

ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
DEPARTMENT OF NURSING AND MIDWIFERY
DEPARTMENT OF NURSING POSTGRADUATE PROGRAM

**INTENSIVE CARE UNIT NURSE'S KNOWLEDGE, ATTITUDE,
PRACTICE AND ASSOCIATED FACTORS OF ORAL CARE FOR A
PATIENT WITH ENDOTRACHEAL INTUBATION IN PUBLIC
HOSPITALS ADDIS ABABA, ETHIOPIA 2021.**

BY: JABESA ABDISA (BSc)

**THESIS TO BE SUBMITTED TO THE ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES, SCHOOL OF NURSING AND
MIDWIFERY, DEPARTMENT OF NURSING IN PARTIAL
FULFILMENT OF THE REQUIREMENTS FOR A MASTER'S
DEGREE IN CARDIOVASCULAR NURSING.**

MAY, 2021

ADDIS ABABA, ETHIOPIA

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APPROVAL SHEET
ADDIS ABABA UNIVERSITY
COLLEGE HEALTH SCIENCES DEPARTMENT OF NURSING AND
MIDWIFERY

I, the undersigned MSc student, declare that I have submitted my original work on a title intensive care unit nurse's knowledge, attitude, self-report practice and associated factors of oral care for patient with endotracheal intubation in public hospitals Addis Ababa, Ethiopia 2021for the examination.

Submitted by:

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Name of student

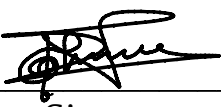
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This thesis work has been submitted for examination with my approval as an advisor.

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APPROVAL BY THE BOARD OF EXAMINATION

This thesis by **Jabesa Abdisa** is accepted in its present form by the board of examiners as satisfying thesis requirement for the degree of masters in **cardiovascular nursing**.

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By my signature below, I declare and affirm that this thesis is my own work. I have followed all ethical principles of scholarship in the preparation, data collection, data analysis and completion of this thesis. All scholarly matter that is included in the thesis has been given recognition through citation. I affirm that I have cited and referenced all sources used in this document. Every effort has been made to avoid plagiarism in the preparation of this thesis.

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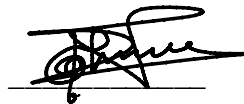
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List of abbreviation and acronyms

AABET	Addis Ababa burn, emergency and trauma
DC	data collectors
FMOH	federal minister of health
ICU	intensive care units
IHRERC	Institutional Health Research, Ethical Review Committee
KAP	Knowledge, attitude, practice
NCDs	non-communicable diseases
NGOs	non-governmental organizations
PI	Principal Investigator
SRS	simple random sampling
Sup	Supervisors
VAP	ventilator associated pneumonia
WHO	World Health Organization

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Abstract

Background: Oral care is basic nursing care that has a paramount impact on patient's general health in a hospitalized patient in general and on intubated patients in particular. There is limited information on the nurse's knowledge, attitude, practice and associated factors of oral care for a patient with endotracheal intubation in Ethiopia.

Objective: The aim of this study is to assess intensive care unit nurse's knowledge, attitude, and self-report and associated factors of oral care for a patient with endotracheal intubation in public hospitals Addis Ababa, Ethiopia 2021.

Method: Institutional-based cross-sectional study was employed. SRS was used to select 306 nurses from four randomly selected hospitals. A Structured and pretested questionnaire was used to collect the data. Cleaned and coded data were entered into Epi-data 4.4.2.1 and exported to SPSS version 25 for analysis. Both descriptive and analytical components were done; all variables that were significant at $p\text{-value} < 0.25$ 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 $p\text{-value} < 0.05$.

Result: The prevalence of intensive care unit nurse's knowledge, attitude, and self-reported practice in the study area is 20.3%, 46.1% and 51.9% respectively. The mean age of the participants was 30.83 ± 3.87 years. Work experience [AOR 0.274, 95%CI: 0.105-0.715], having oral care training [AOR 3.619, 95%CI: 1.698-7.712], having a positive attitude [AOR 2.050, 95%CI: 1.010-4.161], were associated with knowledge while work experience [AOR 5.377, 95%CI: 1.946-14.852] having an adequate number of ICU nurse [AOR 0.514, 95% CI: 0.300-0.881] having good oral care self-reported practice [AOR 2.354, 95%CI: 1.384-4.005] were associated with attitude. Finally, work experience [AOR 4.112, 95 % CI: 1.595-10.597] and having a positive attitude [AOR 2.176, 95 % CI: 1.294-2.659] were associated with self-reported oral care practice.

Conclusion: The overall knowledge, attitude, and practice towards oral care for a patient with endotracheal intubation are inadequate among ICU nurses. Allocation of nurses in ICU, training, and updates should be provided for nurses working in ICU by focusing on those nurses who are less experienced.

Keywords: Intensive care unit, nurse, Addis Ababa, oral care, Ethiopia

1. Introduction

1.1 Background

Oral health is essential to total health and satisfactory quality of life. According to the world health organization (WHO 2012), oral health has been defined 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). Oral diseases share a wide range of intrinsic and extrinsic risk factors with other non-communicable diseases (NCDs), like cardiovascular disease, cancer, diabetes, and chronic respiratory illness. Intrinsic factors include age, sex, and hereditary features, while extrinsic ones comprise an unhealthy diet (particularly, one high in sugars), smoking, and harmful alcohol consumption (2).

Oral hygiene is an important aspect of nursing care in patients on mechanical ventilator and considered as an important factor of general health and it contributes to the quality of life. Oral care is a disease preventive and cost-effective measure for patients, particularly in intensive care units (ICU) patients to prevent ventilator-associated pneumonia (VAP) and other related respiratory diseases. Oral care among critically ill (fully dependent) patients have significant clinical relevance to decrease morbidity and mortality that associated with poor oral hygiene (3-5).

Patients in ICUs frequently require mechanical ventilation to sustain because their ability to breathe unassisted is impaired due to trauma, or as a result of a medical condition or recent surgery. Mechanically ventilated patients who suffer from poor oral hygiene are exposed to the harmful accumulation of oral plaque and the initiation of VAP. These critically ill patients are also dependent on hospital staff to meet their needs for nutrition and hygiene, including oral hygiene. There is a number of factors that associated with poor oral care for intubated patients, study's shows that : inadequacy of resources, knowledge gap in oral care practice, nurse related barriers (perception of nurses and initiative of nurses) are gaps identified (6-8). Nurses are responsible for providing oral care in the hospital; there is limited information on the nurse's knowledge, attitude, practice ,and associated factors of oral care for a patient with endotracheal intubation in Ethiopia in general and in the study area in particular.

1.2 Statement of the problem

Intensive care unit patients will often be incapable of carrying out normal oral hygiene practices, such as tooth brushing themselves, they are entirely dependent on nurses for their oral hygiene needs. In those patients' infections related to micro-inhalation in the trachea of bacterial colonies present in the mouth (9, 10).

In the absence of good oral care endotracheal-tube biofilm formation may play a contributory role in sustaining tracheal colonization and also have an important role in late-onset ventilator-associated pneumonia (VAP) and other respiratory problems caused by resistant organisms on patients with endotracheal intubation (11-13).

Nosocomial pneumonia is responsible for major infection-related mortality and morbidity at the ICU. Up to 50% and more attributable mortality has been reported, depending on the patient case mix and the appropriateness of early antibiotic treatment. The attributable morbidity is reflected by an excess ICU stay of 5–9 days. Moreover, clinically suspected nosocomial pneumonia is an important driver of antibiotic prescription, and consequently of selection pressure on microbial flora (14, 15).

Poor oral health may often lead to several complications in intubated patients. A direct positive relationship between a reduced salivary flow and caries of the teeth has been demonstrated. Stomatitis, which is a painful inflammation of the mucous membranes of the mouth, increases the risk of bacterial translocation and may result in sepsis and subsequent multiple organ failure (16, 17).

