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DEPARTMENT OF EMERGRNCY MEDICINE

ASSESMENT OF KNOWLEDGE, ATTITUDE, PRACTICE AND ASSOCIATED FACTORS OF ORAL CARE IN ADULT INTENSIVE CARE UNIT AMONG NURSES WORKING IN FEDERALLY ADMINISTERED PUBLIC HOSPITALS, ADDIS ABABA, ETHIOPIA, 2019.

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KNOWLEDGE, ATTITUDE, PRACTICE AND ASSOCIATED FACTORS OF ORAL CARE IN INTENSIVE CARE UNIT PATIENTS AMONG NURSES WORKING AT ADULT INTESIVE CARE UNITS OF FEDERALLY ADMINISTERED PUBLIC HOSPITALS IN ADDIS ABABA, ETHIOPIA, 2019.

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Approved by the Examining Board

As member of examining board of the final master's defence, we certify that we have read and evaluate the thesis prepared by Belayneh Shetie. We recommended that it will be accepted as fulfilling the thesis requirement for master science degree in Emergency Medicine and Critical Care Nursing.

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Acronyms and Abbreviations

AACN--American Association of Critical Care Nurses

EBP—Evidence Based Practice

ETT--Endotracheal Tube

ICU--Intensive Care Unit

IE--Infective Endocarditis

OC--Oral Care

MV--Mechanical Ventilator

PI--Principal Investigator

SPSS--Statistical Package for Social Sciences

VAP--Ventilator Associated Pneumonia

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Abstract

Introduction: Normally the oral cavity of human being is colonized by many different groups of microorganisms which have a crucial role in both health and disease. The oral flora of critically ill adults differs from that of healthy adults secondary to host defense and exogenous agents. Oral care is an essential element of intensive care nursing.

Objective: To assess knowledge, attitude, practice and associated factors of oral care for intensive care unit patients among nurses working at federally administered public hospital in Addis Ababa, Ethiopia, from April 5-25, 2019.

Methods: Institutional based cross-sectional study with pre tested structured questionnaires was conducted among 115 nurses. All nurse working in the intensive care unit of federally administered public hospitals during the study period were included in the study. Bivariate and multivariate logistic regression was computed to identify associated factors of knowledge, attitude and practice of oral care and variables with $p< 0.05$ were considered statistically significant.

Result: The mean age of the participants was 27.87±4.240 years and the mean years of experience was 2.85 years. Only 25.2% of nurses have good knowledge about oral care with mean knowledge score of 5.765±1.97. The proportions of nurses who have positive attitude were 79.1% with a mean attitude score of 32.6±5.21. Only 42.6% of nurses have good oral care practice with a mean practice score of 36.43±7.69. Practice and attitude have a significant correlation (p=0.015). Lack of time (AOR=0.176, CI=0.068, 0.454, P=0.000) and lack of equipment (AOR=0.214, CI=0.079, 0.578, P=0.002) have a significant association with oral care practice in ICU.

Conclusion and recommendation: The knowledge of nurses was poor and practices to oral care found poor. Statistically significant associations were found between oral care practice and lack of time and equipment. There is need to improve nurses knowledge and practices to promote care provided to patients by involving them in educational, training programs. There is also a need for adequate staffing and equipping the intensive care unit to reduce lack of time and equipment's. Evidence based practice should be encouraged and written protocols must be followed by nurses.

Key words: Oral care, Knowledge, Attitude, Practice, Factors, ICU, Nurses.

1. Introduction

1.1. Back ground

Normally the oral cavity of human being is colonized by many different groups of microorganisms(1). The oral flora of critically ill adults differs from that of healthy adults secondary to host defense and exogenous agents. Within 48 hours of admission, the pattern of the oropharyngeal flora of critically ill patients undergoes a change from the usual predominance of gram-positive streptococci and dental pathogens to predominantly gram-negative organisms, constituting more virulent flora, including pathogens due to the use of many drugs especially antibiotics, drying of the mucosa or pooling of secretions due to inability to swallow in the intubated or less awake patient. Changes in normal flora may lead to dominance of a pathogenic organism colonizing the oral cavity(2–4).

Patients who are admitted in the Intensive Care Unit (ICU) have very specific care needs, demanding the highest standard of professional care. A patient's individual desires for oral care should be taken into consideration as part of the admission assessment. Usually nursing care for critically ill patients includes some type of oral care, as the nurse has the responsibility for assessing, planning, implementing, and evaluating each patient's oral care needs(5).

Oral health can be compromised by medical conditions, medical treatments, patient disability for oral health behavior, and intensive care unit (ICU) instruments. Oral micro flora of ICU patients contains gram positive microorganism such as staphylococcus aureus, streptococcus pneumonia and pseudomonas. These microorganisms are potentially risk factors for ventilator associated pneumonia (VAP). Bacterial movement from oral to trachea is one of the most important risk factors for Nosocomial pneumonia in intubated patients(6,7).

Oral care is an essential element of intensive care nursing for intensive care unit patients. It aims to keep their oral condition in a comfortable, clean and moist manner, free of infection. Patients in intensive care units (ICUs) may require oral intubation to keep a clear airway. The endotracheal tube (ETT) can induce potential complications such as ventilator-associated pneumonia (VAP), one of the most common hospital-acquired infections among patients receiving mechanical Ventilation in ICUs(8). Oral care with chlorhexidine and antiseptic prevents ventilator-induced pneumonia. Tooth brushing has a significant effect on reducing the number of dental plaques, which is the site of accumulation of ventilator-induced pneumonia microorganisms(9,10).

1.2. Problem statement

Care of the mouth is an important nursing procedure and should be performed as part of the routine general hygiene of a patient. Nurses play an important role in providing effective oral care and promoting oral hygiene(5). However it gets limited exposure in medical education and has been given to dentistry, where emphasis is directed to two major clinical infections: caries and periodontitis but pathogenic micro flora of the mouth and pharynx play a major role in several systemic diseases: like bacteremia's, endocarditis, chronic lung diseases, endotoxin related atherosclerosis and pneumonia(11).

In the ICU, the mouth often enables entry for life sustaining interventions, such as endotracheal intubation for ventilation and orogastric tubes for enteral feeding. Unfortunately, these interventions force the patients to maintain an open mouth, and impair the natural airway defenses. This vulnerable position, in combination with other treatments can contribute to a rapidly deteriorating oral state which affects the overall health of the patients(12).

Oral care is perceived as an unpleasant and basic nursing activity and hence it is mostly not a priority than other aspects of care. Apart from promotion of comfort and pleasant smell, oral care interventions also address three important ventilator associated risk factors. These are oro-pharyngeal colonization, oral secretions which can migrate to the sub glottal area and removal of dental plaque(13).

Aspiration of oral colonization has been identified as one of the common causes of ventilated associated pneumonia (VAP) in ICU as a result of poor oral care. Ventilation associated pneumonia (VAP) is one of the most common nosocomial infection in Intensive Care Units (ICUs), with its risk increasing at a rate of 1-3% per day of intubation. Patients with VAP have a longer stay in ICU, and there is an increase in total hospital length of stay averaging an additional 7-9 days. About 60% of VAP is associated with poor oral hygiene(14,15).

Evidences show a significant difference between study(with routine oral care) and control (without oral care) groups as regard to occurrence of Ventilator associated pneumonia (VAP)and days of ICU stay was found that only 33.3% of patients in the study group stayed more than 7 days in the ICU compared to73.3% of patients the control group(12).

