the guidelines among the nurses be maintained through behavior reinforcement by unit in charge through recognition and award of the nurses as patient's champions.

REFERENCES

1. Garrubba M, Turner T, Grieveson C. Multidisciplinary care for tracheostomy patients: a systematic review. Critical care. 2009 Dec; 13(6):1-6.
2. Kostyliovienė S, Vaškelytė A, Grinkevičiūtė D. Pediatric nurses' knowledge and skills in evidence-based technique of secretion suctioning from a tracheostomy tube. Sveikatos mokslai= Health sciences in Eastern Europe. Vilnius: Sveikatos mokslai, 2018, t. 28, Nr. 6. 2018.
3. Abdelazeem E, Fashafsheh I, Fadllalah H. Effect of training program on nurses knowledge and competence regarding endotracheal tube and tracheostomy care in mechanically ventilated patients. International journal of nursing. 2019 Jun;6(1):48-57.
4. McDonough K, Crimlisk J, Nicholas P, Cabral H, Quinn EK, Jalisi S. Standardizing nurse training strategies to improve knowledge and self-efficacy with tracheostomy and laryngectomy care. Applied Nursing Research. 2016 Nov 1; 32:212-6.
5. Nursing Management of Adult Patients with Tracheostomy [Internet]. MOH Guidelines. 2021 [cited 12 September 2019]. Available from: https://www.moh.gov.sg/hpp/nurses/guidelines/GuidelineDetails/cpgnursing_management_adult_patients_tracheostomy
6. Haynes RB. A critical review of determinants of patient compliance with therapeutic regimens. Compliance with therapeutic regimens. 1976:26-39.
7. Ogunrin OA, Daniel F, Ansa V. Knowledge of the Nigerian code of health research ethics among biomedical researchers in Southern Nigeria. Journal of Empirical Research on Human Research Ethics. 2016 Dec;11(5):397-407.
8. Mosazade Sari Z, Maleki M, Atashzadeh-Shoorideh F, Mehrabi Y. The Study of the observance status of tracheostomy standard principles by nurses in selected teaching hospitals in Tehran. Bulletin of Environment, Pharmacology and Life Sciences. 2014;3(11):12-7.
9. R Barako, T., (2011). Factors influencing evidence based practice among nurses working in Kenyatta national hospital Nairobi2011. Retrieved from http://erepository.uonbi.ac.ke/handle/11295/8017 Accessed November 2019
10. Nizam AA, Ng SC, Kelleher M, Hayes N, Carton E. Knowledge, Skills and Experience Managing Tracheostomy Emergencies: A Survey of Critical Care Medicine trainees. 2016;10(1):10
11. Pritchett CV, Rietz MF, Ray A, Brenner MJ, Brown D. Inpatient nursing and parental comfort in managing pediatric tracheostomy care and emergencies. JAMA Otolaryngology–Head & Neck Surgery. 2016 Feb 1;142(2):132-7.
12. Dhaliwal MK, Choudhary R, Sharma P. A Descriptive Study to assess the knowledge and

skills on tracheostomy care among staff nurses working in selected hospitals of Mohali, Punjab. Asian Journal of Nursing Education and Research. 2018 Apr 1;8(2):242-6.

13. Pulatova, A. Evidence-Based Practice: Knowledge, Attitudes, and Practices of Midwives in Kazakhstan. Retrieved 3 February 2020, from http://urn.fi/URN:NBN:fi:amk-2019081417823