



Knowledge and Practice Regarding Endotracheal Suctioning among Nurses of Selected Teaching Hospitals, Bharatpur, Chitwan

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Abstract

Introduction/Objective: Endotracheal suctioning is one of the common procedures performed by nurses in critical care units to maintain airway patency and optimal oxygenation to the intubated patients. Hence, this study was conducted to find out the knowledge and practice regarding endotracheal suctioning among nurses working at teaching hospitals, Bharatpur.

Method: A descriptive, cross-sectional study design was used with 95 nurses working in different critical care units of two teaching hospitals at Chitwan, by using non-probability, purposive sampling technique. A semi-structured self-administered questionnaire and structured observational checklist were used to identify knowledge and practice regarding endotracheal suctioning among nurses. Data analysis was done by using descriptive and inferential statistics.

Results: Majority of the respondents were above 20 years (66.3%) with the mean age of 21.77 ± 1.91 , 87.4% were Hindu, 82.1% had completed Proficiency Certificate Level in Nursing, 76.8% had work experience of more than 6 months in critical care units and 11.6% had participated in in-service education. A total of 55.8% had adequate knowledge on endotracheal suctioning with the mean percent of 61.6%. The significant influencing variables for the level of knowledge on endotracheal suctioning were working hospital ($p < 0.001$) and working ward ($p < 0.001$). Similarly, 44.2% had satisfactory practice on endotracheal suctioning with the mean percent of 47.5%. The significant influencing variables for the level of practice on endotracheal suctioning were the religion ($p = 0.04$) and ethnicity ($p = 0.017$). Furthermore, there is a significant weak positive correlation ($r = 0.197$) was found between knowledge and practice score on endotracheal suctioning.

Conclusion: Less than half of the nurses had inadequate knowledge whereas more than half of the nurses had unsatisfactory practice on endotracheal suctioning. Hence, it is strongly recommended for need of protocol for endotracheal suctioning and keen supervision and reinforcement for implementing the protocol.

Keywords: Knowledge; Practice; Endotracheal Suctioning; Nurses

Introduction

Critically ill patients often have an increase in the amount of mucous production and an impaired ability to clear secretions due to some sort of respiratory insufficiency such as disorder in normal function of ciliary cells, defect in coughing reflex etc. If secretions are not cleared effectively then the patient may be at risk of chest infection, hypoxemia, atelectasis and cardiovascular instability. Endotracheal intubation as well as the institution of mechanical ventilation has been widely used to manage such critically ill patient [1].

Endotracheal suctioning (ETS) is one of the top ten essential nursing cares which is provided to intubated patients by critical care nurses. ETS is a component of bronchial hygiene therapy for patients with mechanical ventilation in which suction catheter is inserted into the trachea through endotracheal tube and the bronchial secretions of patient's lung are removed by applying the negative pressure to the lungs. It prevents accumulation of the excessive secretion into the lungs, thereby maintains airway patency, and ensures optimal oxygenation and saving the patients' lives [2-4].

ETS should be performed only when clinically indicated. The indications of ETS are deterioration of oxygen saturation and arterial blood gas values, visible secretions in the airway, acute respiratory distress and suspected aspiration of gastric or upper air way secretions. ETS may lead complications such as atelectasis, hypoxemia, injury, nosocomial infections and cardiac dysrhythmias among intubated patient, if it is not performed properly [5].

Usually ETS is performed routinely in critical care units without assessing the needs of patients. But the need of assessment prior to ETS, is an important key factor to prevent complications caused by ETS. Studies showed that performing ETS based on needs of the intubated patients and following standard protocol during ETS gives better effect and very fewer complications among them [6,7].

Hypoxemia is the common complications of ETS. Hyper-oxygenation (delivery of 100% oxygen) to the intubated patient for at least one minute before ETS decreases the risk of hypoxemia in the patients which can be done by adjusting the FiO₂ setting on the mechanical ventilator [8,9].

The appropriate technique and adherence to guidelines of ETS has a direct impact on the patients' prognosis such as reduction of morbidity, mortality, length of hospitalization and costs. But Poor adherence to best practice is commonly seen among nurses while performing ETS [10].

