

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

**NURSES KNOWLEDGE, ATTITUDE AND PRACTICE  
TOWARDS FACE MASK AND ITS ASSOCIATED FACTORS  
DURING COVID-19 PANDEMIC IN SELECTED  
GOVERNMENTAL HOSPITALS, ADDIS ABABA, ETHIOPIA,  
2021.**

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**THESIS SUBMITTED TO SCHOOL OF GRADUATE STUDIES  
OF ADDIS ABABA UNIVERSITY FOR PARTIAL  
FULFILLMENT OF THE REQUIREMENTS FOR THE  
DEGREE OF MASTERS OF SCIENCE IN ADULT HEALTH  
NURSING**

**MAY, 2021  
ADDIS ABABA, ETHIOPIA**

**Addis Ababa university**  
**college of health sciences,**  
**school of nursing and midwifery**  
**postgraduate program**

**Nurse's Knowledge, Attitude and Practice towards face mask and its associated factors during COVID-19 pandemic in selected governmental hospitals, Addis Ababa, Ethiopia, 2021.**

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**Thesis submitted to school of graduate studies of Addis Ababa university in partial fulfillment of the requirements for the degree of masters of science in adult health nursing.**

**June, 2021**  
**Addis Ababa, Ethiopia**

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## **ACKNOWLEDGMENT**

First, I would like to acknowledge Addis Ababa University College of health science school of nursing and midwifery department of nursing for giving the opportunity to participate in this education program and do this thesis.

Second, My special gratitude goes to my advisors Mr. Niguse Tadele, and Mr. Taddese Bedada for their effort, motivation, support and constructive comments starting from topic selection to final thesis submission.

Third, I would like to extend my gratitude to Addis Ababa health bureau, TASH, and St Petros Hospital research committees for their constructive comments and feedback during data collection.

Finally, many thanks go to data collectors and study participants and others who participate in this study.

## **ABBREVIATIONS AND ACRONYM**

AAU	Addis Ababa University
AOR	Adjusted Odd Ratio
BSc	Bachelor of Science
CDC	Center of Disease Control
CI	Confidence Interval
COVID-19	Corona Virus Disease 2019
ETB	Ethiopian Birr
HCW	Health Care Worker
IRB	Institutional Review Board
KAP	Knowledge, Attitude, Practice
MSc	Master of Science
PHEIC	Public Health Emergency of International Concern
PI	Principal Investigator
PPE	Personal Protective Equipment
RPE	Respiratory Protection Equipment
SPSS	Statistical Package for Social Sciences
TASH	Tikur Anbessa Specialized Hospital
WHO	World Health Organization

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## **ABSTRACT**

**Background:** Wearing face masks is considered as an effective technique of preventing respiratory tract infections including COVID-19 and Proper utilization of face masks by healthcare givers can decrease air born viral respiratory infection contamination by 80%. However, a little is known about knowledge attitude and practices of nurses concerning face mask use, and it is very important to identify the gaps and mediate immediately to control the spread of infection.

**Objective:** The aim of this study was to determine nurse's knowledge, attitude, practice, and its associated factors towards face mask during COVID-19 pandemic in Addis Ababa governmental hospitals, Addis Ababa, Ethiopia, 2021.

**Method:** - Across-sectional, quantitative study was conducted from February to May 2021. The study covered 422 nurses working in selected governmental hospitals in Addis Ababa, Ethiopia. Data were collected using a pre-tested self-administered questionnaire adopted from different studies after getting agreement from the study participants. After the data were collected, entered to Epidata version 3.1 and analyzed using SPSS version 25. A descriptive statistics were used. Bivariate and multivariate logistic regression model was used to measure the association between the predictor and outcome variables. Statistical significance was declared at  $p\text{-value} < 0.05$ . Direction and strength of association were expressed using OR and 95% CI.

**Results;** The overall knowledge, attitude, and practice of nurses towards face mask during COVID-19 were 104(25.7%), 358(91.6%), and 86(21.3%) respectively. According to multivariable regression, male nurses had 4 times, and nurses who had training related to face masking are 9 times good knowledge than counterparts (AOR = 3.0, 95% CI=1.8-5.1), (AOR =9.4 95% CI= 5.4-16.2) respectively. The odds of being work experience greater than 10 years, and having training related to face mask had 4 times positive attitude towards face than counterparts (AOR=4.4, 95% CI= (1.6-13), (AOR=4.5,95% CI=1.6-12.3) respectively. female nurses, and work experience greater than 10 years had 2 times good practice on face mask than counterparts (AOR= 2.1, 95% CI= (1.2-3.4), (AOR=2.1, 95% CI=1.1-4.2) respectively.

