

Factors Associated with Nurse's Practice toward Oral Care among a Patient with Endotracheal Intubation in Public Hospitals of Addis Ababa, Ethiopia 2021

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Abstract

Introduction: Maintaining quality oral health in Intubated patients is essential for better health outcomes and quality of life. Nurses are the primary caregivers including oral care in intubated patients. However, there is limited information regarding the level of nursing practice toward oral care in intubated patients and its associated factors in Ethiopia.

Objective: The aim of this study is to determine factors related to Nurses' Practice toward Oral Care for a Patient with Endotracheal Intubation in Public Hospitals of Addis Ababa city, Ethiopia 2021.

Method and material: Institutional-based cross-sectional study was employed. Simple Random Sampling was used to select 306 nurses from four randomly selected hospitals. Structured and pretested questionnaires and Observational checklists were utilized to collect the data. Cleaned and coded data were entered into Epi-data version 4.4 and exported to SPSS version 25 for analysis. Both descriptive and analytical components were done; all variables that were significant at p-value < 0.25 in the binary logistic regression analysis were further analyzed using multivariable logistic regression analysis. Adjusted odds ratio used to measure the strength of association. The levels of statistical significance were declared at a p-value < 0.05.

Result: In this study, only 34.6% of nurses were practicing oral care for intubated patients in public hospitals. Less than half (29.49%) of the nurses reported the presence of oral care protocol in their unit and about 81.6% of participants did not receive training on oral assessment and provision of oral care. Few nurses (29.5%) reported the presence of oral care protocol in their unit. In this study, having a positive attitude toward oral care [AOR=5.109, 95% CI: [1.245-10.23]], having an adequate number of ICU nurses [AOR= 2.9, 95% CI: (1.8- 7.45)], having guidelines in the hospital [AOR= 4.02, 95% CI: (1.45, 7.77)] and being trained on the oral care [AOR= 6.11, 95% CI: (2.45, 9.23)] were independently associated with the nurses' practice toward oral care in intubated patients.

Conclusion: Based on the finding of this study, the overall practice towards oral care for a patient with endotracheal intubation is inadequate among Intensive care unit (ICU) nurses. Therefore, attitude enhancement training toward oral care and provision of the oral care guideline and protocol in the hospital unit is important for nurses to give oral care in intubated patients.

Keywords: Addis Ababa; Ethiopia; Intensive Care Unit; Oral Care; Nurse

Abbreviation and Acronyms

AaBET - Addis Ababa Burn, Emergency and Trauma

AOR- Adjusted odd ratio

CI - Confidence interval

COR- Crude odd ratio

FMOH- Federal minister of health

ICU-Intensive Care Units

IHRERC- Institutional Health Research, Ethical Review Committee

NGOs - Non-Governmental Organizations

PI- Principal Investigator

SPSS- Statistical Product and Service Solutions

WHO - World Health Organization

Introduction

Oral health is essential for overall health and satisfactory quality of

life. World Health Organization (WHO) define, oral health as a state of being free of mouth and facial pain, oral infections and sores, and oral and other diseases that limit an individual's capacity in biting, chewing, smiling, speaking, and psychosocial well-being [1]. Routine oral care is important for maintaining overall health and health outcome of Admitted patients [2]. In contrary to that, poor oral hygiene affects the quality of life can leads vulnerability to gum and respiratory and cardiovascular infections [3].

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Received: 03-May-2022, Manuscript No: johh-22-62556; **Editor assigned:** 05-May-2022, PreQC No. johh-22-62556 (PQ); **Reviewed:** 19-May-2022, QC No. johh-22-62556; **Revised:** 23-May-2022, Manuscript No. johh-22-62556 (R); **Published:** 30-May-2022, DOI: 10.4172/2332-0702.1000314

Citation: Tefera JA, Gela D, Getahun N, Nagari SL, Gelassa FR (2022) Factors Associated with Nurse's Practice toward Oral Care among a Patient with Endotracheal Intubation in Public Hospitals of Addis Ababa, Ethiopia 2021. J Oral Hyg Health 10: 314.