Poor oral hygiene causes buildup of plaque and calculus around teeth that can lead to inflammation and ulceration of the gingival tissues that associated significantly with infective

endocarditis related bacteremia after tooth brushing. Patients with mean plaque and calculus scores of 2 or greater were at a 3.78- and 4.43-fold increased risk of developing bacteremia, respectively. The presence of generalized bleeding after tooth brushing was associated with an almost eightfold increase in risk of developing bacteremia(16).

Even though oral care in intensive care unit is a very important factor for the prevention of many nosocomial infections, provide comfort and satisfaction, studies show that nurses have poor knowledge, negative attitude and poor oral care practice for intensive care unit patients (7,17,18).

Patients who have received routine oral care in intensive care were less likely to develop nosocomial infections like ventilated associated pneumonia (VAP)(12,15,16). Therefore nurses were expected to perform routine oral care to prevent nosocomial infections(14).

As far as my knowledge there is no research conducted in Ethiopia on nurses knowledge, attitude, practice and factors that affect oral care practice in ICU so this research might have a crucial role through displaying the nurses level of knowledge, attitude, practice and barriers that affect oral care in ICU.

1.3. Significance of the study

This study assess the knowledge, attitude, practice and associated factors of oral care in adult intensive care unit among nurses working at federally administered public hospitals which have important contribution for nursing practice, education and further research which will contribute to nursing oral care and improvement of critical patient's outcome.

As a result improved outcomes will shorten patient's ICU length of stay, hospitalization as well as advantage of the patient financially with decreased hospital costs. Hospitals also gain advantage as they were constantly faced with the challenge of providing cost effective services to patients and communities. As poor oral care practice was associated with many local and systemic infections, providing evidence based oral care in ICU is an important aspect.

Overall, the findings will have important suggestions for policy and decision making in health care planning, in allocating resources like human and financial resources.

2. Literature Review

2.1. Knowledge of ICU nurses on oral care

A cross sectional study done on ICU nurses in Brazil show that 71.1 % of nurses failed to adequately respond as to know the daily frequency of oral hygiene performance. 75.6% of the surveyed nurses were aware of the use of chlorhexidine(19).

A similar study done at Lahore, Pakistan show that nurses had fair knowledge about oral care for critically ill patients in ICU(20). Another study conducted at Al Nejah University at west bank governmental hospitals on ICU nurses show that, the knowledge level for almost half of them (48.8%) was poor(21).

Another study conducted at Iran, Kerman University of Medical Sciences; on 70 nurses working in ICU departments show that 28.6% of participants have good knowledge (7). A cross-sectional study conducted at Karnataka India show that all the nurses were aware of the concept of focal infection theory and 93% knew about the potential complications associated with poor oral hygiene in ICU(22).

A study conducted in northern Taiwan on nurses show that the mean score for knowledge about oral care is 58.8%(23). Another cross-sectional study conducted at Johannesburg shows that 31.84% of nurses have good knowledge(13). A cross sectional hospital based study was conducted in Khartoum state on a total of 154 ICU nurses from seven governmental hospitals and were invited to take part in this study. 97.4% of ICU nurses had high knowledge of the importance of mouth care for ICU patients(18).

2.2. Attitude toward oral care

According to a study conducted in Brazil regarding attitude among nursing technicians in ICU, from the 11 questions, only two reached more than 90% of requirements(19). Another descriptive cross sectional study done at Lahore, Pakistan on ICU nurses show that nurses had negative attitude about oral care in intensive care unit(20).

A cross-sectional study conducted at Iran, Kerman University of Medical Sciences, on nurses working in ICU departments show that only 40% of ICU nurses had positive attitude to oral hygiene for ICU patients(7). A similar descriptive, cross-sectional study conducted in northern Taiwan show that ICU nurses had an average percentage attitude of 79.4%(23). Another descriptive and cross-sectional study conducted at Johannesburg on nurses shows a mean score of attitude was 60.02%(13).

A cross-sectional study conducted at Iran to asses' nurses' opinions about oral care in patients under mechanical ventilation from 6 intensive care units in the university hospitals show that oral care obtained the 7th rank in priority and a mean score of 5.7 on a scale of 1-10(24). A study conducted at Malaysia shows more than 89% of the nurses agreed that oral care is very important for mechanically ventilated patients. More than 70% has had adequate oral care training and also adequate time to provide the care at least once a day. However, more than 40% felt that the oral cavity is difficult to clean and that it is also an unpleasant task. Overall, the majority of nurses had a positive attitude towards providing oral care for ventilated patients(17).

2.3. Oral care practice

A crossectional study conducted in Brazil on intensive care unit shows that 35.6% and 26.2% oral care was poor among nurses and nursing technicians respectively. The average practice among nursing technicians was higher among those who had technical expertise in oral care ($p = 0.031$)(19).

A study conducted on ICU nurses at Malaysia to assess oral care practice in ICU show that of 260 nurse respondents, only two indicated that they used chlorhexidine mouth wash for oral care. The majority of nurses provided all types of oral care at least once a day using forceps and gauzes (97%), forceps and cotton (90%), orange stick (70.5%) and spatula and gauze (66.8%). Some nurses even used children's toothbrushes (17%). Other nurses indicated that they provide oral care to their patient 2–8 times a day(17).

Similar study conducted at Lahore, Pakistan show that only 49.5% nurses perform oral care in ICU. Majority of nurses do not perform oral care and give it less priority(20). Another study conducted at Al Nejah University at west bank governmental hospitals show that only 41.7% of nurses oral care practice was acceptable(21).

Another study conducted at Iran, Kerman University of Medical Sciences; on nurses working in ICU departments show that 64.3% of participants had good practice about oral hygiene in ICU patients. Chlorhexidine mouth wash were used by 98% of nurses(7). A cross-sectional study conducted at Karnataka India show that 95.5% of the nurses performed oral care after every shift change and used gauze soaked in chlorhexidine routinely(22).

A study conducted in northern Taiwan at 12 adult intensive care units in one medical center show that the average percentages indicating the intensive care unit nurses' oral care practices were 49.8%(23). Another cross-sectional study conducted at Johannesburg

regarding evidence-based guidelines and recommendations about oral care for intubated critically ill patients shows the mean score for practices were 52.25%(13).

According to a study conducted at Iran to asses' nurses' opinions and practice about oral care in patients under mechanical ventilation from 6 intensive care units in the university hospitals show that more than 21% of subjects did not perform oral care in their usual duties. Only 20% of the patients' charts contained a report on oral care(24).

A cross sectional hospital based study conducted in Khartoum state show that only 20% of nurses were found to apply good practice. 64.5% of the nurses received training in mouth care provision, and (81%) indicated that further training would be beneficial. The oral care practice of ICU nurses ranged between average among 57% and poor among 23%. The result also show that the majority of respondents (98.7%) of nurses use gauze and tongue depressor in performing oral care but none of them uses pediatric tooth brushes(18).

2.4. Factors affecting oral care (Knowledge, Attitude and Practice)

A descriptive cross-sectional survey conducted in USA University of Louisville Kentucky, shows that nurses' oral care education, having sufficient time to provide care, prioritizing oral care, and not viewing oral care as unpleasant had direct effects on the quality of provided care. Intensive care unit experience, oral care education, and having sufficient time had indirect effects(25).