Building up of bacterial plaque is followed by the development of oral problem such as gingivitis, inducing a shift at the gingival surface from predominantly *Streptococcus* and *Actinomyces* spp. to aerobic Gram-negative bacilli. If dental plaque is allowed to accumulate, sub gingival inflammation progresses to periodontitis, which has been associated with systemic diseases such as bacteraemia, rheumatoid arthritis, or cardiovascular diseases (17, 18).

Considerable evidence supports the relationship among poor oral health, the oral microflora, and VAP. Micro aspiration of contaminated upper airway secretions along leaks and defects

of the tracheal seal of the cuff is assumed to play a pivotal role in the development of VAP (19).

Even though nurses report oral access and care delivery difficulty in most mechanically ventilated patients as per guide line, nurses assess the need of mouth care within one day of patients' admission and its nurses' responsibility to assess and provide a care for oral cavity. Researches stated that, although oral hygiene is considered to be standard nursing care, nurses often neglect it in critically ill patients or perform it by means of quickly swabbing the mouth. In a survey exploring nurses' oral care practices in 2 ICUs in a London hospital nurses may be hesitant to provide oral care to intubated patients due to the limited access to the oral cavity and the fear of dislodging or displacing the endotracheal tube. In addition to this, nurse have to have a competent knowledge, positive attitude and gorgeous practice toward oral care, the magnitude of intensive care nurse's knowledge, attitude, practice and associated factors of oral care for patient with endotracheal intubation varies from countries to countries (20-22).

The study done in China the average percentage of ICU nurses' knowledge of oral care for patients with endotracheal intubation was 58.8%, in India mean oral health knowledge score was poor. In Eretria 54.4% of nurses' have reported that they have inadequate knowledge towards patients' oral care. The study in Ethiopia, Gondor university (hospital based cross sectional study 2019) shows that nurses knowledge toward oral care was 53.4% (23) (8, 24, 25).

Whereas the magnitude of nurse's attitude is also differing according to the study's in China ICU nurses ranked oral care third in priority, next to physical assessment and bowel and bladder care, in India oral care as a necessity in all critically ill patients, whereas in Ethiopia The majority of nurses, 212 (55.5%) agreed and 49 (12.8%) strongly agreed on the item "all patients should have an oral check-up during admission (23-25).

Regarding the magnitude of nurse's oral care practice in China the percentage of nurses using cotton swabs or foam swabs to perform oral care once or more every 6–8 hours was 32.2%, while 48.3% of them used toothbrushes once or more every 8–12 hours, in Riyadh, Saudi Arabia about 19% of the nurses' toothbrush as part of patient's oral care at their hospital unit and indicated the routine use of 19% indicated use of mouthwashes. The study in Sudan most

of the nurses reported that they performed mouth care twice daily (61%), and the most frequent duration was 2 - 4 minutes in (81.8%) of the participants. Gauze and tongue depressors were the main tools used. Saline, lubricant, and mouth wash were the most commonly used materials (25-27).

Factors that associated with poor oral care for intubated patients as study's shows inadequacy of resources, knowledge gap in oral care practice, nurse related barriers perception of nurses and initiative of nurses are gaps identified (4).

Proper oral care is the most important thing to prevent VAP and improve patient's quality of life. However, little is known about intensive care unit nurse's knowledge, attitude, practice and associated factors of oral care for patients with endotracheal intubation in Ethiopia. Therefore, this study will be aimed to assess ICU nurses KAP and associated factors in public hospitals Addis Ababa, Ethiopia.

1.3 Significance of the study

This study will provide valuable information about ICU nurses knowledge, attitude, practice and associated factors regarding oral care for intubated patients in public hospitals in Addis Ababa, Ethiopia. The information obtained can form a basis for federal ministry of health, Addis Ababa health bureau, locally available non-governmental organisations (NGOs), and other stakeholders to plan for development of strategic interventions and also it can bring fundamental change in nursing practice to improve oral care for patient on mechanical ventilator and help hospitals to develop protocol on oral care for patients with endotracheal intubation.

This study also will be used as a base for other researchers who are interested to conduct the research on related topic and it will provide support and promote cooperation among different stakeholders towards the initiation of oral care and in the study area or other similar circumstances in different parts of the country.

Based on literatures oral care for patients with endotracheal intubation is the mandatory and essential responsibility of ICU nurses; however, this practice is neglected due to various reasons these indicate the inconsistency between nurse's knowledge, attitude and practice.(26, 28, 29)

Therefore, it's mandatory to assess intensive care unit nurse's knowledge, attitude, self-report and associated factors of oral care for patient with endotracheal intubation in public hospitals Addis Ababa, Ethiopia that can help nurses to develop common and applicable oral care guideline for patients with endotracheal intubation.

2. Literature review

2.1 Knowledge of nurses toward oral care for patients with endotracheal intubation.

Knowledge of intensive care unit nurses toward oral care for intubated patients are the core part of nursing care to prevent ventilator related oral and respiratory diseases and for better comfort of patients.

The study done in China in 2011 shows that the average percentage of ICU nurses' knowledge of oral care for patients with endotracheal intubation was (good) 58.8% (25).

The study in India in 2019 on nurse's oral health knowledge, attitude and practices among nurses in a tertiary care hospital, shows that most nurses were aware of the importance of oral care among inpatients and the effect of poor oral hygiene and systemic diseases have on oral health. Deficiencies in knowledge were prevalent in areas including common medications that affect oral health and regarding care of dentures (23).

In south Africa the study conducted in 2011 shows oral care knowledge of intensive care nurses responses shows that nurses are generally aware of current evidence that aspiration of oropharyngeal secretions is a risk factor for VAP and other aspirational respiratory diseases (28).

The study in Sudan (an observational, cross-sectional study 2015) shows the majority of nurses 97.4% stated that provision of oral care in ICU is important for infection prevention, while 1.3% of them related its importance to patient comfort, 1.3% did not know why mouth care is important for ICU patient (27).

Study in Eritrea shows (a cross-sectional design 2020) 54.4% of nurses' have inadequate knowledge towards patients' oral care and knowledge gap is identified as one barrier to deliver good oral care for patients (8).

The study in Ethiopia, Gondar university (hospital based cross sectional study 2019) shows that nurses knowledge toward oral care was 53.4% (24).

2.2 Attitude of nurses toward oral care for patients with endotracheal intubation.

Attitude of nurses toward oral care for patients with endotracheal intubation can influence the outcome of patients during and post endotracheal intubation.

Study in Pakistan (hospital based cross sectional study 2020) shows that 54(66.7%) nurses disagreed that there were more important tasks to do for unstable patients than oral care (30).

In India (hospital based cross sectional study 2020) shows that nurse's attitude toward oral care shows that majority of the participants perceived oral care as a necessity in all critically ill patients (31).

The study in South Africa shows almost all the nurses (quantitative, prospective, cross-sectional 2011) perceived oral care as a high nursing priority. Thirty-nine nurses (40.6%) found cleaning the mouth an unpleasant task and 46 (47.9%) found it a difficult task to perform. Over half of the participants (57.3%, N=55) found that the mouths of ventilated patients became worse the longer they were ventilated, no matter what the nurses did (28).

The study in Sudan (an observational, cross-sectional study 2015) shows that, nurses who had negative attitude towards mouth care for ICU patients were in the minority (2.6%), while the majority (97.4%) of ICU nurses perceived oral care as a high nursing priority (27).

The study in Ethiopia, Gondar university (hospital based cross sectional study 2019) shows that two hundred nineteen (57.3%) participant scored median and above and was considered as having a positive attitude while (42.7%) participants scored below the median, and was considered as having a negative attitude towards patients' oral care. The majority of nurses, 212 (55.5%) agreed and 49 (12.8%) strongly agreed on the item "all patients should have an oral check-up during admission". Regarding the item "oral care is difficult", the majority of nurses 204 (53.4%) responded disagree. Around 260 (68%) of the participants responded agree and above on the item "oral care is one daily task of nurses" while 80 (20.9%) responded disagree (24).

2.3 Practice of nurses toward oral care for patients with endotracheal intubation.

A quantitative, cross sectional study conducted in services hospital Lahore; Pakistan (2017) involves 222 registered nurses shows that practice level was poor < 60%. Majority of nurses do not perform oral care and give it less priority. Oral hygiene care is often missed and neglected care (29).