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In most healthy individual, oral cavity consist of harmless micro-organisms. However, in hospitalized patients, the risk of infection is increased due to decrease the immunity status. These organisms form dental plaque which when dislodged o enters the bloodstream or the lungs which might cause cardiac or lung infections. In Admitted patients' Hospital, acquired Pneumonia (HAP) is the first leading cause of death and the third most common cause of infection which is more than 50% of mortality and morbidity Hospital-acquired condition attributed for [4-6].

Nosocomial pneumonia is responsible for major infection-related mortality and morbidity at the Intensive Care Unit. Moreover, clinically suspected nosocomial pneumonia is an important driver of antibiotic prescription, and consequently of selection pressure on microbial flora [7, 8]. A study done in the USA revealed that oral hygiene was associated with the prevention of Hospital Acquired pneumonia in patients without endotracheal tube [5]. Therefore quality oral care has paramount importance for hospitalized patients to reduce the incidence of nosocomial infection [9, 10].

In immune compromised patients, the oral care needs un usual consideration and/or care [11]. In these patients oral cavity should be observed, and cleaned appropriately as per guide line and protocol [4]. However, the studies revealed that, oral care is neglected and not prioritized in daily activity of nurses in general and in intubated patients in particular [9, 11].

According to the pieces of literature, oral care is performed in a substandard way just by swabbing the mouth with gauze and normal saline solely [9, 10]. According to the studies, oral care is often seen as a difficult and not suitable activity for nurses who affect its practice [11, 12]. Provided that, the nurse is the front line to practice the oral care in intubated patients, limited studies have been conducted to assess the level of nursing practice toward oral care in intubated patients and its associated factors in Ethiopia in general and in the study area in particular. Therefore, this study aimed to assess the nurses' level of practice toward oral care for the intubated patients and its' associated factors. This study is very important to increase the nurse's bed side activity in intubated patient particularly oral care practice by Showing the factors affect the nurse's oral care practice(Personal, socio-demographic and institutional factors) and setting possible strategy as recommendation to tackle those factors.

The implication of the study in the clinical practice: This study identified nurses' level of practice and factors that affect the nurse's level of practice in the study area. Therefore, the results of this study do have significant implications in enhancing the bedside nursing practice.

➤ At first glance, this study advances the limitation of the previous studies by involving the observational checklists to the study which enable us to assess the Nurse's level of Oral care practice for intubated patients and its associated factors which give valuable cues for clinical practices.

➤ This study highlighted the importance of oral care protocol and/or guideline and appropriate nurse-patient allocation in the Intensive care Unit (ICU) to enhance the nurse's practice toward Oral care for the intubated patient. Therefore, national health care policymakers have to address the nurse's gap by providing, oral care protocol and guidelines in each unit and nurse-patient allocation ratio in ICU which increase the oral care practice.

➤ This study is important for the Hospital Administrators to

identify the level of oral care practice and factors associated with poor oral care practice, so that set the plan to tackle those factors, so that, the bed side nurses oral care practice will be enhanced.

➤ This study is a significant practical implication to help the ICU nurses to identify the level of practice and plan to update their selves. Finally, the cumulative effect of this study is highly important for Intubated patients and decreases the mortality rate related to poor oral care practice

Method and materials

Study area and Design

The Institutional based cross-sectional study was conducted in Addis Ababa city from January –June /2021. Addis Ababa is the capital city of Ethiopia and the African Union. It is located in the geographic centre of the country. The city is home to 23.8 present of all urban dwellers in Ethiopia and has an estimated density of 5936.2 per square kilometre. Addis Ababa has 12 public referral hospitals and more than 40 private hospitals [13].

Populations and sample size

All intensive care unit nurses who were working in a randomly selected public hospital in Addis Ababa city during the study period were the study populations, whereas, randomly selected intensive care unit nurses working in randomly selected public hospitals in Addis Ababa City were the sampling populations. Those Nurses who have worked in the intensive care unit for more than six months were included in this study, while, Nurses who were not available during the time of the study (annual, maternal, sick leave) were excluded from the study.