A study conducted in India show that mechanical obstruction is the main barrier to provide oral care in intensive care unit(22). Another study conducted in Iran show that high load of writing tasks and personnel shortages were the major barriers to oral care(24).

According to a study conducted at Johannesburg, higher level of qualification and years of intensive care experience were not significant factors related to knowledge and the frequency of performing oral care. Although, ICU nurses learning from multiple sources about oral care will improve knowledge and increase the frequency with which they provide oral care for patients(13).

A similar descriptive cross-sectional survey conducted at Kenya University of Nairobi. A total of 100 nurses working in the ICU were asked to participate in the study. The Bivariate correlation shows that nurses' oral care education, having sufficient time to provide care and not viewing oral care as an unpleasant task had direct effects on the quality of care provided(5).

A study conducted in Sudan, Khartoum, and show that there was a highly significant correlation ($P < 0.000$) between knowledge and attitude. Insignificant correlations were found between knowledge and practice ($P < 0.192$), and attitude and practice ($P < 0.097$)(18). But another study conducted in northern Taiwan show that there was a significant correlation between oral care knowledge and practice among the nurses ($p = 0.004$),(23).

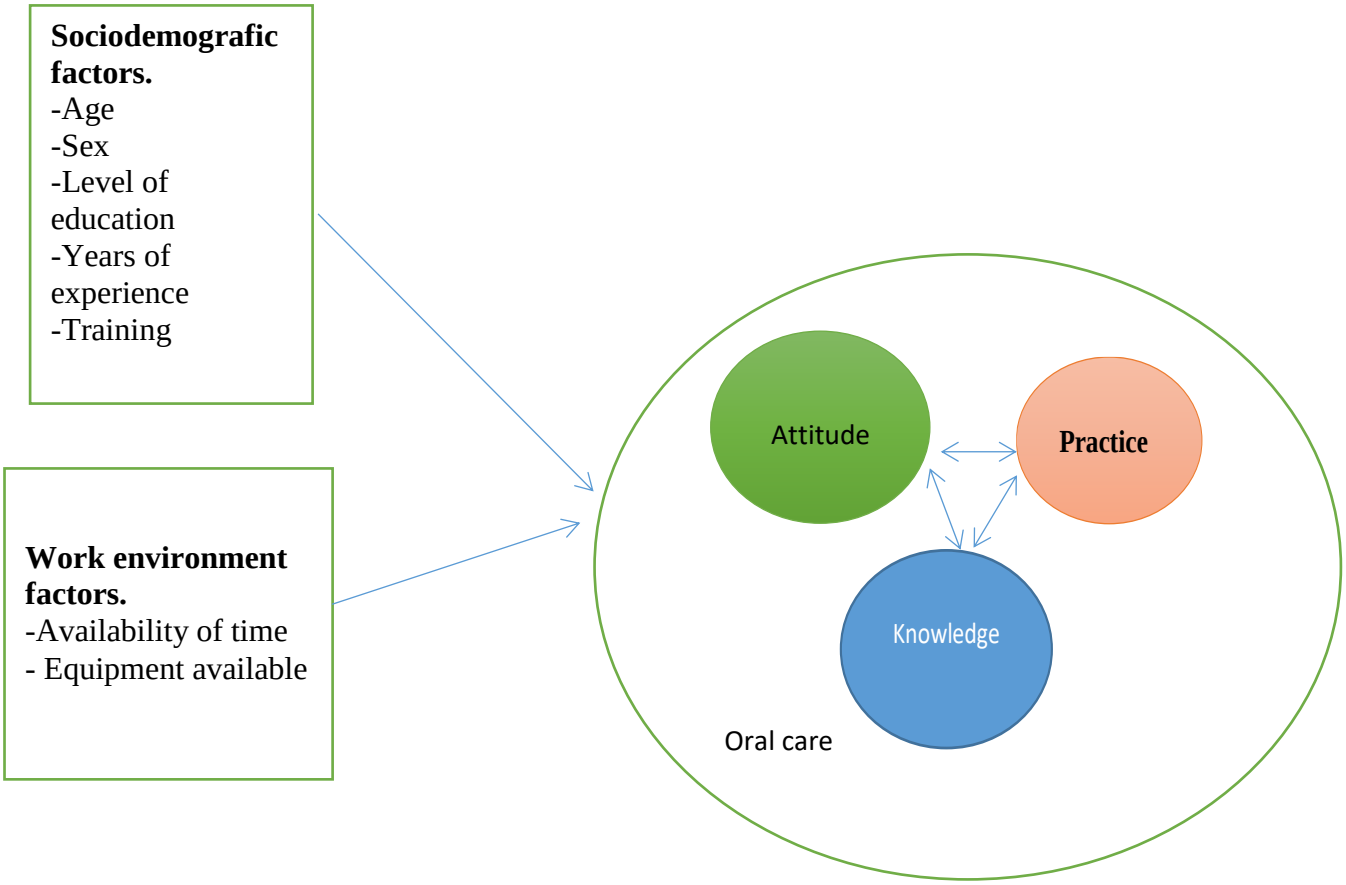

Figure 1: Conceptual presentation of the proposed inter-relatedness of these variables adapted from another study(5,25).

3. Objectives

3.1. General objective

- ❖ To assess the knowledge, attitude, practice and associated factors of oral care in adult intensive care unit among nurses working in federally administered public Hospitals, Addis Ababa Ethiopia, 2019.

3.2. Specific objectives

- ✓ To recognize the level of knowledge of oral care provision among nurses working in ICU of federally administered public hospitals of Addis Ababa.
- ✓ To assess the attitude of nurses toward oral care provision among nurses working in ICU of federally administered public hospitals of Addis Ababa.
- ✓ To determine the practices of oral care provision among nurses working in ICU of federally administered public hospitals of Addis Ababa.
- ✓ To identify associated factors that affects the provision of oral care.

4. Methods

4.1. Study design

Institutional based cross sectional study design was applied.

4.2. Study area

The study was conducted at selected federally administered Hospitals in Addis Ababa, which is capital city of Ethiopia (namely ABeTE, St. Petors, ALERT and Tikur Anbesa Specialized Hospital).

Black Lion Hospital (Tikur Anbesa in Amharic): is Ethiopia's largest general public Hospital in the country which was given to Addis Ababa University (AAU) by the Ministry of Health (MoH) for the faculty as a main teaching Hospital 1998. The intensive care unit is comprised of subunits organized based on the specialty of care provided. The subunits include: medical ICU, surgical ICU, paediatric ICU and cardiac ICU. It has a total of 20 beds distributed in each subunit (6 beds in medical ICU, 6 beds in surgical ICU and 4 beds in each of paediatric and cardiac ICUs). There are a total of 75 nurses working in the ICU (20 in the medical ICU, 20 in the surgical ICU, 15 in the paediatric ICU and 20 in the cardiac ICU). (Tikur Anbesa Specialized Hospital, ICU annual report).

ALERT is a medical facility on the edge of Addis Ababa, specializing in Hansen's disease, also known as "leprosy". It was originally the All Africa Leprosy Rehabilitation and Training Center (hence the acronym), but the official name is now expanded to include tuberculosis. There is currently a 240-bed teaching hospital, which includes dermatology, ophthalmology, and surgery departments, also an orthopedic workshop, and a rehabilitation program. It has around 28 nurses working in ICU.