The study in China (hospital based cross sectional study 2011), shows that the percentage of nurses using cotton swabs or foam swabs to perform oral care once or more every 6–8 hours was 32.2%, while 48.3% of them used toothbrushes once or more every 8–12 hours, stroke ICU nurses had the highest frequency of performing oral care for intubated patients compared with medical or surgical ICU nurses, while surgical ICU nurses performed oral care more frequently than medical ICU nurses did (25).

According to a cross-sectional survey in Riyadh, Saudi Arabia 2018 shows almost 77% of participants reported that nurses are the ones who provide oral care for patients at their hospital units. 3% indicated that oral care is provided by patient's relatives and 8% by the patient himself/herself. Participants were asked about the daily frequency of providing oral care at their hospital units. Responses were as follow: 12.4% not at all, 24.3% once a day, 25.2% twice a day, 26.1% three times a day, and 10.6% $\geq$ more than three times a day. About 19% of the nurses indicated the routine use of toothbrush as part of patient's oral care at their hospital unit and 19% indicated use of mouthwashes (26).

The study in South Africa shows almost all the nurses (quantitative, prospective, cross-sectional 2011), both the type and frequency of oral care provision varied among the participant's mouthwash was used by all but 9 nurses who answered the question, with almost two-thirds of the nurses (64.1%) rinsing their patients' mouths 8-hourly or more frequently. A variety of mouthwashes were used, with 28 participants (30.4%) using more than one type. Thirty nurses (32.6%) stated that they used chlorhexidine exclusively. Of those using one type of mouthwash only, 7 (7.6%) used over-the-counter solutions, 12 (13.0%) used alcohol-free solutions, 4 (4.3%) used povidone-iodine solutions, 9 (9.8%) used glycothymoline, and 1 (1.1%) reported using normal saline. Peroxide was not used by any of the Nurses in this study. Foam toothpastes/gauze swabs, which are often used in combination

with mouthwash, were used at least once a day by 57.6% of the nurses (N=53). Nearly two-thirds of the nurses (63.0%, N=58) indicated that they used manual toothbrushes at least daily, while only 4.3% (N=4) reported using an electric toothbrush. Toothpaste was available to 60.9% (N=56) of those using toothbrushes (28).

The study in Sudan (an observational, cross-sectional study 2015) shows that most of the nurses reported that they performed mouth care twice daily (61%), and the most frequent duration was 2 - 4 minutes in (81.8%) of the participants. Gauze and tongue depressors were the main tools used. Saline, lubricant, and mouth wash were the most commonly used solutions (27).

2.4 Factors associated with ICU nurse's knowledge, attitude and practice of oral care for patients with endotracheal intubation.

2.4.1 Factors associated with ICU nurse's knowledge toward oral care for patients with endotracheal intubation.

Socio-demographic related factors

The study in Ethiopia, Gondar University (hospital based cross sectional study 2019) shows that the bivariate analysis age, sex, level of education, year of experience were associated with knowledge about oral care. The odds of having good knowledge for those degree holders and above were 5 times more likely to have good knowledge as compared to that of diploma holder nurses (24).

Personal related factors

In China Study findings show that nurses who have more resources for learning about oral care have greater knowledge about it and provide oral care to intubated patients more frequently to prevent VAP, and those who do not have access to learn about oral care have shown little knowledge of oral care (25). A quantitative, cross sectional study conducted in services hospital Lahore, Pakistan (2017) involves 222 registered nurses shows there is need to improve nurse's knowledge to promote quality care provided to patients by involving them in educational and training programs (29).

The study in Ethiopia, Gondor university (hospital based cross sectional study 2019) shows that the bivariate analysis level of education, year of experience were associated with knowledge about oral care (24).

Institutional related factors

A quantitative, cross sectional study conducted in services hospital Lahore, Pakistan (2017) also suggested that evidence based practice should be encouraged and written oral care protocols must be followed by nurses to improve knowledge of nurses (29). The study in Ethiopia, Gondar university (hospital based cross sectional study 2019) shows the bivariate analysis, the presence of protocol or guideline tool about oral care, working unit, and teeth and collaboration with the dentist and oral hygienists were associated with knowledge (24).

2.4.2. Factors associated with ICU nurse's attitude toward oral care for patients with endotracheal intubation.

Socio-demographic related factors

A cross-sectional survey in Riyadh, Saudi Arabia 2018 shows that gender and nationality were the most important predictors of a positive attitude (26). The study in Ethiopia in the bivariate logistic regression analysis marital status, level of education, were associated with an attitude of nurses towards patients' oral care variables with p-value 0.2 were entered into the multivariable logistic analysis (24).

Personal related factors

A quantitative, cross sectional study conducted in services hospital Lahore, Pakistan (2017) involves 222 registered nurses shows there is a need to improve nurse's attitude to promote quality care provided to patients by involving them in educational and training programs (29). A cross-sectional survey in Riyadh, Saudi Arabia 2018 shows previous training were the most important predictors of a positive attitude (26). The study in Ethiopia, Gondar University (hospital based cross sectional study 2019) shows odds of having a positive attitude for those who were trained about oral care is 3.54 times more likely have a positive attitude as compared to for those who did not take about oral care. Also in multivariable logistic regression analysis level of education, year of experience and training were statistically significant factors of attitude (24).

Institutional related factors

The study in Ethiopia shows enough staff and presences of assessment tools were associated with an attitude of nurses towards patients' oral care Variables with p-value 0.2 were entered into the multivariable logistic analysis (24). A quantitative, cross sectional study conducted in services hospital Lahore, Pakistan (2017) also suggest suggested that Evidence based practice should be encouraged and written oral care protocols must be followed by nurses to improve attitude of nurse (29).

2.4.3 Factors associated with ICU nurse's practice toward oral care for patients with endotracheal intubation.

Socio-demographic related factors

The study in Canada 2020 With regard to the relationship between socio-demographic characteristics and the intention to deliver oral care to intubated patients; it appeared that gender shows significant association with practice of oral care (7).

Personal related factors

The study in Canada 2020 characteristics and the intention to deliver oral care to intubated patients, previous oral care training had an influence on the level of intention to practice oral care. A cross-sectional survey in Riyadh, Saudi Arabia 2018 shows about 56.2% of participants did not receive training on oral assessment and provision of oral care and a few nurses (2%) received training on oral care at their current job place. A large proportion of nurses (44%) expressed a desire to undergo training on oral care of hospitalized patients.(26) A quantitative, cross sectional study conducted in services hospital Lahore, Pakistan (2017) involves 222 registered nurses shows there is need to improve practices to promote quality care provided to patients by involving them in educational and training programs (7, 29).

Institutional related factors

Study in America Croatia, (cross-sectional questionnaire 2014) survey of ICU nursing staff members of 14 public hospitals (6 large) in all parts of Croatia shows that lack of time due to inadequate staffs as the main barrier to provision of oral care (32). The study in South Africa (quantitative, prospective, cross-sectional 2011) participants were asked whether the unit in which they worked had an oral care protocol or guideline available. Thirty-two nurses (33.3%) acknowledged the availability of such a document in their unit, 50 (52.1%) stated that they had no oral care protocol/guideline available, and 14 (14.6%) were unsure as to whether such a document existed in their area and shows as it affect nurses practice (28). A quantitative, cross sectional study conducted in services hospital Lahore, Pakistan (2017) also suggest suggested that Evidence based practice should be encouraged and written oral care protocols must be followed by nurses to improve practice of nurse (29).

2.5 Conceptual framework

Depending on the review of the literatures, socio-demographic factors (marital status, age and gender of the participants), Personal related factors, oral care training, level of education and Institutional related factors such as; staff numbers, presence of oral care protocol, oral care assessment tools, in service oral care training are associated factors those affects oral care for patients with endotracheal intubation. The direction of the relationship between outcome variable (oral care for patients with endotracheal intubation) and explanatory variables are illustrated on figure 1.