As ETS is an important and one of the most commonly performed procedure in critical care setting of any teaching hospital by nurses, the need to have an adequate knowledge and practice based on standard guideline of ETS is a must, yet most of them were found to perform ETS based solely on their professional experience. A study showed that nurses had poor knowledge (85.7%) and none of the nurses had good practice on ETS [11]. Hence, this study was conducted to find-out knowledge and practice regarding endotracheal suctioning among nurses working at teaching hospitals, Bharatpur.

Materials and Methods

A hospital based cross sectional study was conducted among 95 nurses working at 2 teaching hospitals i.e. the Chitwan Medical College Teaching Hospital (CMCTH) and College of Medical Sciences Teaching Hospital (CMSTH), Bharatpur, Nepal in critical care units. Non-probability, purposive sampling technique was used

The nurses, who are registered from Nepal Nursing Council and qualification of at-least PCL and Bachelor degree with > 3 months professional experience in critical care units in respective institute, were involved. Semi structured, self-administered questionnaire were developed by investigator to measure the knowledge on ETS and structured checklist was also developed by investigator herself to measure the practice on ETS among nurses. Ethical clearance was taken from CMC-Institutional Review Committee (IRC), Bharatpur-13, Chitwan. Data was collected during October to November, 2016 in each shift. The collected data were entered in IBM SPSS 20.0 after checking completeness, consistency and accuracy.

Data were analyzed using descriptive statistics (frequency, percentage, mean, median, standard deviation and inter-quartile range) to identify the respondents' socio-demographic variables, profession related information and knowledge and practice score regarding ETS.

The normality in frequentist statistics was checked by Shapiro-Wilk test and found that the data of knowledge were found normally distributed whereas data of practice were not found normally distributed. So Chi square was used to measure the association between respondents' knowledge and practice level on ETS with selected variables. Prior to chi square test, the total score of knowledge and practice of ETS were further classified into two categories; adequate and inadequate based on median value of knowledge was 23 (IQR = 20 - 26) and satisfactory and unsatisfactory based on median value of practice was 11 (IQR = 10 - 13).

Spearman's rank correlation coefficient test was used to determine the relationship between knowledge and practice score of the respondents on ETS.

Results

Table 1 show that the majority of the respondents were aged above 20 years (66.3%), resided in Chitwan (78.9%), unmarried (77.9%), Hindu (87.4%) and Brahmin/Chhetri (57.9%).

Table 2 shows that majority of the respondent had completed Proficiency Certificate Level in nursing (82.1%) and graduated from nongovernment institute (92.6%), working in CMCTH (61.1%), working in Medical Intensive Care Unit (34.7%), had < 1 year professional experience (57.9%), > 6 months of experience in critical care units (76.8%), had not participated in in-service education on ETS (88.4%) and had available protocol on ETS in their institute (74.7%).

n = 95		
Variables	Frequency	Percentage
Age group (In years)		
>20	63	66.3
≤20	32	33.7
Mean age ± SD = 21.77± 1.91; Min. = 19; Max. = 28		
Place of residence		
Chitwan	75	78.9
Outside Chitwan*	20	21.1
Marital status		
Unmarried	74	77.9
Married	21	22.1
Religion		
Hindu	83	87.4
Non-Hindu**	12	12.6
Ethnicity		
Brahmin/Chhetri	55	57.9
Janajati***	40	42.1

Table 1: Socio-demographic characteristics of respondents.