AaBET Hospital: is a newly established 250-bed and 12 ICU-bed teaching and public referral hospital in Addis Ababa, Ethiopia, affiliated with St. Paul's Hospital Millennium Medical College (SPHMMC). It has around 36 nurses working in adult ICU.

St.Petor Hspital is one of public referral Hospitals in Addis Ababa which have around 24 adult ICU nurses.

4.3. Study period

The study was conducted from April 5 to 25/ 2019.

4.4. Population

4.4.1. Source population

The source population of the study was all nurses who work at federally administered public Hospitals.

4.4.2. Study population

The study population was all adult intensive care unit nurses who work at federally administered public Hospitals during the study period.

4.4.3. Study unit

The study unit was individual nurses who fulfill the inclusion criteria.

4.5. Sample size

- ✓ The sample size was all nurses in intensive care unit of four federally administered public hospitals in Addis Ababa Ethiopia (Tikur Anbesa=41, Petros=24, Alart=27 and Aabet Hospital=36).

4.6. Eligibility criteria

4.6.1. Inclusion criteria

- ✓ All Nurses who works in the ICU of selected hospitals.

4.6.2. Exclusion criteria

- ✓ Nurses who are in annual and maternal leave.

4.7. Variables

4.7.1. Dependent variables

- ❖ Knowledge
- ❖ Attitude
- ❖ Practice

4.7.2. Independent variables

- Age,
- Sex,

- Year of experience,
- Level of education.
- Training on oral care practice
- Availability of equipment
- Time available

4.8. Operational definitions

Oral care: Oral care/hygiene is the practice of keeping the mouth clean and healthy by brushing and flossing to prevent tooth decay and gum disease.

Knowledge: in this study it refers to the correct response of the subject regarding the oral care practice in ICU.

Good knowledge: Refers for those study participants who scored point more than 60% of knowledge questions correctly(9).

Attitude: Are the Perception/feeling that nurses have, who are working in federally administered public hospitals towards the oral care in ICU.

Positive attitude: Refers to those study participants who scored point greater than 60% of attitude questions(20).

Practice: in this study it refers to the actions done by the nurses on the subject regarding the oral care in ICU.

Good Practice: Refers to those study participants who scored point greater than 70% of practice questions (20)

Critical care: The care of seriously ill clients from point of injury or illness until discharge from intensive care

Critically ill patient: Patients who required more intensive and careful nursing care.

Critical care Unit: The unit in which comprehensive care of a critically ill patient which is deemed to recoverable stage is carried out.

Critical care nursing: those comprehensive, specialized and individualized nursing care services which are rendered to patients with life threatening conditions

4.9. Data collection

Data was collected using structured pretested self-administered questionnaire by four BSc nurses and one supervisor.

4.10. Study instrument

A self-administered closed ended questionnaire adapted in English from previous similar studies(5,20,21). The questionnaire contains five sections: socio-demographic variables (age, sex, year of experience and educational status), knowledge, attitude, practice questions and factors. A total of 46 item questionnaire including 8 questions on socio-demographic characteristics was adapted after reviewing related literatures. The second part of the questionnaire consists questions related with knowledge on oral care in ICU like the correct frequency of oral care. The third part of questionnaire consists of 10 questions on attitude like statements Oral care is a very high priority. The fourth part consists of 11 questions on oral care practice in ICU. The participant's gradation of the response was provided in a Likert scale ranging from 1 to 5 (1-strongly disagree, 2-disagree, 3-nutral, 4-agree and 5-strongly agree) for the attitude and practice part. The final part consists of 7 questions which assesses the perceived barriers that affect the provision of oral care practice

4.11. Data quality control

One day training was provided to four BSc nurses on the study instrument and data collection procedures prior to the beginning of the study. Pretesting of the questionnaire was conducted by 5% of the samples two weeks prior to data collection in selected ICU Nurses other than the sampled ICU Nurses to check the reliability, clarity, sequence, consistency and time required to fill the entire questionnaire. Day to day supervision was conducted for each data collectors by principal investigator to see how the data collection tools are used and filled questionnaires were checked for completeness, legibility and consistency.

4.12. Data analysis and presentation

The data was checked for completeness and unclear responses then coded and entered into the Epi info version 7.0. It was transferred and analyzed using SPSS version 24 software. Descriptive statistics was used to summarize quantitative data. Then the results were presented in terms of tables and graphs and in percentages for qualitative data. Pearson's correlation test was done and regression analysis was applied to assess the relationship between knowledge, attitude and practice. Bivariate and multivariate logistic regression was done to test the association between independent and dependent.

4.13. Ethical consideration

Permission to carry out the research was sought from the Addis Ababa University College of health science research standards and ethics committee. The research purpose, its benefits and the procedures was explained for each potential respondent. The respondents were signing an informed consent and any respondent seeking further clarification was assisted.

Any person unwilling to participate was not force to do and any person wishing to withdraw at any time during the study was free to do so. Confidentiality and privacy were strictly maintained. Only the principal investigator and the research assistants access the data.

5. RESULTS

5.1 Sociodemographic characteristics of the respondents

Of the 122 nursing professionals working in the institutions ICU during the study period, 115 participated in the study with a response rate of 94.2%. Nearly half of nurses (53.9 %) were females and (46.1 %) were males. The mean age of the respondents was 27.87±4.240 years. Majority of the respondents (80.0%) had Bachelor degrees. Regarding to their years of experience in intensive care unit (40.9%) had less than one year, (47.8%) 1-5 years and (11.3%) more than 6 years. Most of the participants (51.3%) reported that their nurse to patient ratio was 1to1. Only 42.6% of ICU nurses were trained about oral care.

Table 1: Socio demographic characteristics of nurses working in ICUs of federally administered public hospitals, Addis Ababa, April 2019.

Variable		Frequency	Percent
Sex	Male	53	46.1
	Female	62	53.9
Age	21-30	96	83.5
	31-40	17	14.8
	>40	2	1.7
Qualification	Diploma	14	12.2
	Degree	93	80.7
	Masters	8	6.9
Nurse to patient ratio	1 to 1	59	51.3
	1 to 2	40	34.8
	1 to 3	13	11.3
	1 to more	3	2.6
Years of experience	<1	47	40.9
	1-5	55	47.8
	>6	13	11.3
Training on oral care	No	66	57.4
	Yes	49	42.6

5.2. Knowledge of intensive care unit nurses on oral care

Out of total respondents 55.7% (n=64) correctly responded to the time for initiating oral care post admission in intensive care unit. Only 41.7% (n=48) correctly answered the minimum frequency of oral care. Regarding to the correct position of the patient during oral care in intensive 71.3% (n=82) of the respondents correctly responded. Only 22.6% (n=26) of the respondents correctly responded the best substance to be used for oral care in intensive care unit. One fifth 21.7% (n=25) of respondents correctly responded solution not to be used for oral care. Almost half of the nurses knew the importance of repositioning of endotracheal tube and deflating of cuff pressure, 51.3% (n=59) skin /mucosal/tracheal breakdown, 47.8% (n=55) enhance patient comfort and 49.6 % (n=57) reduce aspiration of oral secretion. Majority of the nurses 63.5% (n=73), 68.7% (n=79) and 44.3% (n=51) knew that oral care in ICU is important for patient comfort, local infection prevention and systemic infection prevention respectively. The mean knowledge score was 5.765±1.97 (48.04%) (Table 2).