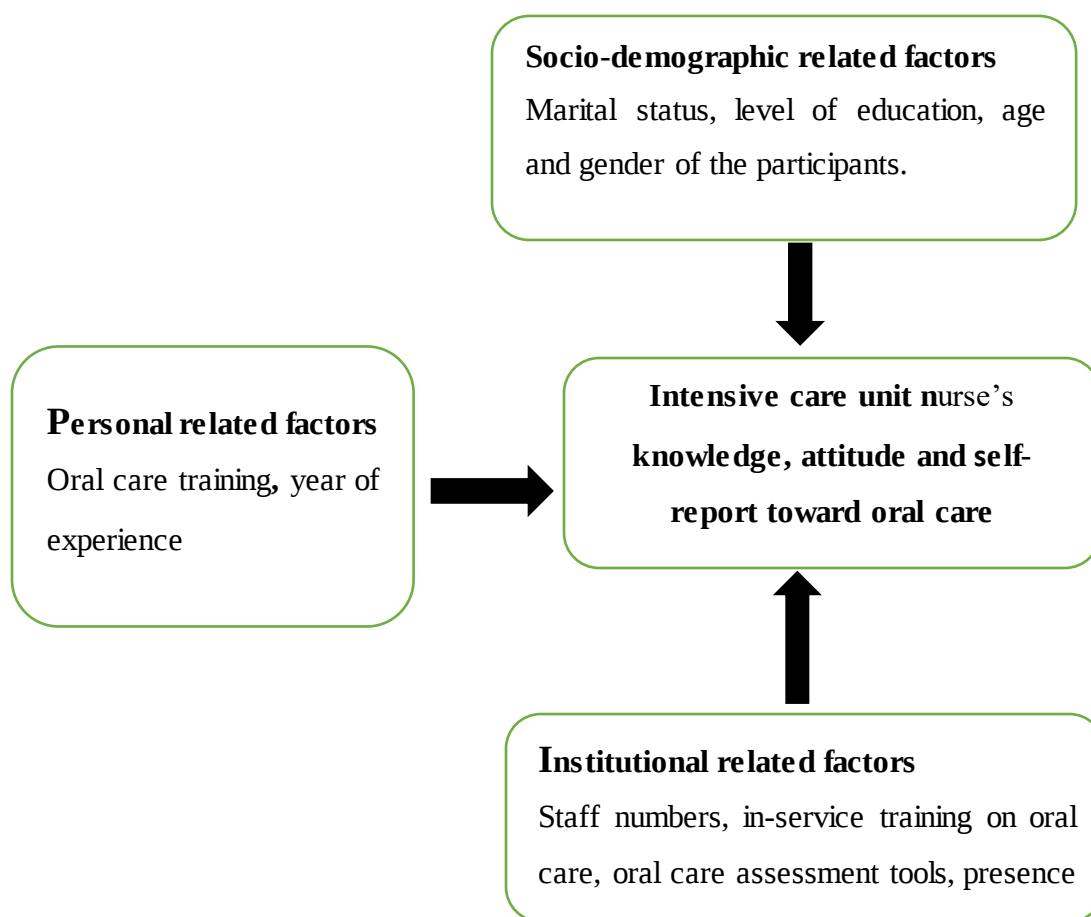


Figure 1: Conceptual frame- work to assess intensive care unit nurse's knowledge, attitude, self-report practice and associated factors of oral care for patient with endotracheal intubation in public hospitals, Addis Ababa Ethiopia 2021. (Adapted and modified from different literatures,(24, 25, 29, 33)

3. Objectives

3.1 General objectives

- To assess intensive care unit nurse's knowledge, attitude, self-report practice and associated factors of oral care for patients with endotracheal intubation in public hospitals Addis Ababa, Ethiopia 2021.

3.2 Specific objectives

- To assess intensive care unit nurse's knowledge about oral care for patients with endotracheal intubation in public hospitals Addis Ababa, Ethiopia 2021.
- To assess intensive care unit nurse's attitude about oral care for patients with endotracheal intubation in public hospitals Addis Ababa, Ethiopia 2021.
- To assess intensive care unit nurses self-report practice about oral care for patients with endotracheal intubation in public hospitals Addis Ababa, Ethiopia 2021.
- To identify factors associated with nurse's knowledge toward oral care for patients with endotracheal intubation in public hospitals Addis Ababa, Ethiopia 2021.
- To identify factors associated with nurse's attitude toward oral care for patients with endotracheal intubation in public hospitals Addis Ababa, Ethiopia 2021.
- To identify factors associated with nurse's self-report practice toward oral care for patients with endotracheal intubation in public hospitals Addis Ababa, Ethiopia 2021.

4. Methodology

4.1 Study area and period

The study was conducted in Addis Ababa city from January –June /2021. Addis Ababa is the capital city of Ethiopia and the African Union and is often called the "African Capital" Located in the foothills of the Entoto Mountains and standing 7,726 feet (2,355 meters) above sea level. It is located in the geographic center of the country. The total population in Addis Ababa is 6.6 million populations according to the report of 2017(34). The city is home to 23.8 percent of all urban dwellers in Ethiopia, and has an estimated density of 5936.2 per square kilometre. It is the 106th largest urban area in the world, according to demographer. (34, 35)

Currently, Addis Ababa has 12 publics and more than 40 private hospitals. Many of the later were built in the past 21 years. Black Lion hospital is the largest referral hospital in the country. In the year 2010/11 all state run hospitals in Addis Ababa have admitted more than 1.2 million patients. (36)



Figure 2: Map of Addis Ababa city to assess the knowledge, attitude, self-report practice and associated factors of ICU nurses toward oral care for patient with endotracheal intubation in selected public hospitals in Addis Ababa, Ethiopia 2021.

4.2 Study design

The institutional-based cross-sectional study was used.

4.3 Populations

4.3.1 Source population

All intensive care unit nurses' working in public hospital in Addis Ababa, Ethiopia in 2021.

4.3.2 Study population

All intensive care unit nurses' those who were working in randomly selected public hospital in Addis Ababa during the study period in 2021.

4.3.3 Sampling population

Systematically selected intensive care unit nurses working in randomly selected public hospital in Addis Ababa during the study period in 2021.

4.3.4 Study subject

Individual intensive care unit nurses' working in randomly selected public hospital in Addis Ababa during the study period in 2021.

4.3.5 Inclusion and Exclusion criteria

Inclusion Criteria

Nurses who have worked in intensive care unit for more than six months.

Nurses who have at least six months of experience in nursing profession.

Exclusion criteria

Nurses who were not available during the time of the study (annual, maternal, sick leave)

Nurses those with serious illnesses.

4.4 Sample Size Determination and Sampling technique

4.4.1 Sample size determination

Sample size was calculated using a formula for single population proportion considering the following assumptions. Confidence level = 95%, Critical value $Z_{\alpha/2} = 1.96$, Degree of precision $d = 0.05$. The proportion $(p) = 0.5$ (no study in Ethiopia concerning Intensive care

unit nurse's knowledge, attitude, practice and associated factors of oral care for patient with endotracheal intubation).

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

n = the minimum sample size required,

p= estimated proportion of knowledge, attitude, practice and associated factors of ICU nurses toward oral care for patient 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%,

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

Total number of nurses in the intensive care unit of all public hospitals were (N)= **1005**.

