Knowledge regarding endotracheal suctioning among Nurses of a teaching hospital of Kaski District

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ABSTRACT

Introduction: Endotracheal suctioning (ETS) is an essential procedure that involves removal of accumulated lung secretions from tracheobronchial tree through an artificial airway. It is crucial that this procedure is performed with professional competence based on updated scientific evidence and guidelines that guarantee efficiency and safety of the patient to prevent the common infection like ventilator associated pneumonia (VAP). **Objectives:** To identify the level of knowledge regarding ETS among nurses and to measure the association between knowledge level and selected demographic variables. **Methods:** Descriptive cross-sectional research design was adopted for this study which was conducted in Gandaki Medical College Teaching Hospital and Research Centre of Kaski, Nepal. The study population were all the nurses working in in-patient department of the hospital. Sample size was calculated through standard formula and probability simple random sampling technique was used to select 92 nurses. Semi- structured self-administered questionnaire was used to collect data. Collected data was entered, coded and edited into Statistical Package for Social Science (SPSS) version 16. Data was analyzed by employing both descriptive and inferential statistical methods. **Result:** Only 4.3% of the total respondents had good knowledge on ETS whereas 52.2% had fair knowledge and 43.5% had poor knowledge. There was significant association between respondent's level of knowledge on ETS and ethnicity (*p*=0.049) and professional qualification (*p*=0.028). **Conclusion:** Nearly half of the nurses had poor knowledge on ETS. Therefore, it is necessary to upgrade nurse's knowledge on ETS through inservice education programs.

Keywords: Endotracheal Suctioning, Knowledge, Nurses

INTRODUCTION

Endotracheal suctioning (ETS) is an essential procedure which involves removal of accumulated lung secretions from tracheobronchial tree through an artificial airway with the help of mechanical suction device.[1] ETS is an element of bronchial hygiene therapy and mechanical ventilation.[2,3] It is a patient-based care that involves preparation of patient, suctioning event and post-procedure care. The primary purposes of ETS are to provide adequate oxygenation, maintain airway permeability and gaseous exchange, increase alveolar ventilation and prevent ventilator-associated pneumonia.[4]

It is crucial that this procedure is performed with professional competence based on updated scientific evidence and guidelines that guaranties efficiency and the safety of the patient. Nurses whose responsibility is to provide care to patients must perform ETS efficiently and effectively by maintaining sterility in order to avoid infections.[1,5] Different complications such as

cardiac and respiratory failure, hemodynamic instability, tracheobronchial injury, increased intracranial pressure and hypoxemia; especially infection Ventilator Associated Pneumonia (VAP) may occur if the procedure is performed incorrectly.[1-6]

In the present context, risky practices of ETS remains the global problem. Although scientific guidelines for ETS are available, many of these recommendations have not been applied in nurses' clinical practices which may be due to the lack of good knowledge.[7] Regardless of established ETS evidence-based recommendations nurses rather perform procedures traditionally or routinely.[4,8] A study conducted among staff nurses in Nellore revealed that 7%, 73% and 20% had inadequate, moderate and adequate knowledge level regarding ETS respectively.[2] Similarly, another study conducted among 42 ICU nurses in Khartoum teaching hospital, Sudan identified that majority (85.7%) had poor knowledge level on ETS.[6] In the context of Nepal, Shrestha and Shrestha[3] revealed that a total of 44.2% of the nurses had inadequate knowledge whereas Dahal and Kunwar[1] found fair knowledge among 39.3% of nurses regarding endotracheal suctioning. Assessment of knowledge regarding ETS among nurses working at Gandaki medical college has not been explored yet. Therefore, the researcher aimed to assess knowledge regarding ETS among nurses.

METHODS

Descriptive cross-sectional research design was adopted for this study. Gandaki Medical College Teaching Hospital and Research Centre (GMCTHRC) was selected as the setting for the study. The targeted population of the study consisted of all nurses working in in-patient department of GMCTHRC whose total number was 204. Sample size was 92 based on sample size estimation formula. Simple random sampling technique was used to select the sample from the sampling frame of 204 nurses using lottery method. All the PCL and Bachelor level nurses working for at least 3 months in in-patient department of GMCTHRC were included in the study. A semi-structured self-administered questionnaire in English language was used as an instrument which was developed on the basis of extensive review of the literature, standard recommendations and protocols for endotracheal suctioning along with consultation with experts. The instrument was organized into 2 parts:

Part I: Consisted of questions related to demographic and job-related characteristics of respondents such as nurses' age, religion, ethnicity, place of residence, marital status, professional qualification, working units, designation, duration of work experience and training.

Part II: Consisted of 22 questions related to knowledge regarding ETS, 20 of which were single response questions and 2 were multiple response questions with 4 options in each, so the total score was 28.