Table 2: Knowledge of nurses working in ICUs of federally administered public hospitals, Addis Ababa, April 2019.

	Incorrect		Correct	
	Frequency	percent	Frequency	Percent
Time for initiating oral care post admission in intensive care unit?	51	44.3	64	55.7
Oral care for unconscious patient should be performed pre day at least	67	58.3	48	41.7
Oral care for each patient should last for	61	53.0	54	47.0
The correct position of the patient during doing oral care is	33	28.7	82	71.3
The best solution should be used in oral care for intubated patient is	89	77.4	26	22.6
Which solution shouldn't be used in oral care for intubated patient	90	78.3	25	21.7
Repositioning Avoid skin	56	48.7	59	51.3

of ETT and deflating of cuff pressure should perform in order to	/mucosal/tracheal breakdown				
	Enhance patient comfort	60	52.2	55	47.8
	Reduce aspiration of oral secretion	58	50.4	57	49.6
The benefits of oral care in ICU	Patient comfort	42	36.5	73	63.5
	Local infection prevention	36	31.3	79	68.7
	Systemic infection prevention	64	55.7	51	44.3

Scoring system <60% unsatisfied and > 60% satisfied knowledge.

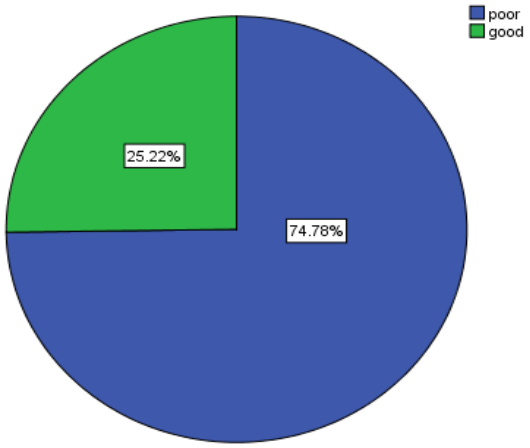

Figure 2. Percentages of intensive care unit nurse's knowledge, working in ICUs of federally administered public hospitals, Addis Ababa, April 2019

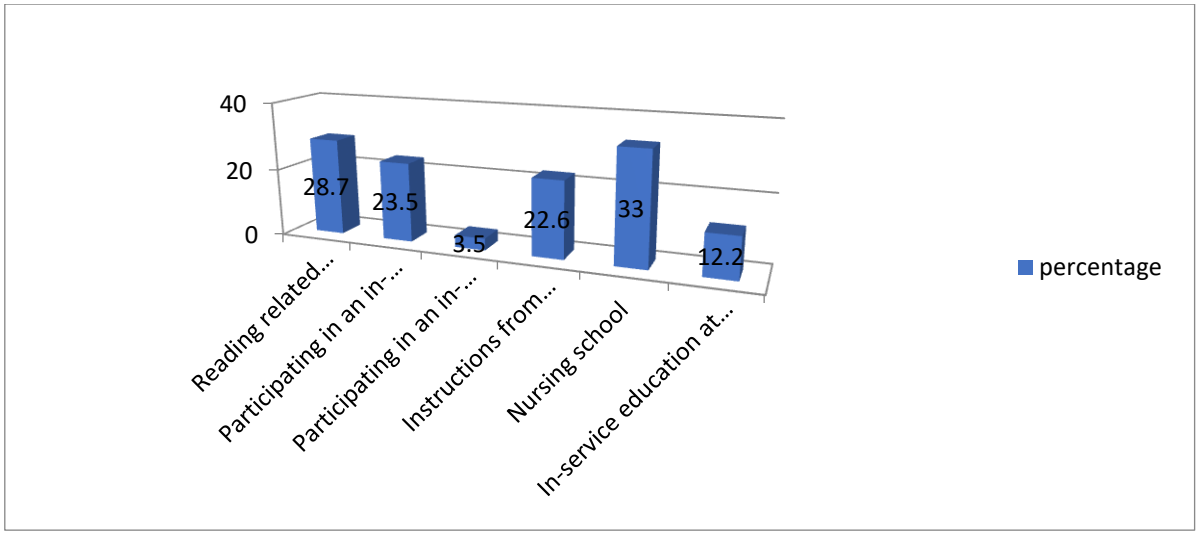

Figure 3: Intensive care unit nurse's Source of information, working in ICUs of federally administered public hospitals, Addis Ababa, April 2019.

5.3. Attitudes of intensive care unit nurses toward oral care

Table 3 Shows that 74.6% (n=86) believed that oral care is very high priority. Majority 60.9% (n=70) of the respondents agreed that nurses have enough time to perform oral care task. Forty four percent (n=51) of respondents believed that oral cavity is difficult to clean. Majority (55.7%) of the respondents believed that nurses require more supplies or equipment. Less than half (36.6%) of the respondents agreed the mouth of ventilated patients gets worse no matter what I do. More than half (54.8 %) of the respondents agreed that oral care training is sufficient to perform the task. Minority (40.9%) of the respondents agreed nurses have suitable toothbrush. Majority (67.8%) of the respondents believed that it is interested to have further education about recent oral care protocol. Overall nurses have positive attitude to oral care for ICU patients with a mean attitude score of 32.6±5.21.

Table 3: Attitude of nurses working in ICUs of federally administered public hospitals, Addis Ababa, April 2019.

Item	Strongly disagree		Disagree		Neutral		Agree		Strongly agree	
	No	%	No	%	no	%	no	%	No	%
Oral care is a very high priority	6	5.2	10	8.7	13	11.3	61	53.0	25	21.7
Nurses have enough time to perform oral care task	8	7.0	24	20.9	13	11.3	54	47.0	16	13.9
Cleaning the oral cavity is an unpleasant task	12	10.4	37	32.2	23	20	30	26.1	13	11.3
The oral cavity is difficult to clean	13	11.3	37	32.2	14	12.2	39	33.9	12	10.4
Nurses require more supplies or equipment	12	10.4	23	20	16	13.9	41	35.7	23	20.0
The mouth of most ventilated patients gets worse no matter what I do	13	11.3	30	26.1	30	26.1	34	29.6	8	7.0
Oral care training is sufficient to perform the task	11	9.6	24	20.9	17	14.8	52	45.2	11	9.6
Nurses have suitable toothbrush	28	24.3	23	20.0	17	14.8	37	32.2	10	8.7
I feel it would be useful to use an oral assessment guide	8	7.0	16	13.9	19	16.5	59	51.3	13	11.3
I'm interested to have further education about recent oral care protocol	1	0.9	8	7.0	12	10.4	58	50.4	20	17.4

Scoring system; < 60% Negative Attitude, > 60% Positive Attitude

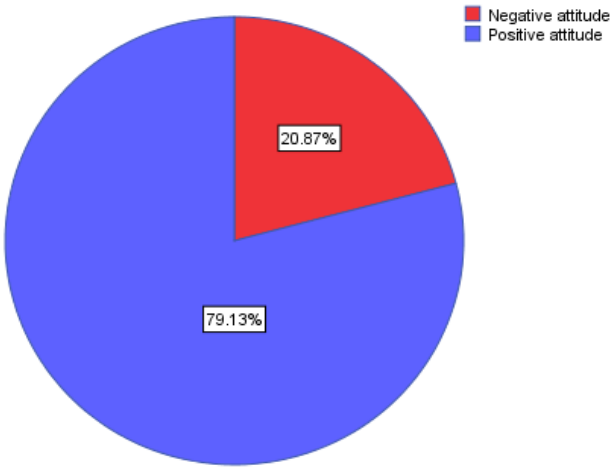

Figure 4. Percentages of intensive care unit nurse's attitude, working in ICUs of federally administered public hospitals, Addis Ababa, April 2019.