*Nawalparasi, Bara, Makwanpur, Dhading; **Buddhist, Christian,***Newar, Gurung, Magar, Tharu, Tamang.

n = 95		
Variables	Frequency	Percentage
Professional qualification		
Proficiency Certificate Level Nursing	78	82.1
Bachelor in Nursing	17	17.9
Graduation institute		
Nongovernment	88	92.6
Government	7	7.4
Working Institute		
Chitwan Medical College Teaching Hospital (CMCTH)	58	61.1
College of Medical Science Teaching Hospital (CMSTH)	37	38.9
Working area		
Medical Intensive Care Unit	33	34.7
Surgical Intensive Care Unit	24	25.3
Neuro-surgery Intensive Care Unit	15	15.8
Coronary Care Unit	14	14.7
Gastro-intensive Care Unit	9	9.5

Professional experience (In years)		
≤ 1	55	57.9
> 1	40	42.1
Experience in critical care units (In months)		
> 6	73	76.8
≤ 6	22	23.2
Participation in in-service education on ETS*		
Yes	11	11.6
No	84	88.4
Available protocol on ETS		
Yes	71	74.7
No	24	25.3

Table 2: Profession related information of respondents.

*ETS: Endo-tracheal Suctioning

Table 3 shows the respondents’ knowledge mean score and mean percentage of different areas of ETS. Respondents have overall mean percent on knowledge score of 61.6% with highest score (80.0%) in meaning and Ryle’s tube feeding and minimum score (42.5%) in knowledge regarding complications related to ETS.

n = 95				
Areas of Knowledge	Max. Score	Obtained Range	Mean ± SD	Mean%
Definition	1	0 - 1	0.8 ± 0.4	80.0
Purposes	4	1 - 4	3.1 ± 0.8	77.5
Indications	4	1 - 4	2.9 ± 0.8	72.5
Articles	7	2 - 7	4.3 ± 1.2	61.4
Procedure	12	3 - 10	6.3 ± 1.6	52.5
Changes after ETS	4	1 - 4	3.1 ± 0.9	77.5
Complications	4	0 - 3	1.7±0.7	42.5
Ryle’s Tube Feeding	1	0 - 1	0.8 ± 0.4	80.0
Total	37	14 - 33	22.8 ± 3.9	61.6

Table 3: Knowledge mean score and percentage of different areas of ETS.

*ETS: Endo-tracheal Suctioning

Table 4 shows that majority of the nurses (55.8%) had adequate level of knowledge regarding ETS. Table 5 shows that there was no significant association found between respondents' level of knowledge regarding ETS and socio-demographic variables at p value 0.05 level.

Level of Knowledge	Frequency	Percentage
Inadequate (≤ 23 median value)	42	44.2
Adequate (> 23 median value)	53	55.8
Total	95	100.0

Table 4: Respondents' level of knowledge regarding ETS.

*ETS: Endo-tracheal Suctioning; Median value of overall knowledge score = 23 (IQR = 20 - 26).

Variables	Level of Knowledge		χ ²	p value
	Inadequate n (%)	Adequate n (%)		
Age (In years)				
> 20	38 (60.3)	25 (39.7)	1.555	0.212
≤ 20	15(46.9)	17 (53.1)		
Place of residence				
Chitwan	41 (54.7)	34 (45.3)	0.182	0.670
Outside of Chitwan	12 (60.0)	8 (40.0)		
Ethnicity				
Brahmin/ Chhetri	29 (52.7)	26 (47.3)	0.497	0.481
Janajati	24 (60.0)	16 (40.0)		
Religion				
Hindu	46 (55.4)	37 (44.6)	0.036	0.849
Non-Hindu	7 (58.3)	5 (41.7)		
Marital status				
Unmarried	38 (51.4)	36 (48.6)	2.673	0.102
Married	15 (71.4)	6 (28.6)		

Table 5: Association between level of knowledge regarding ETS and socio-demographic variables.

*ETS: Endo-tracheal Suctioning; Significance level at 0.05.

Table 6 shows that the level of knowledge was significantly associated with working Institute (p = < 0.001) and working area (p = < 0.001). Table 7 shows the respondents' practice mean score and percentage related to ETS according to practice phases. Nurses