The level of knowledge on ETS among nurses was categorized in 3 levels: (Elbokhary et al., 2015; Dahal & Kunwar, 2018)

Good knowledge (22-28): >75%

Fair knowledge (15-21): 50-75%

Poor knowledge (0-14): <50%

Validity of the instrument was maintained by extensive review of related literature and consultation with research advisors and subject matter expertise in the field of nursing before and during the construction of the tool.

Reliability of the tool was tested by using Split-half method in which reliability coefficient score was 0.7 indicating the tool as reliable. To identify accuracy, clarity and consistency of the tool, pretesting of the instrument was done among 10% of the sample size.

The study was carried out after the approval of the research proposal from the concerned authority of Gandaki Medical College. Informed written consent was taken from each participant after explaining the purpose of study to the respondents. None of the respondents were forced to participate in the study. Respondents' dignity and confidentiality were maintained by not disclosing the name and other information of the respondent except its use in the study. Data was collected by researcher herself from June 30 to July 13, 2019. Average of 6-8 nurses were approached from different departments in each day. The collected data was organized, coded and entered into Statistical Package for Social Science (SPSS) version 16 daily and then analyzed by employing both descriptive and inferential statistical methods. In descriptive statistics, frequencies, percentage, mean and standard deviation were calculated to analyze demographic data. In case of inferential statistics, Chi-square test, Fishers Exact Test and Likelihood Ratio was used to find the association between selected variables with knowledge score. The level of significance was considered at 5% with p value <0.05 and 95% confidence interval.

RESULTS

Table 1 reveals the demographic and job-related characteristics of the respondents which shows the mean age of the respondents was 23.55 years (SD ± 2.66 years). Two third of the respondents (66.3%) belonged to age group 21-25 years. Around four-fifth of the respondents (79.3%) were Hindus and 45.7% were Brahmin/Chhetri. Majority

(93.5%) were residing in urban area. More than half of the respondents (56.5%) were unmarried. Majority of the respondents (82.6%) had PCL level of education. Half of the respondents were working in critical units of the hospital with more than two-thirds working as staff nurse (77.2%). More than three-fourth (77.2%) had working experience of more than one year and very few (8.7%) had received the training on endotracheal suctioning.

Table 1: Demographic and Job-related Characteristics of the Respondents **(n=92)**

Variables	Number	Percentage
Age in years		
15-20	10	10.9
20-25	61	66.3
25-30	20	21.7
30-35	1	1.1
Mean age ± SD in years= 23.55 ± 2.66; Min.=18, Max.=30		
Religion		
Hinduism	73	79.3
Buddhism	16	17.4
Christianity	3	3.3
Ethnicity		
Dalit	7	7.6
Janjati	43	46.7
Brahmin/Chhetri	42	45.7
Type of Residence		
Urban (residing in urban municipality)	86	93.5
Rural (residing in rural municipality)	6	6.5
Marital Status		
Unmarried	52	56.5
Married	38	41.3
Divorce/Single	2	2.2
Professional Qualification		
PCL Nursing	76	82.6
BN/BNS	8	8.7
B.Sc. Nursing	8	8.7
Working Units		
General Units	46	50.0
Critical Units	46	50.0
Designation		
Nursing Incharge	3	3.3
Senior Staff nurse	18	19.6
Staff Nurse	71	77.2
Duration of Work Experience		
<1 year	21	22.8
≥1 year	71	77.2
Training on Endotracheal Suctioning		
Yes	8	8.7
No	84	91.3

Table 2 illustrates the overall respondents' level of knowledge on endotracheal suctioning. Among 92 participants, more than half of the nurses (52.2%) had fair knowledge with 43.5% of them having poor knowledge. Only 4.3% of the nurses had good knowledge on endotracheal suctioning.

Table 3 shows statistics of overall scoring on knowledge on ETS among nurses. The mean score of the overall knowledge on ETS was 14.33 (51.2%).

Table 2: Overall Respondents' Level of Knowledge on Endotracheal Suctioning **(n=92)**

Level of Knowledge	Number	Percentage
Good Knowledge (>75%)	04	4.3
Fair Knowledge (50-75%)	48	52.2
Poor Knowledge (<50%)	40	43.5

Table 3: Statistics of Overall Scoring on Knowledge on ETS among Nurses **(n= 92)**

Variables	Total Possible Score	Mean (S.D.)	Median	Minimum	Maximum
Overall knowledge score on ETS	28	14.33 (3.6)	14	07	23
Percentage of Knowledge score on ETS	100	51.2 (12.9)	50	25	82

Table 4 shows that there is statistically significant association between respondents' level of knowledge on endotracheal suctioning and their ethnicity (*p*= 0.049) and professional qualification (*p*= 0.028). For the ease in computing association, respondents' good and fair knowledge were merged to make a class of adequate knowledge (i.e. ≥50%) whereas poor level of knowledge was classified as inadequate knowledge (i.e. <50%).