5.4. **Practice level of intensive care unit nurses on oral care**

Out of the total respondents 47.8% (n=55) agreed that they were doing oral care at all shifts. The majority of the respondents 72.2% (n=83) agreed that as they were considering the position of the patient while providing oral care. Only 27.8% (n=32) of the respondents agreed that, they were deflating the cuff pressure of ETT during oral care. Majority of the respondents 69.6 % (n=80) agreed that they were doing documentation of assessment. Out of eleven questions the percentage shows answers of 3 questions have result < 50%, percentage of seven questions shows results > 50%, and only one question shows result > 70%. Overall nurses have poor oral care practice with a mean practice score of 36.43±7.69. (Table 4)

Table 4: Practice of nurses working in ICUs of federally administered public hospitals, Addis Ababa, April 2019.

Item	Strongly disagree		Disagree		Neutral		Agree		Strongly agree	
	no	%	No	%	No	%	no	%	No	%
I'm doing oral care at all shifts	14	12.2	31	27.0	15	13.0	39	33.9	16	13.9
I'm doing oral care every 2-4 hours at shift	19	16.5	47	40.9	25	21.7	19	16.5	5	4.3
Each time I'm providing oral care it takes 5-7 min for each patient	5	4.3	31	27.0	11	9.6	55	47.8	13	11.3
I'm considering the position of patient during providing oral care	3	2.6	15	13.0	14	12.2	67	58.3	16	13.9
When I'm doing oral care I take	4	3.5	17	14.8	20	17.4	60	52.2	14	12.2

into consideration brushing of teeth										
When I am doing oral care I take into consideration brushing of gum	8	7.0	27	23.5	17	14.8	48	41.7	15	13.0
When I am doing oral care I take into consideration brushing of tongue	6	5.2	18	15.7	18	15.7	57	49.6	16	13.9
When I am doing oral care I take into consideration moisturing of lips	2	1.7	10	8.7	24	20.9	61	53.0	18	15.7
I'm deflating cuff pressure of ETT during oral care	29	25.2	35	30.4	19	16.5	23	20.0	9	7.8
An assessment of a patient's oral care needs take place within 24hours of their admission to ICU	7	6.1	19	16.5	22	19.1	53	46.1	14	12.2
I do documentation of assessment	4	3.5	14	12.2	17	14.8	53	46.1	27	23.5

Scoring system; ≤70% poor, >70% good practice

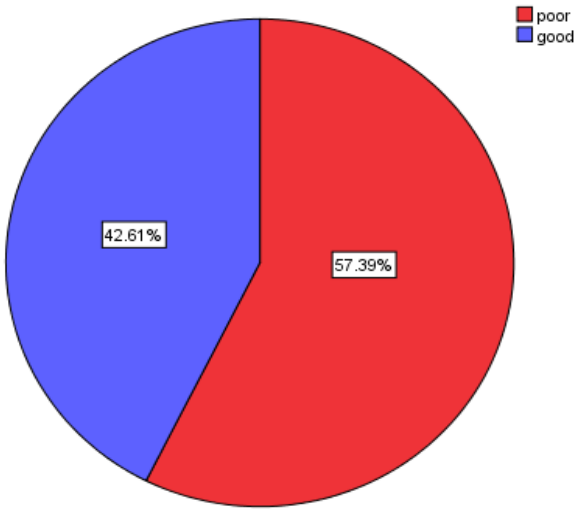

Figure 5. Percentages of intensive care unit nurse's oral care practice working in ICUs of federally administered public hospitals, Addis Ababa, April 2019.

5.4.1. Tools used for oral care

Out of total respondents most of them 70.4 %(n=81) of nurses use gauze and tongue depressor and only 5.2% (n=6) of nurses reported that they use pediatric tooth brush for oral care in ICU.

Table 5: Tools used for oral care

Tool	Frequency	Percent
Adult tooth brush	30	26.1
Foam swab	5	4.3
Pediatric tooth brush	6	5.2
Gauze and tongue depressor	81	70.4
Other	3	2.6

5.4.2. Solutions used during oral care

Most of the respondents 81.7% (n=94) were used saline and only 8.7% (n=10) were used Chlorhexidine.

Table 6: Solutions used during oral care

Substance used	Frequency	Percent
Chlorhexidine	10	8.7
Sodiumbiarbonate	5	4.3
Petroleum jelly	8	7.0
Tooth paste	13	11.3
Lemon water	8	7.0
Glycerin	5	4.3
Saline	94	81.7
Sterile water	48	41.7
Other	0	0.0

5.5. Constraints to perform oral care in ICU

Barriers for ICU nurses could be lack of time (56.5%), inadequate staff (66.1%), fear of tube displacement (60%), lack of oral care equipment's, (69.6%), fear of aspiration (53%), too much writing tasks (50.4%) and others (10.4%) like uncooperativeness of patient.

Table 7: Perceived barriers for oral care practice in ICU

Variable	Yes		No	
	frequency	Percent	frequency	Percent
Lack of time	65	56.5	55	43.5
Staff shortage	76	66.1	39	33.9
Too much writing tasks	58	50.4	57	59.6
Fear of aspiration	61	53.0	54	47.0
An existing endotracheal tube	69	60.0	46	40.0
Lack of equipment	80	69.6	35	30.4
Other	12	10.4	103	89.6

5.6. Relationships between oral care knowledge, attitude, and practice for ICU nurses

There was a significant correlation (p= 0.015) between practice and attitude with a Pearson correlation coefficient of 0.226. Insignificant correlation were found (p=0.782) between knowledge and practice, and knowledge and attitude (p=0.282).

5.7. Factors associated with the knowledge of ICU nurses on oral care

A binary logistic regression was done to test the association between the knowledge and Sociodemographic variables; but no significant association was observed between knowledge and Sociodemographic factors like; age, sex, qualification, years of experience and training.

5.8. Factors associated with the Attitude of ICU nurses toward oral care

A binary logistic regression was done to test the association between the attitude and Sociodemographic variables; but no significant association was observed between attitude and Sociodemographic factors like; age, sex, qualification, years of experience and training.

5.9. Factors associated with ICU nurses oral care practice

First bivariate binary logistic regressions was done to test the association of Sociodemographic factors and perceived barriers with oral care practice then variables with a p value of ≤0.2 were interred to multivariable binary logistic regression (years of experience lack of time, too much writing task, an existing endotracheal tube and attitude).

The multivariable binary logistic regression revealed that lack of time and lack of equipment have a significant association with oral care practice.

The result of the study revealed that nurses with lack of time, 82.4% (OR=0.176, CI=0.068, 0.454) less likely to perform good oral care practice and Nurses with lack of equipment, 78.6% (OR=0.214), (CI=0.079, 0.578) less likely to perform good oral care practice.