The sample size for this study was calculated using a single population proportion formula, considering the following assumptions. Confidence level = 95%, Critical value $Z_{\alpha/2} = 1.96$, Degree of precision $d = 0.05$. The proportion (p) = 0.5 as follow

$$n = \frac{z^2 p(1-p)}{d^2}$$

n = the minimum sample size required

p= estimated proportion of practice and its associated factors of nurses toward oral care for patients with endotracheal intubation in selected public hospitals in Addis Ababa, Ethiopia.

z = the standard value of confidence level of $\alpha=95\%$

d = the margin of error between the sample and the population (0.05)

For this study $p = 0.5\%$,

$$Z=1.96, P=0.5\%, d=0.05n = \frac{(1.96)^2 \times 0.5(1-0.5)}{(0.05)^2} = 384$$

The total number of nurses in the intensive care unit of all public hospitals was (N) = 1005. Therefore, the Population correction formula was utilized since the target population is less than10, 000 as shown below;

$$n_{\text{Final}} = \frac{n}{1 + \frac{n}{N}}$$
$$n_{\text{Final}} = \frac{384}{1 + \frac{384}{1005}} = 277.85 \approx 278$$

Accordingly, the sample size is 278. By considering a non-response rate of 10%, 278+28 the final sample size became 306.

Sampling procedures

Considering the homogeneity of the nurses in the hospitals, four hospitals out of 12 public hospitals found in Addis Ababa were randomly selected (Namely Black lion Specialized Hospital, St. Paul Millennium Medical College, Addis Ababa Burn Emergency and Trauma (AaBET) Hospital, St. Peters specialized hospital, and Yekatit 12 hospital) were selected using simple random sampling (SRS). Then, Intensive care unit (ICU) nurses were identified and documented to get a complete frame of the study population among randomly selected hospitals. Then, the total sample size was allocated to each hospital based on the number of ICU nurses they have using the proportional allocation formula. To select the individual nurse, simple random sampling was used to select the nurses from each hospital by randomizing (using the lottery method) based on their assignment to the ICU bed number, then after, the principal observer, observe the nurse Oral care practice using a designed oral care checklist and lastly, a self-administered questionnaire was distributed to the same nurses in the given hospital to collect other variables(socio-demographic characteristics, nurses attitude toward oral care personal and institutional characteristics).

Data collection tools

Participants' socio-demographic characteristics, institutional and personal characteristics and attitudes toward oral care for intubated patients were collected using standardized and validated questionnaires after reliability was checked. Participants' practice toward oral care in intubated patients was collected using the validated checklist [14] after reliability was checked.

Data quality Assurance

A structured and pretested questionnaire was used and training was given for data collectors and supervisors on the objective of the study, method, contents, and also how to maintain confidentiality and privacy of the study subject was intensively conducted. Data were collected by five experienced staff nurses with diplomas and above recruited from selected hospitals. A Pre-test was conducted on 24 nurses working in an adjacent hospital (Zewuditu hospital) before the actual data collection.

Operational definition

Oral care practice: The level of oral care practice in this study was computed from the questions designed to assess the nurse's practice toward oral care. This question included 24 questions which are categorized in to four components (i.e. practice before oral care, during oral care, post oral care and patient monitoring and care activity). Accordingly, Good practice is if the nurses' total practice score is greater than or equal to 60%. While, poor practice is if the nurses score below 60% of the total practice questions designed to measure nurses practice toward oral care [15].

Endotracheal intubation: is a medical procedure in which a tube is placed into the windpipe (trachea) through the mouth or nose. In most emergency situations, it is placed through the mouth [9].

Data Processing and analysis

The data was coded, cleaned, and entered into Epi-data manager 4.4.2.1 and exported to Statistical Product and Service Solutions (SPSS) version 25 for analysis. Both descriptive and analytical components were done; all variables that will be significant at p-value < 0.25 in the binary logistic regression analysis were candidates for further

multivariable logistic regression analysis. Adjusted Odds Ratio with 95% CI was estimated to measure the strength of association. The levels of statistical significance were declared at a p-value < 0.05. The results were presented by tables and figures.