Variables	Level of Knowledge		χ ²	p value
	Inadequate No. (%)	Adequate No. (%)		
Professional qualification				
PCL Nursing	45 (57.7)	33 (42.3)	0.640	0.424*
Bachelor Nursing	8 (47.1)	9 (52.9)		
Graduation institute				
Nongovernment	49 (55.7)	39 (44.3)	-	1.000+
Government	4 (57.1)	3 (42.9)		
Working Institute				
CMCTH	23 (39.7)	35 (60.3)	15.717	< 0.001*
CMSTH	30 (81.1)	7 (18.9)		
Working area				
MICU	14 (42.4)	19 (57.6)	20.071	< 0.001***
SICU	8 (33.3)	16 (66.7)		
NSICU	13 (86.7)	2 (13.3)		
CCU	10 (71.4)	4 (28.6)		
GICU	8 (88.9)	1 (11.1)		
Professional experience (In years)				
≤ 1	33 (60.0)	22 (40.0)	0.939	0.333*
>1	20 (50.0)	20 (50.0)		
Experience in critical care units (In months)				
>6	40 (54.8)	33 (45.2)	0.127	0.722*
≤6	13 (59.1)	9 (40.9)		
Participation in in-service education on ETS				
Yes	4 (36.4)	9 (63.6)	1.117	0.291**
No	49 (58.3)	35 (41.7)		
Available protocol on ETS				
Yes	38 (53.5)	33 (46.5)	0.586	0.444*
No	15 (62.5)	9 (37.5)		

Table 6: Association between level of knowledge regarding ETS and profession related variables.

*ETS: Endo-tracheal Suctioning; Significance level at 0.05; *Pearson's chi square; **Continuity Correction; ***Likelihood ratio; +Fisher's Exact Test.

have overall mean percent of practice score 47.5% with highest score (60.0%) during procedure and lowest score (44.2%) in pre-procedure of ETS.

n = 95				
Phases of Practice	Max. Score	Obtained Range	Mean ± SD	Mean%
Pre-procedure	12	3 - 8	5.3±1.4	44.2
During procedure	4	1 - 3	2.4±0.5	60.0
Post procedure	8	1 - 6	3.7±1.4	46.3
Total	24	6 - 17	11.4 ± 2.1	47.5

Table 7: Respondents’ practice mean score and percentage of different phases of ETS.

*ETS: Endo-tracheal Suctioning

Table 8 depicts that the level of practice regarding ETS based on median score of overall practice i.e. 11 with 10-13 IQR. Among 95 respondents, 55.8% of respondents had unsatisfactory level of practice whereas 44.2% had satisfactory level of practice regarding ETS.

n = 95		
Level of Practice	Frequency	Percentage
Unsatisfactory (≤11 median value)	53	55.8
Satisfactory (> 11 median value)	42	44.2
Total	95	100.0

Table 8: Respondents’ level of practice regarding ETS.

*ETS: Endo-tracheal Suctioning; Median score of overall practice = 11 (IQR=10-13).

Table 9 revealed that the level of practice was significantly associated with ethnicity (p = 0.017) and the religion (p = 0.040) of respondents. Table 10 reveals that there was no significant association found between respondents’ level of practice regarding ETS and profession related variables at p value 0.05 level.

Variables	Level of Practice		χ ²	p value
	Unsatisfactory n (%)	Satisfactory n (%)		
Age (In Years)				
> 20	33 (52.4)	30 (47.6)	0.881	0.348*
≤ 20	20 (62.5)	12 (37.5)		
Place of residence				
Chitwan	42 (56.0)	33 (44.0)	0.006	0.936*
Out of Chitwan	11 (55.0)	9 (45.0)		
Ethnicity				
Brahmin/ Chhetri	25 (45.5)	30 (54.5)	5.657	0.017*
Janajati	28 (70.0)	12 (30.0)		
Religion				
Hindu	43 (51.8)	40 (48.2)	4.225	0.040**
Non-Hindu	10 (83.3)	2 (16.7)		
Marital status				
Unmarried	40 (54.1)	34 (45.9)	0.409	0.523*
Married	13 (61.9)	8 (38.1)		

Table 9: Association between respondents’ level of practice regarding ETS and socio-demographic variables.

*ETS: Endo-tracheal Suctioning; Significance level at 0.05; *Pearson’s chi square; **Continuity Correction.

Table 11 show that relationship between knowledge and practice score of ETS among the nurses. There is weak positive correlation (r = 0.197) between knowledge and practice score, which is statistically non-significant (p = 0.055).