Table 8: Bivariate and multivariate analysis of oral care practice and different variables

variable		**Practice**					
		good	**Poor**	**COR (95%)**	**P-value**	**AOR (95%)**	**P-value**
sex	Male	22	31	1		1	
	Female	27	35	1.087(0.518,2.833)	0.826		
Age	20-30	40	56	1		1	
	≥31	9	10	1.260(0.469,3.383)	0.647		
qualification	Diploma	6	8	1		1	
	Degree	38	55	0.921(0.296,2.870)	0.887		
	Masters	5	3	2.222(0.375,13.180)	0.379		
Years of experience	≤1	22	25	1		1	
	2−5	13	32	0.462(0.195,1.094)	0.079	0.604(0.213,1.707)	0.341
	≥5	14	9	1.768(0.641,4.876)	0.271	3.026(0.909,10.069)	0.071
Training	not received	27	39	1		1	
	Received	22	27	1.177(0.558,2.484)	0.669		
lack of time	NO	33	17	1		1	
	Yes	16	49	0.168(0.075,0.379)*	0.000	0.176(0.068,0.454)**	0.000
staff shortage	NO	21	18	1		1	
	Yes	28	48	0.500(0.228,1.094)	0.83		
Too much writing task	NO	29	28	1		1	
	Yes	20	38	5.08(0.240,1.076)	0.077	0.802(0.315,2.044)	0.644
fear of aspiration	NO	20	34	1		1	
	Yes	29	32	1.541(0.730,3.251)	0.257		
An existing endotracheal tube	NO	21	25	1		1	
	Yes	28	41	0.813(0.383,1.727)	0.590	1.434(0.556,3.703)	0.456
lack of equipment	NO	23	12	1		1	
	Yes	26	54	0.251(0.108,0.582)*	0.001	0.214(0.079,0.578)**	0.002
Attitude	Negative	5	19	1		1	
	Positive	44	47	3.557(1.223,10.34545	0.020	2.266(0.601,8.539)	0.227
Knowledge	Unsatisfied	36	50	1		1	
	satisfied	13	16	1.128(0.483,2.635)	0.780		

*significant at COR and ** significant at AOR

6. DISCUSSION

This study shows that only 25.2% of nurses have good knowledge regarding to oral care. which is similar with the result of the study done at Iran, Kerman University(7) and Johannesburg(13) on ICU nurses show that, only 28.6% and 31.84% of nurses have good knowledge respectively. In contrast with the result of the study done at Lahore, Pakistan(20) show that > 50% of nurses have fair knowledge. The variation might be due to sample size and socio demographic variations.

Sixty seven (58.3%) of nurses failed to respond correctly the daily frequency of oral hygiene performance which is better than a study done in Brazil 71.1% of nurses failed to respond however in this study only 22.6% of the surveyed nurses were aware of the use of chlorhexidine which is less than a study done at Brazil show 75.6% of nurses aware of use of chlorhexidine (17). The difference may be due to sample size and Sociodemographic variations.

Despite the findings in literature showing the influence of oral health on the overall health condition of inpatients (3,4,15,16) 57.35% of intensive care unit nurses do not have training on oral care. From the nurses who have received training indicate that 55.1% of their training was part of basic nursing training.

The result of the study revealed that 79.1% of ICU nurses had positive attitude toward oral care which is similar with a study done at Taiwan show 79.4% (23) of nurses had positive attitude but better than a study conducted in Iran which showed only 40% of nurses had a positive attitude. The result of this study is in contrast with the result of the study done at Lahore, Pakistan(20) which showed that ICU nurses have negative attitude toward oral care. This may be due to qualification difference in this study 80% of the respondents have bachelor's degree while at Pakistan 69.8% of the respondents were diploma. However, in this study, no significant association was found between attitude and qualification level.

In these study 37.4% and 44.3% of nurses felt that the Cleaning the oral cavity is an unpleasant task and the oral cavity is difficult to clean respectively which is similar with the result of the study done in Malaysia (40%). However, 74.7% of ICU nurse agreed that oral care in ICU is a very high priority which is less than the result of study done in Malaysia (89%)(17). This difference may be due to training difference, in this study only 42.6% of nurses trained while 70% of nurses trained at Malaysia about oral care.

According to the result of the study the proportion of ICU nurses who had good oral care practice was 42.6% which is in line a study conducted Al Nejah University at west bank governmental hospitals (21) show that 41.7% of nurses have acceptable oral care practice. However the result of this study is less than the study done at Iran(7) show 64.3% of participants had good practice about oral hygiene in ICU patients. These differences might be due to hospital resources and supplies.

Regarding to the materials and solutions used for oral care, the present study showed that 70.4% of nurses used gauze and tongue depressor which is in line with a study done at Malaysia show 70.5%. But only 5.2%of nurses use pediatric toothbrush, contrary to the result of a study conducted at Malaysia (17%) (17). The finding also revealed that only 8.7% of nurses reported that they used a chlorhexidine solution in performing oral care. While this finding is in contrary with study conducted at Kerman, Iran(98%) (7). These differences might be due to participants were didn't use an evidenced based practice (EBP) during performing oral care.

This study demonstrated that no significant association between ICU nurses experience and level of education with Knowledge, attitude and practice towards oral care which is similar to study done at Johansberge(13). In this study the most frequent constraint to perform mouth care was lack of equipment (69.6%), unlike in Sudan ,India and Iran where this was attributed to uncooperativeness of the patient, mechanical obstruction and high load of writing tasks(18,22,24) respectively.

The finding of this study showed that there was significant correlation between practice and attitude, the finding may be due to that fact that those who have a positive attitude toward oral care might practices good oral care in ICU. But there was no correlation between knowledge and practice, knowledge and attitude. These finding is incoherence with the study done at kartum(18) show that there was no correlation between oral care practice and attitude toward oral care, but there was a correlation between knowledge and attitude.

A logistic regression revealed that, having sufficient time to provide care has a direct effect on good oral care practice. This finding is in line with the study done at Kenya Nairobi and USA(5,25). This might be due to the fact that in the absence of adequate time, there was a difficulty to perform good oral care practice. The finding also revealed that nurses with lack of equipment, less likely to perform good oral care. It might be due to the fact that, in the absence of a material difficult to perform task.

7. LIMITATIONS OF THE STUDY

- The study design is crossectional which has a limitation to establish a causal association as how and when the associations are established.
- Small sample size.
- Assessing practice through self-administered questionnaire.

8. CONCLUSION

Nurses are responsible and accountable for oral care to prevent the patient from hospital acquired infections and feel them pleasant during hospital stay. While it is an essential aspect of nursing care and given high priority of intensive care nursing, the result of this study revealed that, level of knowledge and practice were found poor. And despite the high qualifications of nurses who are working in critical care units, the majority of nurses have poor knowledge and practices. Oral care practice and attitude have statistically significant correlation. Lack of time and equipment were significant factors of oral care practice.

9. RECOMMENDATIONS

- **For hospitals**
  - ✓ There must be a guideline and policy to asses and provide oral care for ICU admitted patients.
  - ✓ Provide adequate training for nurses in evidence based oral health care.
  - ✓ There must be adequate staffing and equipment's to reduce lack of time and equipment's.
  - ✓ There must be a teaching sessions for intensive care unit nurses in the form of seminars, workshops and symposiums to enhance the nurse's level of knowledge and practice.
  - ✓ Oral care practice supervision should be performed.
- **For Nurses**
  - ✓ The nurses should be updated their knowledge through reading different materials.
  - ✓ The nurses should consider oral care as essential and routine care for their patients.
- **For researchers**
  - ✓ Further research is needed to determine the most effective way to perform oral hygiene care in critically ill patients as well as deciding on the most appropriate frequency of oral care.