The nursing practice of oral care in intubated patients was calculated from 24 practice items which have four components (i.e., practice prior to oral care, 7 questions, practice during oral care event, 2 questions, practice during post oral care, 8question, and practice regarding oral care monitoring, 7 questions) using oral care checklist questions with the right answer by the observer, that nurses scored greater than or equal with 60% of the given question were coded 1 and otherwise"0".

Results

Socio-demographic characteristics of the study participants

Out of the total sample size (306), 295 Intensive care nurses were enrolled in the study yielding a response rate of 96.40%. Almost half of the study participants, 148 (49.8%) were male. A high proportion of 221(74.9%) of the respondents were within the age group of 20-30 years while 70 (23.7%) are 31-40 years and 4 (1.4%) of them are above 40 with a mean age of 30.83±3.87 and 153(51.5%) of the study participants were married. A high proportion of 255(85.9%) of the respondents were BSc holders while 39 (13.1%) have master's degrees holders (Table 1).

Personal related characteristics of the study participant

From the total study participants, 157(52.9%) have 6month -3 years ICU work experience, 90(30.3%) have 3- 5years of work experience and 48 (16.2%)have greater than 5 years of working experience respectively. A high proportion of participant's 254 (85.5%) did not take any form of oral care training while 41 (13.8%) of participants say they had oral care training before (Table 2).

Institutional related characteristics of the study participants

From the total study participant 128 (43%) address that they have a 1:1 nurse-patient ratio in their ICU while more than have of the participants 167 (56.2) says they have not 1:1 nurse-patient ratio in their ICU. In addition, the majority 217 (73.1%) of the study participants have no oral care protocol or guideline in their hospital. At the same time, 241 (81.1%) participants address that they have no in-service training on oral care for patients with endotracheal intubation, while 208 (70%) of the participants have no tools to assess the oral cavity of patients (Table 3).

Table 1: Socio-demographic related characteristics of of nurses working in Public hospitals of Addis Ababa City (n=295).

Variable	Category	Frequency	Percentage
Age	20-30	221	74.9
	31-40	70	23.7
	>40	4	1.4
Gender	Male	148	49.8
	Female	147	49.5
Marital status	Single	141	47.5
	Married	153	51.5
	Divorced	1	.3
Education level	Diploma	1	.3
	BSc degree	255	85.9
	Master's degree	39	13.1

Table 2: Personal related characteristics of the study participants (n=295).

Variable	Category	Frequency	Percentage
Work experience	6 month -3 years	157	52.9
	3 years-5 years	90	30.3
	> 5years	48	16.2
Participant who have oral care training before	Yes	41	13.8
	No	254	85.5

Table 3: Institutional related characteristics of the study participants (n=295).

Variable	Category	Frequency	Percentage
Adequate number of staff nurses	Yes	128	43
	No	167	56.2
Oral care protocol in hospital	Yes	76	25.6
	No	217	73.1
Oral care tool to assess the oral cavity	Yes	86	29.0
	No	208	70.0
Inservice training on oral care	Yes	54	18.2
	no	241	81.1

Nurses 'Attitude score toward the oral care in intubated patients

From the total Attitudes question 136 (46.1%) of the participants scored above 60% of the total attitude question and considered having a positive attitude toward oral care (Figure 1).

Nurses level of practice toward the oral care in intubated patients

From the total of 24 practice questions, only 102 (34.6%) of the participants scored above 60% of the total attitude question and considered having a positive attitude toward oral care. Based on observation, 97.3% of those practicing oral care Wash their hand prior to the oral care and 100% done personal protective equipment whereas, only 34.2% and 52% oxygenate the patient and used 1.5% hydrogen peroxide respectively (Table 4) and (Figure 2).

Factors associated with oral care practice of participants

In bi-variable logistic regression, the age of the participants, work experience and oral care training, Participants' attitude, and presence of guidelines in the institution were associated with the practice of the participants.