Discussion

This study was designed to find out the knowledge and practice regarding endotracheal suctioning among nurses of selected teaching hospitals, Bharatpur.

Variables	Level of Practice		χ^2	p value
	Unsatisfactory n (%)	Satisfactory n (%)		
Professional qualification				
PCL Nursing	46 (59.0)	32 (41.0)	1.793	0.181
Bachelor in Nursing	7 (41.2)	10 (58.8)		
Graduation institute				
Nongovernment	50 (56.8)	38 (43.2)	-	0.696+
Government	3 (42.9)	4 (57.1)		
Hospital setting				
CMC	28 (48.3)	30 (51.7)	3.409	0.065
CMS	25 (67.6)	12 (32.4)		
Clinical area				
Medicine Intensive Care Unit	19 (57.6)	14 (42.4)	6.948	0.139**
	13 (54.2)	11 (45.8)		
Surgical Intensive Care Unit				
Neuro-surgery Intensive Care Unit	10 (66.7)	5 (33.3)		
Coronary Care Unit	4 (28.6)	10 (71.4)		
Gastro Intensive Care Unit	7 (77.8)	2 (22.2)		
Professional experience (In years)				
≤ 1	34 (61.8)	21 (38.2)	1.925	0.165
> 1	19 (47.5)	21 (52.5)		
Experience in critical care units (in months)				
> 6	40 (54.8)	33 (45.2)	0.127	0.722
≤ 6	13 (59.1)	9 (40.9)		
Participation in in-service education on ETS				
Yes	9 (81.8)	2 (18.2)	2.328	0.127*
No	44 (52.4)	40 (47.6)		
Available protocol on ETS				
Yes	40 (56.3)	31(43.7)	0.034	0.853
No	13 (54.2)	11(45.8)		

Table 10: Association between respondents' level of practice regarding ETS and profession related variables.

Significance level at 0.05; *Continuity Correction; **Likelihood ratio; +Fisher's Exact Test.

Score	Spearman Correlation coefficient (r) value	p value
Knowledge Vs Practice	0.197	0.055

Table 11: Relationship between knowledge and practice score on ETS of respondents.

*ETS: Endo-tracheal Suctioning; Level of significance at 0.05.

The level of knowledge on ETS was adequate i.e. 55.8% and working institute ($p < 0.001$) and working area ($p < 0.001$) were significant influencing variables for level of knowledge regarding ETS among nurses. This might be due to most of the nurses working in CMCTH were bachelor nurses and most of the nurses of SICU had participated in in-service education on ETS. These findings are in line with the study conducted in Turkey by Marus, *et al.* (2016) who reported that there was statistically significant ($p = 0.013$) association with the type of intensive care unit and the nurses' knowledge scores.

The level of practice on ETS was unsatisfactory i.e. 55.8% and ethnicity ($p = 0.017$) and religion ($p = 0.04$) were significant influencing variables for level of practice regarding ETS among nurses. It might be due to the factor that most of the nurses belonged to Hindu and Brahmin/Chhetri ethnicity. A distinct findings reported by Haghghat and Yazdannik (2015) from Iran were that there is statistically significant association with the length of working in ICU ($p = 0.01$) and suctioning practices ($p = 0.02$) among nurses.

In the present study, there is weak relationship ($p = 0.055$) between knowledge and practice score on ETS among nurses. A similar finding was reported by Varghese and Moly (2016) in India whereas a different finding by Ansari, *et al.* (2012) in Iran reported that there is significant correlation between the scores of knowledge and practice on ETS among nurses.

Conclusion

It is concluded that more than half of the respondents have adequate level of knowledge and unsatisfactory practice on ETS. The significant influencing variables for level of knowledge on ETS were working institute and working areas and level of practice on ETS were religion and ethnicity.

Furthermore, there is a weak positive correlation found between knowledge and practice scores on ETS among nurses, which is statistically non-significant. This depicts that nurses who had adequate knowledge on ETS may or may not perform ETS satisfactorily.

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