Population correction formula; were used since the target population is less than 10,000.

$$n_{final} = \frac{n}{1 + \frac{n}{N}}$$

$$n_{final} = \frac{384}{1 + \frac{384}{1005}} = 277.85 \approx 278$$

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

4.4.2 Sampling technique

Four (4) hospitals out of 12 public hospitals found in the Addis Ababa were selected randomly. (Tikur Anbessa Specialized Hospital, St. Paul millennium medical College with AABET, St Peters specialized hospital, and Yekatit 12 hospital) were selected using simple random sampling (SRS). Then, eligible individuals (nurses who meet the inclusion criteria) were identified and documented to get complete frame of the study population among randomly selected hospitals. Then, the total sample size was allocated by probability proportional to size to each hospital based on the number of ICU nurses they have.

$$ni = \frac{n \times Ni}{N}$$

Where; ***ni*** = the sample size of the i^{th} hospital

Ni = population size of the i^{th} hospital

$n = n_1 + n_2 + \dots + n_4$ is the total sample size = **306**

$N = N_1 + N_2 + \dots + N^{\text{th}}$ - is total population size of the randomly selected hospital = **827**

The total number of intensive care unit nurse's in randomly selected hospitals is **827**. Hence, the sample size proportion was allocated to each hospital based on the given proportional allocation formula. For hospital 1 St. Paul Millennium Medical College with AABET, the total number of intensive care unit nurses are 360, then the number of nurses those selected for the study are calculated as $360 \times 306 / 827 = \mathbf{133}$, for hospital 2 (St Peters specialized hospital), $180 \times 306 / 827 = \mathbf{67}$, for hospital 3 (Yekatit 12) $97 \times 306 / 827 = \mathbf{36}$ and for hospital 4, (Tikur Anbessa Specialized Hospital) $190 \times 306 / 827 = \mathbf{70}$.

Three hundred six (**306**) nurses were enrolled in the study using simple random sampling.

Then finally, the required numbers of participants were enrolled in the study using systematic sampling.

4.4.3 Sampling procedure

Four government hospitals in Addis Ababa (Tikur Anbessa Specialized Hospital, St. Paul millennium medical college with AABET, St Peters specialized hospital, hospital and Yekatit 12 hospital) are selected using simple random sampling (SRS). The sample size proportionally allocated to each hospital based on the number of ICU nurses working in the hospitals. Finally, SYRS/Systematic random sampling were used to select the nurses from each hospital.

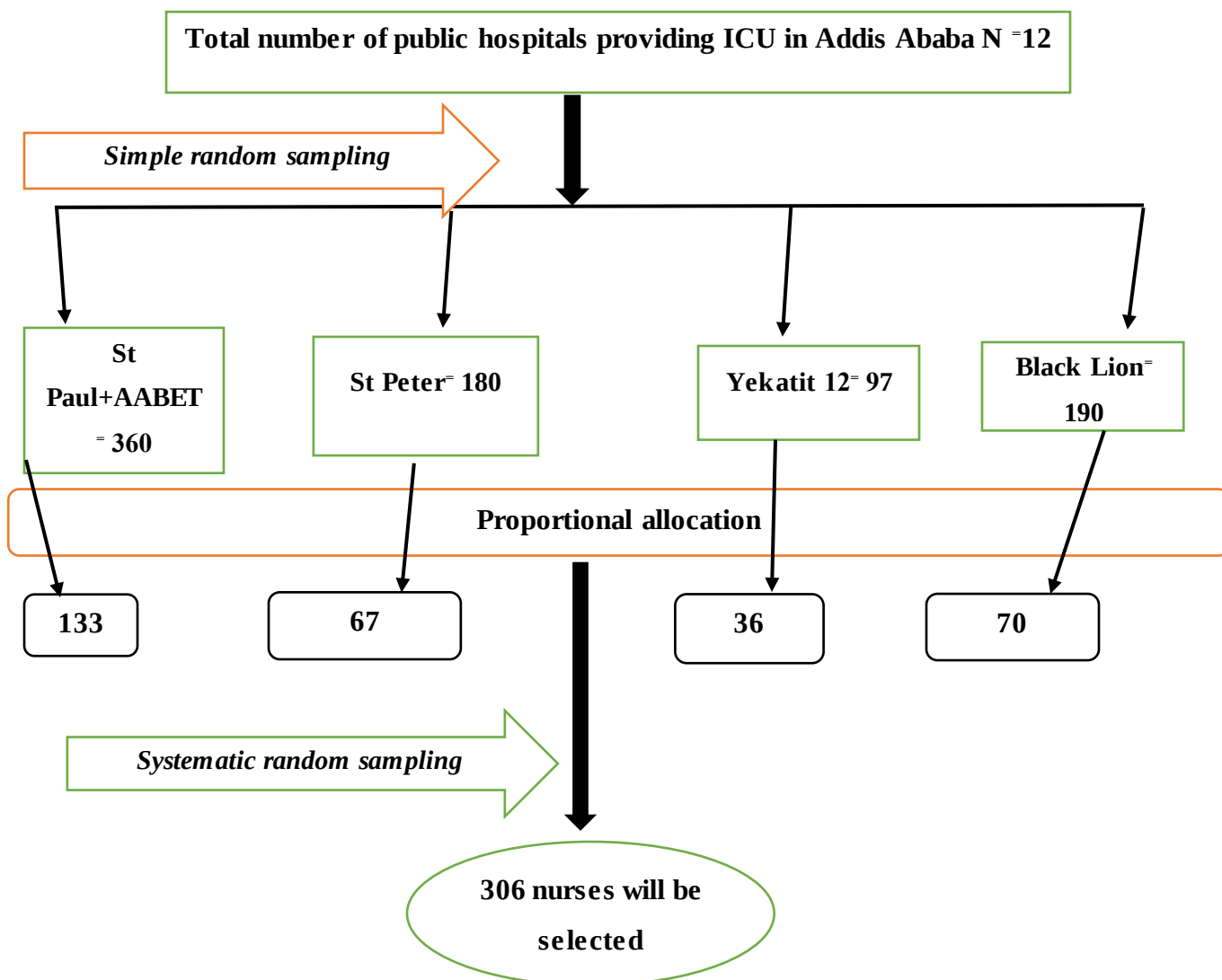


Figure 3: Schematic presentation of sampling procedures to assess the knowledge, attitude, self-report practice and associated factors of intensive care unit nurses toward oral care for patient with endotracheal intubation in public hospitals in Addis Ababa, Ethiopia 2021.

4.5 Data quality Assurance

Structured and pretested questionnaire were used and training were 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 diploma and above recruited from selected hospitals. Pre-test were conducted on 24 nurses working in Zewuditu hospital before the actual data collection begins and necessary corrections made on the questionnaire. The collection of data was checked by principal investigator on daily basis for any incompleteness and /or inconsistency.

4.6 Ethical consideration

Ethical clearance and approval will be obtained from Addis Ababa University, College of health sciences, school of nursing and midwifery. Permission to conduct the research will be obtained from each hospital institutional review board of the hospitals involved in the study. In addition, after explanation of the objective of the study, consent were obtained from those who were meet the inclusion criteria and agreed to participate. Furthermore, affirmation that they could be free to withdraw consent and discontinue participation without any form of prejudices was made. Confidentiality of information and privacy of participants were assured for all the information provided.

4.7 Dissemination of the results

First, the studies were presented to the community of the Addis Ababa University on the open defence of the Master's thesis. Then the findings of the study were submitted to Addis Ababa University, Addis Ababa health biro. Finally, the thesis, findings will be published in a scientific journal.

4.8 Study Variables

Dependent variable:

- Intensive care unit nurse's knowledge
- Intensive care unit nurse's attitude
- Intensive care unit nurse's self-report practice toward oral care for patient with endotracheal intubation.
- Factors associated with ICU nurses knowledge, attitude and self-reported practice.

Independent variables

- **Socio-demographic related factors:** Marital status, level of education age and gender of the participants.
- **Personal related factors:** Oral care training, monthly income and year of experience.
- **Institutional related factors:** Staff numbers, presence of oral care protocol, oral care assessment tools and in-service training on oral care.

4.9 Operational definition

The study material is adapted and modified from different literatures, they are: study done in China on 2011 "Critical care nurses' knowledge, attitudes and practices of oral care for patients with oral endotracheal intubation", study in Egypt 2016 "Nurses knowledge, attitude and practice toward mouth hygiene among critical ill patients 'and study in Eritrea "Do nurses have barriers to quality oral care practice at a generalized hospital care in Asmara, Eritrea? A cross-sectional study in 2020. And interpreted as follows.(8, 25, 37)

Oral care Self-report practice- Good practice is if the nurses total self-report practice score is greater than or equal to 60%. while poor practice is if the nurses score below 60% of the total Self-report practice questions designed to measure nurses practice toward oral care(37).