In multi-variable variable logistic regression, Participants' attitude, and the presence of guidelines in the unit, having training and the Nurse to patient allocation ratio was significantly associated with participants' level of practice toward oral care for intubated patients. Those Intensive care(ICU) nurses who have a good attitude toward oral care for the intubated patients are practiced oral care 5 times more than that of poor attitude[AOR=5.109,95 % CI: (1.25-10.23)]. In this study, Those nurses who have oral care training are 6 times more likely to practice oral care in the intubated patient[AOR=6.11,95 % CI: (2.45-9.23)]. Oral care is 3 times more likely to practice inappropriate nurse to patient ratio allocation compared to the counterpart [AOR=2.9, 95 % CI: (7.8-7.45)]. Those nurses working in the hospital with Oral care guidelines are 4 times more practice the oral care compared with the counterpart [AOR=4.02,95 % CI: (1.45-1.77)] (Table 5).

Discussion

Nursing practice toward the oral care for the intubated patient

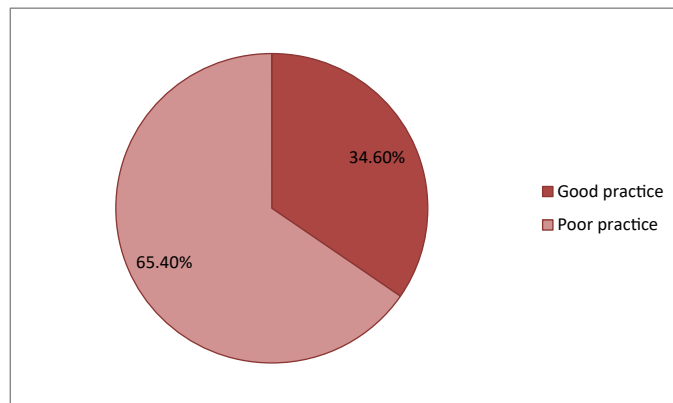


Figure 1: Nurse's attitude toward oral care practice among endotracheal intubated patient in Public hospital of Addis Ababa city 2021.

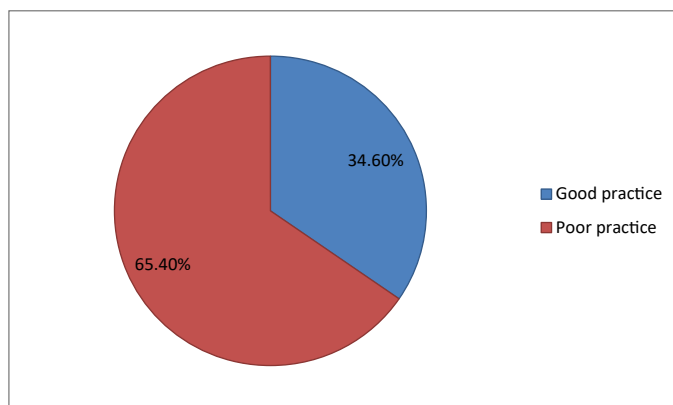


Figure 2: Nurse's Practice toward oral care among endotracheal intubated patient in Public hospital of Addis Ababa city 2021.

in the study area was 34.6% [(95% CI: 30.95%, 43.4%)]. In this study, the attitude of the participants, presence of Oral care protocol in the institution, having oral care training, and adequacy of the nurse to patient ratio allocation in the unit was identified as a factor associated with the nurses' level of oral practice for intubated patients in the study area. The level of nursing practice toward the oral care for the intubated patient in the study is comparable with the recent study in Eretria (16) (33.3%) and Australia [9] and it is higher when compared to studies done in Pakistan and Sudan (25%) [17]. The variation might be due to the difference in socio-demographic characteristics. The level of nursing practice toward the oral care for the intubated patient in this study was lower than the level of practice reported in the study conducted in, India (66.6%), and Saudi Arabia (55.3%) [3, 18]. The variation may be due to the difference in the socio-demographic characteristics of the participant and the difference in duration.