Table 4: Association between Respondents' Level of Knowledge on Endotracheal Suctioning and Selected Variables **(n= 92)**

Variables	Level of Knowledge		χ^2	*p*-value
	Adequate No. (%)	Inadequate No. (%)		
Age (in years)			0.004	0.948
≤ 25	40 (76.9)	31 (77.5)		
>25	12 (23.1)	9 (22.5)		
Religion			1.098	0.578*
Hinduism	43 (82.7)	30 (75)		
Buddhism	8 (15.4)	8 (20.0)		
Christianity	1 (1.9)	2 (5.0)		
Ethnicity			6.034	**0.049***
Dalit	2 (3.8)	5 (12.5)		
Janjati	21 (40.4)	22 (55.0)		
Brahmin/Chhetri	29 (55.8)	13 (32.5)		
Type of residence			0.228	0.174ε
Urban municipality	47 (90.4)	39 (97.5)		
Rural municipality	5 (9.6)	1 (2.5)		
Marital status			3.594	0.166*
Unmarried	29 (55.8)	23 (57.5)		
Married	23 (44.2)	15 (37.5)		
Divorce/Single	0 (0.0)	2 (5.5)		
Professional Qualification			4.819	**0.028**
PCL Nursing	39 (75.0)	37 (92.5)		
Bachelor	13 (25.0)	3 (7.5)		
Working Unit			0.000	1.000
General Units	26 (50.0)	20 (50.0)		

Critical Units	26 (50.0)	20 (50.0)		
Designation				
Nursing In-charge	2 (3.8)	0 (0.0)	0.503	0.317€
Staff Nurse	50 (96.2)	40 (100)		
Duration of Work experience			0.004	0.948
<1 year	12 (23.1)	9 (22.5)		
≥ 1 year	40 (76.9)	31 (77.5)		
Training on Endotracheal Suctioning				
Yes	4 (7.7)	4 (10.0)	0.724	0.488€
No	48 (92.3)	36 (90.0)		

Significant level of P-value at 0.05; *Likelihood Ratio; €-Fishers Exact Test

DISCUSSION

The present study assessed the level of knowledge on endotracheal suctioning among 92 nurses working in general and critical units of GMCTHRC. Based on the obtained results, only 4.3% of the nurses had good knowledge whereas 52.2% and 43.5% had fair and poor knowledge respectively. These findings are in line to the study done by Elbokhary et al.[6] which revealed that only 4.8% of nurses had good knowledge level. Shrestha et al[3] also found that 44.2% of Nepalese nurses working in ICU had inadequate knowledge regarding ETS. However, the findings are inconsistent with the study of Dahal and Kunwar[1] in which level of knowledge was good among 60% and fair among 39.3% of nurses. This discrepancy may be due to the lack of in-service education and training on endotracheal suctioning.

Endotracheal suctioning as the 'procedure to reduce ventilator associated pneumonia' was known by 76.1% of nurses. Less than half (44.6%) of the respondents knew that it must be done while withdrawing the catheter. Just more than one-fourth (29.3%) of the nurses knew the nerve that is stimulated during ETS. Majority (70.7%) of the nurses knew semi-fowlers as the best position for ETS. Less than half (48.9%) knew the recommended duration (10-15 second) for each ETS. Around half knew the appropriate size (43.5%), recommended pressure (58.7%), length of suction catheter (44.6%) and number of suctions to be performed per suctioning (30.4%). The most important action while endotracheal suctioning is hyperoxygenation before and after the procedure. This knowledge was known to 48.9% of the respondents. The correct volume of air to inflate endotracheal tube cuff was known by 54.3% of the nurses. About one-third of the respondents (23.9%) knew that ETS should be discontinued immediately if heart rate either increases or decreases. Majority of the nurses (84.8%) knew that hypoxia is the most serious complication that occurs during endotracheal suctioning. Less than half of them (46.7%) answered that a suction catheter should be

disposed after single use.

There was statistically significant association of respondents' knowledge on endotracheal suctioning with their ethnicity (*p*=0.049) and professional qualification (*p*= 0.028). A study conducted by Shrestha, et al[3] showed no association of level of knowledge with professional qualification (*p*=0.424) and ethnicity (*p*=0.481).

CONCLUSION

The study concludes that only few nurses had good knowledge and nearly half of the nurses had poor knowledge on ETS. The significant influencing variables for level of knowledge on ETS were professional qualification and ethnicity. Therefore, it is necessary to upgrade the nurses' knowledge on ETS through in-service education programs.

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