Attitudes regarding to oral care – Positive attitude is if the nurses total attitude score is greater than or equal to 60% of the total attitude question, while negative attitude is if the nurses total attitude score is below 60% of the total attitude question designed to measure nurses attitude toward oral care (37).

Oral care Knowledge - Good knowledge is if the nurses total knowledge score is above the median of total knowledge question, while low knowledge is if the nurses total knowledge

score is equal or below the median of total knowledge question designed to measure nurses knowledge toward oral care (37).

Chlorohexidine: It belongs to a class of drugs known as antimicrobials. It works by decreasing the amount of bacteria in the mouth, helping to reduce swelling and redness of the gums and bleeding when you brush. Chlorhexidine remains the gold standard to which other antiplaque and gingivitis agents are compared. Its effectiveness can be attributed to its bactericidal and bacteriostatic effects and its substantivity within the oral cavity (38).

Intensive care unit nurse: are the nurses with a focus on the utmost care of the critically ill or unstable patients following extensive injury, surgery or life threatening diseases (39).

Sodium chloride: Rinsing the mouth with sodium chloride (NaCl) solution is believed to promote healthy gum and improve oral ulcer healing (40).

Hydrogen peroxide: Hydrogen peroxide generated by viridians group streptococci has an antagonistic effect on many bacterial species, including a number of pathogens, in the oral cavity environment (41).

Serious illness- is a health condition that carries a high risk of mortality and either negatively impacts a person's daily function or quality of life, or excessively strains their caregivers (21).

Sodium bicarbonate: Sodium bicarbonate as an oral rinse has been more commonly utilized in oral hygiene regimens in intensive care patients. Effective oral hygiene has been proposed as a key factor in the reduction of dental plaque colonization and subsequent development of ventilator associated pneumonia (VAP) (42).

5. Materials

5.1 Data collection tools and techniques

The data was collected from the study participants using pretested and structured questionnaire and observational checklist which was adapted and modified from different studies. Participants information on Socio-demographic variables (gender, age, educational status, marital status), about oral care cleaning solutions and its characteristics, opinion on the priority of various nursing oral care activities, nursing treatment, ranking the importance of oral care as were considered. And also frequency and ways of performing oral care practice were collected (8, 25, 37).

5.2 Data Collection Procedure

Structured self-administered questionnaire and observational checklist were used to collect data. The data collection procedure was conducted over a period of one month facilitated by five experienced and trained data collector nurses and supervised by three supervisors and principal investigator (PI).

5.3 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 $p\text{-value} < 0.05$ in binary logistic regression analysis were candidate 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 $p\text{-value} < 0.05$. The results were presented by tables and figures.

6. Result

6.1. Socio-demographic characteristics of the study participant

Out of the total sample size (306), 295 ICU nurses were enrolled in the study yielding a response rate of 96.40%. Around 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 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.

Table 1: Socio-demographic related characteristics of of the study participant. (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
	Diploma	1	.3
Education level	BSc degree	255	85.9
	Master's degree	39	13.1

6.2 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 work experience and 48 (16.2%)have greater than 5 years of working experience respectively. A high the proportion of participant's254 (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: Personal related characteristics of the study participant. (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

6.3 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 half 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 says they 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: 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

6.4 Knowledge, Attitude and self-reported practice of the study participants.

From the total knowledge question asked 235 (79%) of the participants scored below the median and considered having poor knowledge of oral care. While from the total Attitudes question asked 136 (46.1%) of the participants scored above 60% of total attitude question and considered having positive attitude toward oral care. Regarding Oral care practice from the total self-report oral care practice question asked 153 (51.9%) of the participants scored above 60% of total self-report oral care practice question and considered having good practice of oral care.

Table 4: Oral care knowledge, attitude and self-reported practice of the study participants. (n=295)

		Frequency	Percentage	Mean	SD
Knowledge level	Poor	235	79.7%	20	0.403
	Good	60	20.3%		
Attitude level	Negative	159	53.9%	46	0.499
	Positive	136	46.1%		
Self-reported practice level	Poor	142	48.1%	52	0.501
	good	153	51.9%		

SD: Standard deviation

6.5 Factors associated with oral care knowledge of participants

In bi-variable logistic regression, age of the participants, work experience, oral care training, level of attitude, and level of practice were associated with knowledge of participants. In multi-variable variable logistic regression work experience, oral care training and level of attitude were associated with the knowledge of participants. Those ICU nurses who have greater than 5 years of working experience were 73% less likely to have poor knowledge about oral care for patients with endotracheal intubation [AOR 0.274, 95%CI:0.105-0.715] than those ICU nurses who have 6 months to 3 years of work experience. Those ICU nurses who have oral care training were 3.6 were more likely to have good knowledge about oral care for patients with endotracheal intubation [AOR 3.619, 95%CI: 1.698-7.712] when compared to those who have no training on oral care for patients with endotracheal intubation. Those nurses who have a positive attitude toward oral care were 2 times more knowledgeable [AOR 2.050, 95%CI: 1.010-4.161] than those nurses who have a negative attitudes toward oral care.

Table 5: Factors associated with oral care knowledge of the study participants. (n=295)

Variable	Category	Level of knowledge		COR (95% CI)	AOR(95% CI)	P-value
Age		Good	Poor			
	20-30	35 (15.8%)	186 (84.2%)	1	1	
	30-40	23(32.9%)	47 (67.1%)	2.601(1.405-4.814)	1.709(0.81-3.609)	0.160
	>40	2 (50%)	2 (50%)	5.314(0.724-38.992)	1.751(0.220-13.951)	0.597
Work experience	6 month-3 years	28(17.8%)	129(82.2%)	1	1	
	3 years-5 years	10 (%11.1)	80 (88.9%)	0.576 (0.266-1.249)	0.589(0.244-1,421)	0.239
	> 5 years	22 (45.8%)	26(54.2%)	3.898(1.937-7.847)	0.274(0.105-0.715)	0.008*
Training on oral care	YES	17(41.5%)	24(58.5%)	3.476 (1.722-7.017)	3.619(1.698-7.712)	0.001*
	NO	43(16.9%)	211(83.1%)	1	1	
Attitude level	Positive	42(30.9%)	94(69.1%)	3.500(1.900-6.446)	2.050(1.010-4.161)	0.047*
	Negative	18(11.3%)	141(88.7%)	1	1	
Self-reported practice level	Good	43(28.1%)	110(71.7%)	2.874(1.551-5.328)	2.026(0.994-4.130)	0.52
	Poor	17(12.0%)	125(88.0%)	1	1	

NB: AOR= Adjusted odds ratio, COR= Crude odds ratio, CI= Confidence interval,

* Statistically significant

6.6 Factors associated with oral care attitude of participants

In bi-variable logistic regression age of the participants, marital status, work experience, having an adequate number of ICU nurses, levels of knowledge, and level of practice, were associated with an attitude of the participant. In multi-variable variable logistic regression work experience, having an adequate number of ICU nurses, level of knowledge, and level of practice were associated with an attitude of participants. Those ICU nurses who have greater than 5 years of working experience had 5.3 times more positive attitude about oral care for patients with endotracheal intubation [AOR 5.377, 95%CI: 1.946-14.852] than those ICU nurses who have 6 months to 3 years of work experience. In this study, those ICU nurses who have an adequate number of ICU nurses have 50% less likely to have negative attitude [AOR 0.514, 95% CI: 0.300-0.881] than those who have no adequate number of ICU nurses. The study also revealed nurses who good practices have 2.3 times positive attitude [AOR 2.354, 95%CI: 1.384-4.005] than those ICU nurses who have poor practice on oral care.