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11. Annexes

Annex I: Information sheet

My name is Belayneh Shetie a student at Addis Ababa University, college of health science school of medicine, department of emergency medicine undertaking masters in emergency medicine and critical care nursing. I take this opportunity to invite you to participate in this study entitled '' assessment of knowledge, attitude, practices and associated factors on oral care for ICU patients among nurses working in intensive care units of federally administered public Hospitals, Addis Ababa Ethiopia.

Significance: This study will identify knowledge, attitude, and practice and associated factors on oral care among nurses working in adult intensive care units of federally administered public hospitals. That entails a significant contribution for nursing practice, education and further research, which will contribute to the quality of care and improvement of critical patient's outcome.

Procedures: This study involves interviewing nurses working in the ICU by filling a self-administered questionnaire. The results of this study may aid in development of an oral care protocol, which will ease your burden of patient care, and also in improving it. There are no risks associated with participating in this study although some questions may be personal in nature.

You are at liberty to participate or to withdraw at any time you wish without prejudice or coercion. You will not be required to write your name and the results will be treated with confidentiality.

Contact Persons: In case of questions or concerns about the content of this study or about your rights as a participant, please feel free to contact the following;

The Principal Investigator: - Belayneh Shetie

Cell phone -0910315488

Email belaynehshetie7@gmail.com

THE LEAD ADVISOR:

Dr. Tigist Zewudu (assistant professor)

Mr. Kibatu Gebrie (MSC, Lecturer)

Annex II: Consent for the participant

I have read all the process and the objective of the study and understood the same as written that includes informed about the purpose, advantage, and disadvantage of this study. I also understood that the research imposes no risk and no complication to would be provided to my family and me. I have been told that if I feel discomfort to respond to any of the question, I feel free to drop it any time I wish to do so. I have understood the information given and the participation is voluntary based. I have been told that my answers to the questions will not be given to anyone and not expect to write my name. Now I am giving my consent to participate in the study voluntarily.

_____ Yes, I want to participate in the study (Please go to the next page).

_____ No, I don't participate in the study (Thank you very much!).

Witness: Signature_____ Date _____

Data facilitator

Name_____Signature_____Date____/_____

Result: 1. Questionnaire completed _____

2. Questionnaire partially completed _____

3. Participant refused _____

4. Others (please Specify) _____

Checked by Supervisor:

Name_____Signature_____Date____/____/__

Annex III: Questionnaire

Addis Ababa University, Collage of health science, Department of Emergency medicine.

Instruction: Read and sign the attached consent form before filling this questionnaire. Do not write your name.

Questionnaire Code ……Date ……..Hospital…….

Part one: Sociodemographic data

Please give your own answer

S.no	Variables	Possible responses
101.	Age	In years…….
102.	Sex	a. Male b. Female
103.	Qualification level	a. Diploma Nurse b. Bachelor's degree Nurse c. Master's degree Nurse d. Other specify……
104.	Type of ICU where you currently working	a. Medical ICU b. Surgical ICU
105.	Nurse to Patient ratio in your ICU	a. 1 to 1 b. 1 to 2 c. 1 to 3 d. 1 to more than three
106.	Years' of experience in Critical care unit	In years……..
107.	Are you trained specifically in oral care?	a. Yes b. No
108.	If yes, please specify where did you train in oral care?	a. At university as a nursing student. b. In hospital while continuing education programs. c. In educational session held in our unit. d. Other specify……..

Part two: Knowledge

Please encircle your own answer for the following questions from the given alternatives. More than one answer is possible.

Code	Questions	Possible alternatives
201.	When did oral care started after admission in intensive care unit?	a. Immediately b. 1 day c. 2 days d. 3 days
202.	Oral care for unconscious patient should be performed pre day at least.	a. Once b. Twice c. Three times d. More
203.	Oral care for each patient should last for	a. Less than 1 minute b. Between 1 and 5 minutes c. Between 5 and 10 minutes d. More than 10 minutes
204.	The correct position of the patient during doing oral care is	a. Semi fowler b. High fowler's position c. lateral position d. Supine position
205.	The best solution should be used in oral care for intubated patient is	a. Hydrogen peroxide b. Normal saline 0.9% c. Tap water d. Chlorohixedin
206.	Which solution shouldn't be used in oral care for intubated patient	a. Hydrogen peroxide b. Tap water c. Normal saline 0.9% d. Chlorohixedin
207.	Repositioning of ETT and deflating of cuff pressure should perform in order to	a. Avoid skin /mucosal/tracheal break down b. Enhance patient comfort c. Reduce aspiration of oral secretion
208.	The benefits of oral care in ICU	a. Patient comfort b. Local infection prevention c. Systemic infection prevention
209.	What is your source of information	a. Reading related studies and materials of my own

	about oral care?	accord b. Participating in an in-service course in the hospital c. Participating in an in-service course outside of the hospital d. Instructions from senior ICU nurses e. Nursing school f. In-service education at ICU

Part three: Attitude

For questions in this section, please indicate how strongly you agree or disagree with the following statements about oral care by putting mark "X" on your response below.

Code	**Item**	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
301	Oral care is a very high priority					
302	Nurses have enough time to perform oral care task					
303	Cleaning the oral cavity is an unpleasant task					
304	The oral cavity is difficult to clean					
305	Nurses require more supplies or equipment					
306	The mouth of most ventilated patients gets worse no matter what I do					
307	Oral care training is sufficient to perform the task					
308	Nurses have suitable toothbrush					
309	I feel it would be useful to use an oral assessment guide					
310	I'm interested to have further education about recent oral care protocol					

Part four: Practice

For questions in this section, please indicate how strongly you agree or disagree with the following statements about your oral care practice by putting mark "X" on your response below.

Code	Item	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
401	I'm doing oral care at all shifts					
402	I'm doing oral care every 2-4 hrs. at shift					
403	Each time I'm providing oral care it takes 5-7 min for each patient					
404	I'm considering the position of patient during providing oral care					
405	When I'm doing oral care I take into consideration brushing of teeth					
406	When I am doing oral care I take into consideration brushing of gum					
407	When I am doing oral care I take into consideration brushing of tongue					
408	When I am doing oral I care I take into consideration moisturing of lips					
409	I'm deflating cuff pressure of ETT during oral care					
410	An assessment of a patient's oral care needs take place within 24hours of their admission to ICU					
411	I do documentation of assessment					

412. Which of the following tool do you use when carrying out oral care?

a. Adult tooth brush c. Pediatric tooth brush

b. Foam swab d. Gauze and tongue depressor e. other specify……..

413. Which of the following solution do you use when carrying out oral care? More than one answer is possible.

a. Chlorhexidine b. Sodium bicarbonate c. Petroleum jelly d. Toothpaste

e. Lemon water f. Glycerin g. Saline h. Sterile water

Part five; Factors affecting oral care practice

Please identify weather the following factors affect your practice of oral care in ICU or not.

S.no	Variables	Possible answers
501.	Lack of time	a. Yes b. No
502.	Staff shortage	a. Yes b. No
503.	Too much writing tasks	a. Yes b. No
504.	Fear of aspiration	a. Yes b. No
505.	An existing endotracheal tube	a. Yes b. No
506.	lack of equipment	a. Yes b. No
507.	Other specify…….	

Thank you for your participation!