**Conclusion and recommendation;** The level of Knowledge and practice in nurses worked in Addis Ababa governmental hospitals is extremely poor, and have comparatively positive attitude. sex, work experience and training had significantly associated with nurse's knowledge attitude and

practice of face mask. Continues and comprehensive training, focus on less than 10 years' work experience

**Key word:** Knowledge, Attitude, practice, Nurse, facemask, and COVID-19 pandemic.

# 1. INTRODUCTION

## 1.1. Background information

Face mask is one of personal protective equipment (PPE) used by health care giver during medical procedure as a protective covering for the mouth and nose, which is made of polypropylene fibber or cotton fabric(1). It has been known non-pharmacological public health intervention used for self-protection against different respiratory tract infections including COVID-19(2). Many countries including Ethiopia have already included the use of face masks in their pandemic control plans, after World Health Organization (WHO) professed COVID-19 as a Public Health Emergency of International Concern (PHEIC) on 30 January 2020 and international pandemic on 11 March(3).

According to US Food & Drug Administration 2020, There are two main face masks used in clinical settings: surgical masks and N95 masks. N95 masks are designed to block at least 95% of small particles, have a very close fit and the separation ability exceeds that of a surgical mask. Surgical masks, which are the main topic of this research, considered to be used by health care workers(HCW) to prevent saliva from contaminating a surgical field and may be effective in blocking splashes and large-particle droplets and respiratory secretion, but the loose fit also means that they do not provide complete protection against small pathogenic particles but these masks may provide some protection when N95 masks are not available with other COVID-19 prevention practices like frequent hand-washing and social distancing(4).

WHO state the importance of having good knowledge, attitude and practice of face masking in the time of COVID-19 pandemic in different journals, and recommend place mask carefully to cover mouth and nose and tie securely to minimize any gaps between the face and the mask, and avoid touching the mask while in use, in addition remove the mask by using appropriate technique without touch the front, during removal clean hands by using an alcohol-based hand rub or soap and water, If the mask is visibly soiled or single-used replace masks with a new clean ,and discard in yellow color coded plastic container(5)(6).

Health care workers (HCW) face mask knowledge, Attitude, and Practice towards face mask use is discourses in a variety of studies, and shows significant number of nurses has poor out came on their assessment. Different predicts such as socio demographic factors like (age, sex, education level, work experience), organizational factor (training on face mask utilization, inadequate resources and personal factors (discomfort, Allergy/Acne, belief on the effectiveness of surgical face mask) were associated with KAP of face mask.

## **1.2. Statement of the problem**

In national health system, the risk of COVID-19 infection by nurses is much higher than the other health care workers risk of infection, There are about 33.5% of nurses infected with COVID-19 because of the nature of their work and poor utilization of PPE including face mask(7). In united Arab Emarat 51.4% of nurses are at a higher risk of COVID-19 infection because of poor adherence to infection prevention and control guideline spatially in face mask utility(8).

Health care workers believed to have good knowledge regarding face mask when they compared with general population(9), but in different literatures the level of HCW including nurses having poor knowledge of face mask is ranges from 17% up to 76.5% (7,10,13,17). A Study conducted at Addis Ababa police health facility among the total HCW only 21.3% nurses have good knowledge about proper face mask utilization, in addition nurses has less knowledgeable about proper use of face mask when they compared to other HCW with AOR = 2.6, 95% CI: 1.17, 5.65(10).

WHO recommend HCW including nurses should have 80% of good attitude on face mask use to have achievable level of adherence regarding prevention of disease prohibited by using proper practice of face mask including COVID-19(12).but only 35.2% up to 4.5% of HCW has good attitude about COVID-19 prevention by properly using of face mask (4),6,7,12).

WHO states that poor practice of face masking increase the risk of infection (13). A systematic review and meta-analysis conducted to assess the efficacy of face mask in preventing respiratory virus infection were showed that Proper face mask utilization by nurses can decrease the risk of infection by 80%(15), but practices of face mask HCW including nurses in different literatures ranges from 61% up to 8.5%, (7,10). A study conducted in France, At Brest University to assess wearing of face mask by HCW during COVID-19 lockdown, an observational checklist reveled that HCW including nurses the most frequent error seen during face masking is putting under the chin, as a bib, around the neck, and reuse single face mask are very common(16).

Preventing health profession from respiratory infections is crucial to promote the health and safety of staff and to maintain the performance and capability of the health workforce



during outbreaks of emerging infections(17),but with the exponential spread of COVID-19, HCWs are challenged with inadequate supply of face mask (18), especially those in more suffocated areas by patient trafficking are faced with using substandard options such as cloth masks(19).