Table 6: Factors associated with oral care attitude of the study participants (n=295)

Variable	Category	Level of attitude		COR(95% CI)	AOR(95% CI)	P-value
Age		Positive	Negative			
	20-30	88 (39.8%)	133 (60.2%)	1	1	
	30-40	62 (32.4%)	26(37.1%)	2.558(1.469 - 4.454)	1.033(0.521-2047)	0.926
	>40	4 (100%)	0 (0.0%)	1	1	
Marital status	Single	52(36.9%)	89(63.1%)	1	1	
	Married	83(54.2%)	70(45.8%)	2.029(1.272-3.238)	1.356(0.787-2.339)	0.273
	Divorced	0(0.0%)	1(100%)	1	1	
Work experience	6 month-3 years	56(35.7%)	101(64.3%)	1	1	
	3 years-5 years	38(42.2%)	52(57.8%)	1.318(0.775-2.241)	0.058(0.586-1.910)	0.852
	> 5 years	42(87.5%)	6(12.4%)	12.625(5,053-31.541)	5.377(1,946-14852)	0.001*
Adequate number of ICU nurses 1:1	Yes	43(33.6%)	85(66.4%)	403(0.250-0.649)	0.514(0.300-0.881)	0.015*
	No	93(55.7%)	74(44.3%)	1	1	
Self-reported practice level	Good	92(60.1%)	61(39.9%)	3.359(2.077-5.433)	2.354(1.384-4.005)	0.002*
	Poor	44(31%)	98(69%)	1		
Level of knowledge	Good	42(70%)	18(30%)	3.500(1.900-6.446)	2.385(1.170-4.859)	0.17
	Poor	94(40%)	141(60%)	1	1	

NB: AOR= Adjusted odds ratio, COR= Crude odds ratio, CI= Confidence interval,

* Statistically significant

6.7 Factors associated with oral care self-reported practice of participants

In bi-variable logistic regression, age of the participants, work experience, oral care training, level of knowledge and level of attitude was associated with the self-reported of participants. In multi-variable variable logistic regression work experience and level of attitude was associated with self-reported of participants. Those ICU nurses who have greater than 5 years of working experience have 4.1 times good practice on giving oral care for patients with endotracheal intubation [AOR 4.112, 95 % CI: 1.595-10.597] than those who have 6 months to 3 years working experience. While those nurses who have a positive attitude toward oral care have 2.1 times good oral care practice [AOR 2.176, 95 % CI: 1.294-2.659] than those who have negative attitude toward oral care.

Table 7: Factors associated with oral care self-reported practice of the study participants.
(n=295)

Variables	Category	Self-reported level	practice	COR(95% CI)	AOR(95% CI)	P-value
Age		Good	Poor			
	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)	0.003*
Level of attitude	Positive attitude	92(67.6%)	44(32.4%)	3.359(2.077-5.433)	2.176(1.294-2.659)	0.003*
	Negative attitude	61(38.4%)	98(61.6%)	1	1	
Level of knowledge	Good knowledge	43(71.7%)	17(28.3%)	2.874(1.551-5.328)	1.858(0.935-3.690)	0.77
	Poor knowledge	110(46.6%)	125(53.2%)	1	1	

NB: AOR= Adjusted odds ratio, COR= Crude odds ratio, CI= Confidence interval,
* Statistically significant

7. Discussion

The aim of this study is to assess intensive care unit nurse's knowledge, attitude, and self-reported practice and associated factors of oral care for patients with endotracheal intubation in public hospitals Addis Ababa, Ethiopia 2021. Around half of the study participants (49.8%) were male. High proportions (74.9%) of the respondents were within the age group of 20-30 years with a mean age of 30.83 ± 3.87 and (51.5%) of the study participants were married. The majority (85.9%) of the respondents were BSc holders, while 39 (13.1%) of the participants have master's degrees.

Oral care knowledge for patients with endotracheal intubation

The prevalence of intensive care unit nurses knowledge in this study is lower in terms of knowledge when compared with the study done in China (58.8%) and Egypt (64%). This difference may be due to having standardized nursing care and health care system in the developed country particularly in China. Those ICU nurses who have greater than 5 years of working experience were 73% less likely to have poor knowledge about oral care for patients with endotracheal intubation than those ICU nurses who have 6 months to 3 years of work experience. This might be due to long time exposure to different nursing practice and procedures help nurses to develop good knowledge toward oral care. In this study we discover that those participants who have oral care training were more likely to have good knowledge about oral care. The same study was done in Eritrea in which inadequate knowledge is observed were those in charge like matron, assistant matrons, and supervisors did not take any training for more than 25 years. Those nurses who have a positive attitude toward oral care were 2 times more knowledgeable than those nurses who have a negative attitude toward oral care. Therefore we suggest that there is a need of improving scientific clinical knowledge of the participants through compressive training based on current best available evidence to enhance their knowledge, by focusing on those nurses with low attitude level and encourage experienced nurses to work in ICU which help them to prevent poor oral care-related health problem for patients with endotracheal intubation (8, 25, 37).

Oral care attitude for patient with endotracheal intubation

The prevalence of nurses' level of attitude in this study is comparable with the study in Gondar (57.3%) this might be due to the same health system and related socio demographic status of the study population. In this study, those ICU nurses who have adequate number of ICU nurses have 50% less likely to have negative attitude than those who have no adequate number of ICU nurses, the difference might be due to nurses who are busy with different nursing procedures cannot pay attention to oral care, rather they become focus to other procedures due to lack of adequate staff. This is the same problem identified in the study done in Eretria in which shortage of staff, nurses are identified as one barrier during giving proper oral care. The study also revealed that participants which have good self-reported practices the level has a positive association with attitude. This might be due to those nurses who have good practice level agree with nursing responsibility toward oral care that helps them to develop a positive attitude. Those ICU nurses who have greater than 5 years working experience have a positive association with attitude about oral care than those ICU nurses who have 6 months to 3 years of work experience. This might be due to long time exposure to different nursing practice and procedures help nurses to develop a positive attitude toward oral care. This study is directly the same as the study done in Gondar University in which, the odds of having a good attitude for those who were experiencing greater than 10 years is 5.72 times more likely have a positive attitude as compared to those nurses who experienced less than 10 years. In addition to this same study done in Sudan indicate experience has led to great improvement in positive attitude toward oral care. Therefore encourage experienced nurses to work in ICU, encouraging nurses with good practice level to share their experience for other nurses, proper allocation of nurses in the ICU in 1:1 ratio should be considered as well as enhancing nurse's attitude toward oral care by using different on job short term and formal long term training that contains well-structured attitude enhancing modules should be carried out (8, 24, 27).

Oral care self-reported practice for patients with endotracheal intubation

The prevalence of intensive care unit nurses self-reported practice in this study is lower in terms of practice when compared with the study done in China (49.8%). This difference may be due to having standardized nursing care and health care system in China. Those ICU nurses who have greater than 5 years of working experience have a positive association with good practice on giving oral care for patients with endotracheal intubation than those who have 6 months to 3 years working experience. This might be due to working in ICU for a long period exposed to different types of oral care practice, which helps them to own good practice on oral care for intubated patients. In addition, the result is comparable with the study done in China were that senior nurses with more years of experience in the ICU performed oral care practices more frequently and for intubated patients. Those nurses who have a positive attitude toward oral care have 2.1 times good oral care practice than those who have a negative attitude toward oral care. This might be due to those nurses who have a positive attitude level are perform the standard nursing procedures during giving oral care that helps them to develop good oral care practice. Therefore encouraging other nurses to perform oral care routinely as it helps them to develop good practice level, especially for those with low experience in the ICU and encourage experienced nurses to work in ICU mandatory (25).

8. Conclusion

The overall knowledge, attitude and practice towards oral care for a patient with endotracheal intubation are inadequate among ICU nurses. In this study year 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 procedure in reducing the length of hospitalization, costs, and mortality rate it is necessary to organize training classes for nurses working in intensive care units, especially for those with low ICU working experience on how to do oral care properly and its importance.

9. Recommendation

For the ministry of health

- Planning pre job training on specific clinical procedures
- Formulating and disseminating uniform guidelines on oral care and management of patients with endotracheal intubation.
- Supplying appropriate oral care solutions.
- Hiring adequate amount of nurses for hospitals to ensure quality service.

For hospitals

- Considering ICU nurses with low experience during on job training.
- Encouraged to establish policies and procedures for oral care according to type of patients
- On-going and regular in-service training should be introduced into the ICUs to improve knowledge, attitude and practice on evidence-based oral care.
- Investing an adequate number of ICU nurses.
- Identify and interfere with skill gap observed in the ICU.