In this study, the attitude of nurses to the oral care practice among intubated patients is significantly associated [AOR =5.109(1.245-10.23)] with oral care practice among intubated patients; this is due to the reality that having a positive attitude is the base to practice every activity. This study revealed that those nurses' who have taken Oral care practice training were 6 times more practice the oral care compared to their counterparts. This is due to the fact that training can enhance the nurses' Cognitive and Skills to practice oral care among intubated patients. This study in line with the study done in Eritrea showed 94.5% reported adequate training is needed to provide quality oral care [16].

Table 4: Participants level of practice toward oral care in Intubated patients (n=295).

S.N	Practices Prior to Oral Care	Yes (%)	No (%)
1	Hands are washed	97.3%	9%
2	Personal protective equipment's (e.g. Gloves) are worn	100%	0%
3	Hyper oxygenation/hyperinflation prior to suctioning.	34.2%	65.8%
4	Suction endotracheal tube.	65.6%	34.4%
5	Old tape and ties are loosened and removed	43.2%	56.8%
6	If patient is nasally intubated, the nurse cleaned around endotracheal tube using saline-soaked gauze or cotton swabs.	52.6%	47.4%
7	If patient is orally intubated or pharyngeal airway or mouth Gag (acting as bite-block) are removed.	66.2%	43.8%
Oral Care Event			
8	Perform oral care using pediatric toothbrush or Adult (soft) toothbrush at least twice a day. Gently brush patient's teeth to clean and remove plaque from teeth.	39%	61%
9	Oral swab with 1.5% Hydrogen peroxide solution to clean mouth every 2 to 4 hours.	52%	48%
Post-Oral Care Practices			
10	Suction oral cavity/pharynx.	62%	38%
11	Oral tube was moved to the other side of the mouth.	46%	54%
12	Oropharyngeal airway (bit-block) was replaced along the endotracheal tube (To prevent biting, minimize pressure areas on lips, tongue, and oral cavity).	43%	57%
13	The nurse ensured proper tube cuff inflation using minimal leak volume or minimal occlusion volume	64%	36%
14	After oral care, the nurse reconfirm tube placement, and note position of tube at teeth or naris (common tube placement at teeth is 21 cm for women and 23 cm for men)	32%	68%
15	After oral care, the nurse secure the endotracheal tube in place (according to institutional standard) (to prevent inadvertent dislodgment of the tube)	67%	33%
16	With each cleansing, applying a mouth moisturizer to the oral mucosa and lips to keep tissue moist?	49%	51%
17	Hands are washed	93%	7%
Patient Monitoring and Care			
18	Head of the bed elevated at least 30 degree unless contraindicated.	53%	47%
19	Suctioning endotracheal tube if clinically indicated.	64%	46%
20	The nurse monitored the amount, type and colour of secretions.	36%	64%
21	If patient is nasally intubated, the nurses monitor for nasal drainage.	92%	8%
22	The nurse assesses the oral cavity and lips at least every 8 hours	19%	81%
23	During oral care, the nurse assesses build-up of plaque on teeth or potential infection related to oral abscess?	83%	17%
24	The nurse reconfirm tube placement, and note position of tube at teeth or naris. Retape or secure endotracheal tube at least once per day for soiled or loose securing devices.	79%	21%

Table 5: Factors associated with Nurse's level of practice toward Oral care among endotracheal intubated patient.