The use of face masks by HCW has been reported to cause peri-oral dermatitis, and longer hours of wearing surgical face mask have been associated with higher rates of facial itch and elicited sensations of facial thermal discomfort(20). A study conducted in Singapore General Hospital 33% of respondents complained of sweating and 19.6% incidence rate of facial itch and found that individuals with facial dermatoses were more likely to complain of facial itch after mask-wearing. 19.9% of respondents complained of dermatological issues associated with mask-wearing, with higher reported dermatological issues in those wearing masks for longer hours.(21).

A variety of complimentary options can increase the level of knowledge Attitude and Practice of face mask utilization. Adequate provision of face mask, and continues training in working please can increase KAP of health care worker in prevention of COVID-19 are recommended by a variety of studies((5,6,12,13).

The aim of this study is to determine the knowledge, attitudes and practice of nurses and to identify associated factors related to nurses toward face mask utilization. A few studies done on the different health care facilities to assess HCW KAP on proper use of face mask to prevent COVID-19 in the world and in Ethiopia, however only little is known about nurse's knowledge, attitude and practice of face mask utilization and few studies done some where lacks some variables included under institutional factors(previous training, working units, institutional rules) and personal factors (discomfort, Allergy, and uncertain belief about the effectiveness of face mask to block COVID-19 infection). This study focus is only nurses So, this study is important to fill this gap.

## 2. LITERATURE REVIEW

### 2.1. Nurses' knowledge of towards face mask and its associated factors

A study conducted in Pakistan to assess HCW KAP regarding the use of face mask to limit the Spread of COVID-19, the overall level of knowledge were 35.2% (13), and another cross-sectional study conducted in six hospitals in Iran Shiraz University of Medical Sciences to assess HCW knowledge perception and practice regarding the use of respiratory protection equipment's the level of knowledge were 66.5%(22)

A cross-sectional study in Addis Ababa(TASH and St. Paul's) hospital for evaluation of HCW knowledge, attitudes and practices about hand hygiene and tuberculosis (TB) infection control measures they register 83% knowledge regarding using of surgical face mask in tuberculosis infection control (23), in another hand, A study conducted in Addis Ababa, Ethiopia police health facility, to assess HCW face mask utilization in case of COVID-19, the level of knowledge of HCW were 33.3% and, nurse's level of knowledge were about 21.3%. about 85.8% of the health professional recognize surgical mask can protect from COVID- 19 and 89.7% recognize correct use of surgical face mask. 62.3% of the participants know the layers of the surgical mask and 56.4% understand the layer which acts as a filter media. Regarding the type of mask, for protection against COVID-19, 67.6% of the participants were answered to the correct answer(10).

Socio demographic characteristics such as Age Sex, and work experience, and organizational factor training have been indicated as variables influencing on the knowledge of face mask use by HCW. A study conducted in Addis Ababa, Ethiopia, police health facilities, Male HCW were 2.2 times less knowledgeable about face mask compared to female professionals (AOR = 2.2, 95% CI: 1.25, 3.86) (10). In another hand a study conducted in Iran University of Shiraz, knowledge of HCWs on using respiratory protective equipment's in older HCW ( $\geq 30$  years) and individuals with advanced job experience ( $\geq 10$ ) was greater with p value=0.008 and p value=0.005 respectively(22).

Different studies involve training as a factor affecting knowledge of face mask use by nurses, A study conducted in Nigeria to assess knowledge and use of PPE among nurses in teaching hospital wards, with level of knowledge is 91.9% with 74.4% of participants received training on PPE in the 3 years prior the study (24), and another study conducted

at Iran hospital to assess HCW KAP of PPE states the cause of increased level of knowledge among older and higher work experience health care workers might be the availability of training(22).

## **2.2. Nurses attitude towards face mask and its associated factors**

A systematic meta-analysis for a study conducted in Japan, Australia and China reported that Duration of wearing masks in majority of Australian participants and same Chinese participants stated that surgical masks are effective for only a short while. With a range of thoughts about the duration of effectiveness ranging from 30 seconds to four hours. None of the Japanese nurses mentioned that masks should be changed frequently; instead, some stated that they wear masks to prevent respiratory tracts from dryness(4).

A study conducted to assess HCW, KAP towards hospital acquired infection prevention at Dessie referral hospital. 62.8% of HCW has negative attitude towards changing mask before going to another patient (25).