Nursing administrators

- Unit protocols should be reviewed regularly as updates and new evidence for best practice are constantly emerging and ICU nurses should be educated on updated protocols.
- Encouraging experienced nurses to work in the ICU.
- Encouraging nurses to share their experience for other nurses to enhance their knowledge, attitude and practice since oral care is the daily task of nurses.
- Facilitating in-service training in their ICUs.

Future research should be conducted which contain observational and qualitative study to examine ICU nurses knowledge, attitudes and practices before and after implementation of an educational program on evidence-based oral care for intubated patients.

10. Limitation and strength of the study

Inferring whether the exposure affects the outcome or outcome affect the exposure was not possible in the cross-sectional design. The study relied on nurses self-reporting of their knowledge, attitude, and practice towards the oral care for patients 'with endotracheal intubation that might be under/over-reported that should be supported with observation in feature study. Despite these limitations, the the study was the first study in the study area, with a high response rate and unique as it comprehensively examined the factors associated with knowledge, attitude and practice and provide clues for the future best care for patients in the ICU.

Annexes

Annexes 1: Participant information sheet and consent form

My name is _____. I am working as a data collector in the study conducted by Jabesa Abdisa MSc in Cardiovascular nursing student at Addis Ababa University, Health Science College Nursing and Midwifery department. The aim of the study is **“To assess Intensive care nurse’s knowledge, attitude, practice and associated factors of oral care for patient with endotracheal intubation in selected public hospitals, Addis Ababa Ethiopia 2021.** For partial fulfilment of the master’s degree program.

Your involvement is important for the success of this study. You are chosen to participate in the study because you are working as ICU nurse. A decision on your involvement will be made by you and only you. Your selection is based on random without any peculiar criteria and if you are going to participate, you are expected to answer certain questions on the next pages. This will take around 30 minutes.

Risk: there is no dangerous physical or psychological risk expected being involved in the study.

Benefits: you have the right to know the findings of the study. Furthermore, the results of this study has significant role for improving quality of care and increase ICU Nurses holistic performance.

Confidentiality: Your personal information will only be used for the purpose of the study. You will not be personally identified in the study report. For this purpose, the data will be secured strictly without your name and detail identification.

Participation: You have to know that your participation is largely based on your willingness and approval. You have the right to say “no” and not participate in the study. You will not be penalized and there is no loss of benefits if you decide not to participate. If you wish to withdraw from this study you can stop at any time. You are not obliged to respond to all questionnaires.

Questions: You can ask any questions about this study.

Declaration of voluntary informed, written and signed consent:

I have read the consent form or the interviewer was read me the participant information sheet and voluntary informed consent. I have clearly understood the purpose of the research, the procedures, the risk and benefits, issues of confidentiality, the rights of participating and contact address for any enquiry. I have been given the opportunity to ask questions for things that may have been unclear. I was informed that I have the right to withdraw from the study at any time or not to answer any question that I do not want. Therefore, I declared my voluntary consent to participate in this study with my initials (signature) as indicated below

Participant signature _____ Date ____/____/____/2021 G.C

Name and Signature of data collector _____/2021G.C

Name of principal investigator: **Jabesa Abdisa**

E-mail: jaboabdi84@gmail.com or Cell phone +251910736586

Annex 2: Questionnaire

Questionnaire on the assessment of intensive care nurse's knowledge, attitude, self-report practice and associated factors of oral care for patient with endotracheal intubation in selected public hospitals, Addis Ababa Ethiopia 2021.

Part I. Socio-demographic characteristics related variable.

Identification			
	Name of hospital		
	Date of interview	DD/....MM.....YY	
NO	Question	Coding	Skip
101	Age	-----	
102	Gender	1. Male 2. Female	
103	Marital status	1. Single 2. Married 3. Divorced 4. Widowed	
104	Your education level	1. Diploma 2. BSc degree 3. Master's degree 4. Doctorate degree	

Part II personal characteristics related variable.

NO	Question	Coding	Skip
201	Your work experience in ICU	1. 6 month -3 years 2. 3 years-5 years 3. > 5years	
202	Have you taken oral care training before?	1. Yes 2. No	

Part III. Institutional characteristics related variable.

NO	Question	Coding	Skip
301	Does your ICU have adequate number of staff nurses 1:1(nurse to patient ratio)?	1. Yes 2. No	
302	Did you have oral care protocol or guide line in your hospital?	1. Yes 2. No	
303	Does your hospital have inservice trining on oral care?	1. Yes 2. No	
304	Do you have a tool to assess the oral cavity of a patient?	1. Yes 2. No	
Part IV. Questionaries' to assess attitude of participants toward oral care.			
NO	Question	Coding	
401	It is not nurses' responsibility to assess the oral status of intubated patients.	1. strongly agree 2. somewhat agree 3. neutral 4. somewhat disagree 5. strongly disagree	
402	Oral care is not high priority for intubated patients.	1. strongly agree 2. somewhat agree 3. neutral 4. somewhat disagree 5. strongly disagree	
403	Cleaning the oral cavity is an unpleasant task.	1. strongly agree 2. somewhat agree 3. neutral 4. somewhat disagree 5. strongly disagree	
404	The mouth of intubated patients gets worse no matter what I do.	1. strongly agree 2. somewhat agree 3. neutral 4. somewhat disagree 5. strongly disagree	
405	Nurses do not need additional training to provide oral care for intubated patients.	1. strongly agree 2. somewhat agree 3. neutral 4. somewhat disagree 5. strongly disagree	
406	The oral cavity is difficult to clean	1. strongly agree 2. somewhat agree 3. neutral	

		4. somewhat disagree 5. strongly disagree	
407	Ventilated patients should not be given special attention in doing oral care.	1. strongly agree 2. somewhat agree 3. neutral 4. somewhat disagree 5. strongly disagree	
408	Nurses do not need oral care guide line to provide a quality oral care	1. strongly agree 2. somewhat agree 3. neutral 4. somewhat disagree 5. strongly disagree	
Part V. Questionnaires' to assess knowledge of participants toward oral care.			
NO	Question	Coding	
501	Which is not characteristic of ideal oral cleaning solution?	1. Contains alcohol* 2. Anti-bacterial or inhibits bacteria 3. Maintains oral moistness 4. Promotes wound healing	
502	What is the characteristic of chlorhexidine as oral cleaning solution?	1. Anti-bacterial* 2. Decreases viscosity of oral mucus 3. Not treats oral infections	
503	What is the characteristic of sodium chloride (normal saline) as oral cleaning solution?	1. Eliminates debris attached to oral mucus 2. Maintains oral moistness 3. Removes dental plaque 4. Promotes wound healing*	
504	What is the characteristic of hydrogen peroxide as oral cleaning solution?	1. Anti-bacterial* 2. Decreases viscosity of oral mucus 3. Promotes wound healing	
505	What is the characteristic of sodium bicarbonate as oral cleaning solution?	1. . Anti-bacterial 2. Increases viscosity of oral mucus 3. Neutralizes excessive oral acidity*	
506	Which oral care supplies and equipment effective for removing dental plaque?	1. Cotton swab 2. Foam swab 3. Toothbrush* 4. Gauze pad 5. Other	

Part V. self-report questionnaires to assess practice of participants toward oral care.

NO	Activities	Coding	
601	Do you assess the oral health of a ICU patient?	1. Yes 2. No	
602	Do you discuss the oral health status of intubated patients?	1. Yes 2. No	
603	Do you give oral care for intubated patients?	1. Yes 2. No	
604	If answer on question “603” is “YES“ On what basis you give oral care for intubated patients?	1. less than 3/day 2. greater than 3/day 3. occasional	
605	Does you assess for patients oral cavity?	1. Yes 2. No	
606	What did you use to perform the oral care for intubated patients?	1. Tooth brush 2. Gauze with normal saline only 3. Other	
607	Do you use suction machine when they provide oral care, for intubated patients?	1. Yes 2. No	
608	Have you ever used Chlorohexidine mouth wash for oral care?	1. Yes 2. No	
609	Do you use toothpaste?	1. Yes 2. No	

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