Variables	Category	Level of practice		COR(95% CI)	AOR(95% CI)	P- value
		Good	Poor			
Age	20-30	101(45.7%)	120(54. %)	1	1	
	30-40	48(68.6%)	22(31%)	2.592(1.466-4.583)	1.443(0.758-2.748)	0.264
	>40	4(100%)	0(0.0%)	1	1	0.999
Work experience	6 month-3 years	64(40.8%)	93(59.2%)	1	1	
	3 years-5 years	48(53.3%)	42(46.7%)	1.661(0.985-2.800)	1.604(0.927-2.776)	0.91
	> 5 years	41(85.4%)	7(14.6%)	8.511(3.593-20.162)	4.112(1.595-10.597)	0.03
Nurses' attitude	Good	100(73.5%)	36(26.5%)	7.32(2.4;12.63)	5.109(1.245- 10.23)	.0015*
	Poor	56	103	1		
Presence of oral care protocol	Yes	65	22	3.33(2.45-9.80)	4.02(1.45-7.77)	0.0043*
	No	88	120			0.0034*
Training	Trained	41	13	4.22(1.25-8.65)	6.11(2.45-9.23)	0.005*
	Not trained	82	159	1		
Ratio of ICU nurse to patient	Adequate	86	42	1.67(1.2-4.3)	2.9(1.8-7.45)	0.002*
	Not adequate	69	98	1		

In this study, the odds of practicing Oral care is increased by four folds among nurses Working in the Hospital which have Oral care guideline and/or oral care protocol [AOR= 4.02(1.45-7.77)]. This might be due to the reality that protocol and/or guide line increase the level and quality of practice. In this study only 18.3% of the nurses working in the intensive care Unit (ICU) were trained to provide Oral care for the intubated patient. This finding is less when compared with a study

done in Saudi Arabia Riyadh which only 43.8% were trained to give oral care [18]. The discrepancy might be that the Oral care training might be different from one country to another country.

Conclusion and recommendation

The overall Practice towards oral care for a patient with endotracheal intubation is inadequate among ICU nurses. In this study years of

experience, oral care training, and level of attitude were the significant predictors of nurses' knowledge. Level of practice, adequate number of ICU nurses, and year of experience were the significant predictors of nurses' attitude finally the level of attitude and year of experience was the significant predictors of nurses' self-reported practice of oral care for patients with endotracheal intubation. Therefore, by considering the importance of oral care in reducing the length of hospitalization, costs, and mortality rate, it is necessary to organize training classes for nurses working in intensive care units to enhance the attitudes of the nurse toward oral care, Providing oral care protocol and guide line in each Intensive care Unit (ICU) and allocating appropriate ratio of nurses to patient in ICU is very important to decrease the mortality and morbidity related poor oral care practice.

Limitation and strength of the study

Inferring whether the exposure affects the outcome or outcome affects the exposure is not possible in the cross-sectional design. Despite these limitations, the study was the first study in the study area, with a high response rate and unique as it comprehensively examined the factors associated Nurses oral care practice and provide clues for the future best care for patients in the Intensive Care Units

Authors' contributions

Jabessa Abdisa, Tefera designed the study, developed the proposal, participated in the data Collection, performed analysis. The first draft of the manuscript was written Firaol Regea Gelassa. Debela Gela Negalign Getahun, and Shalama Lekasa Nagari, approved the proposal with revisions, participated in data analysis, and revised subsequent drafts of the manuscript. All authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Ethics approval and consent to participate

Ethical clearance was obtained from Addis Ababa University, college of health science, school of nursing and midwifery ethical review committee (Ref. No: S/N/124/2013). Permission letter was obtained from each hospital. An official permission letter was secured from each hospital. Each study participant was informed about the purpose, method, expected benefit, and risk of the study. They were also informed about their full right not to participate or withdraw from the study at any time, and deciding not to participate had no impact on their service.

Voluntary inferred and written consent was obtained and participants' willingness was respected and confidentiality was guaranteed. The study has been performed following the ethical standards laid down in the 1964 Declaration of Helsinki. This was also approved by the Ethical Review Committee.

Consent for publication

Not applicable

Availability of data and materials

The summary data are available in the main document. The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Funding

This study was funded by Addis Ababa University. However, the funder had no role in study design, data collection, analysis, preparation of the manuscript, and decision to publish.

Acknowledgements

The authors thanks all study participants and all the data collectors and supervisors for that this study would not have been possible without them. They also thank Addis Ababa University and the Ministry of Science and higher education Ethiopia for arranging the necessary budgets needed for the study.

Conflict of interest

The authors declare that there is no any competing interest.

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