A study conducted in police health facility's, Addis Ababa, Ethiopia to assess HCW, KAP of face mask utilization in case of COVID-19, more than half 54.7% of the respondents had an undesirable attitude towards face mask(10), in addition, the study recognize attitude towards face mask use was significantly associated with the educational status, and knowledge about face mask (AOR = 5.0, 95% CI: 2.08, 12.20), HCW with an educational level of degree and above was more likely to have a negative attitude about face mask use than professionals with an educational level of  $\geq$  master (AOR = 2.4, 95% CI: 1.07, 5.47). Police HCW with poor knowledge about face mask utilization were less likely to have a negative attitude about face mask use compared with police HCW good knowledge about face mask (AOR = 0.1, 95% CI: 0.05,0.17) (10). in another hand a study conducted in Iran University of Shiraz HCW exhibited a weak association between knowledge and Attitude of respiratory protective equipment's ( $r = 0.245$ ,  $P < 0.001$ ) and HCW who have high level of education has lower attitude than HCW lower level of education (22).

## **2.3. Nurses Practice of towards face mask and its associated factors**

Study done in police health care facilities, Addis Ababa Ethiopia, HCW practice regarding proper face mask utilization was low, and practice of nurse's face mask were about

48.20%. Of the total 66.7% of them had a poor practice of face mask utilization, more than half (59.6%) of the professionals removed their face mask if there is a need to talk to the patient while 77.7% of the store using a mask in a bag for later use if not sick.33.3% of the study participants do not wear face mask in public places and most 91.3% of them wore face masks in hospital sites. A 37.0% of health professionals do not decontaminate their hands before wearing their face mask and 57.1% of them check the inside and outside of the mask before wearing. About 71.6% of them did not decontaminate their hands after taking off the mask and 77.0% re-used a single-use mask(10).

A repeated-measures crossover design conducted to assess the Physiologic and other effects and compliance with long-term respirator use among medical intensive care unit nurses in University of Louisville Hospital. use of face mask has minimal physiological changes in respiration and oxygen saturation levels, it is possible that there could be greater discomforts during prolonged periods (12hrs) of use of face mask is associated with complaints of headaches, light-headedness, as well as an increase in perceived exertion and perceived shortness of breath spatially individuals who have a pulmonary diseases, including asthma, chronic rhinitis, and chronic obstructive pulmonary disease (26).

Johns of Hopkins reported wearing of face mask for long period of time can Cause different forms of skin problems including acne that is caused the mask traps dirt and oil in pores. A Cross-sectional study conducted in SRM Medical College Hospital and Research institute of 250 healthcare workers participated in the study, the results were excessive sweating around the mouth accounting to 67.6%, trouble in breathing on exertion 58.2%, itchy nose 52.0% and acne 56.0% (27),

Another study conducted in China to assess Individual and organizational factors associated with the use of face mask by Chinese migrant workers, poor practices of face mask was significantly associated with low perceived barrier (5.31 vs. 5.64,  $p < 0.05$ ). and Higher perceived self-efficacy was significantly associated with wearing a protective face mask (10.95 vs. 10.44,  $p < 0.05$ ). organizational factors were significantly associated with using protective face mask(28).

A Qualitative study conducted in Hanoi Participants characterized facemask use as a routine practice. Several pointed out that facemask use increases significantly during outbreaks, pandemics, and other high-risk situations. Nurses stated that ‘We are obligated to wear a facemask before coming to a patient’s room. If a patient call while we are eating, we must wear a facemask to go to the patient. Sometimes, patients call while we are sitting in the office, we would take the face mask from a pocket immediately as a quick response’. Cloth masks were used commonly because of surgical/medical mask scarcity; however, participants also reported that medical masks and respirators are reused after “washing. (29).

Study conducted in Vietnam. to assess Current practices and barriers to the use of face masks and respirators among HCW most participants described face masks as the “only” and the “best protection” method available to protect HCWs from respiratory infections(29). And a study conducted in southern Ethiopia, institutional based cross study in Wolaitta Sodo Otona hospital 60.5% of HCWs have good practice towards infection prevention and controlling measures by using face mask, Practice of face mask by male HCW is less likely when compared with female health care workers, in addition infection prevention practice is different based on working unit, medical ward case team HCW are less likely when they compared to surgical ward case team(30).

In Addis Ababa police health facility Professionals with poor knowledge about face mask and its use were less likely to properly use face mask than professionals with good knowledge of face mask and its use (AOR = 0.01, 95% CI: 0.003,0.023) (10). A cross-sectional study conducted at Iran hospital show that between knowledge and practice regarding the use of face mask has weak significant relationship(22), And contrasted with the study conducted , which showed that the level of knowledge regarding the use of RPE was low, while all the respondents had moderate to high practice(31).

A study conducted in southern Ethiopia to assess the practice of health professionals regarding the correct use of facemask in terms of COVID-19, The overall magnitude of correct use of facemask among health professionals was 10.1% (95% CI: 7.4–13.6). About 30% and 42% did not wear facemask before contact with patients and in the patient transit areas, respectively. Most (60.6%) of health professionals adjust their facemask during

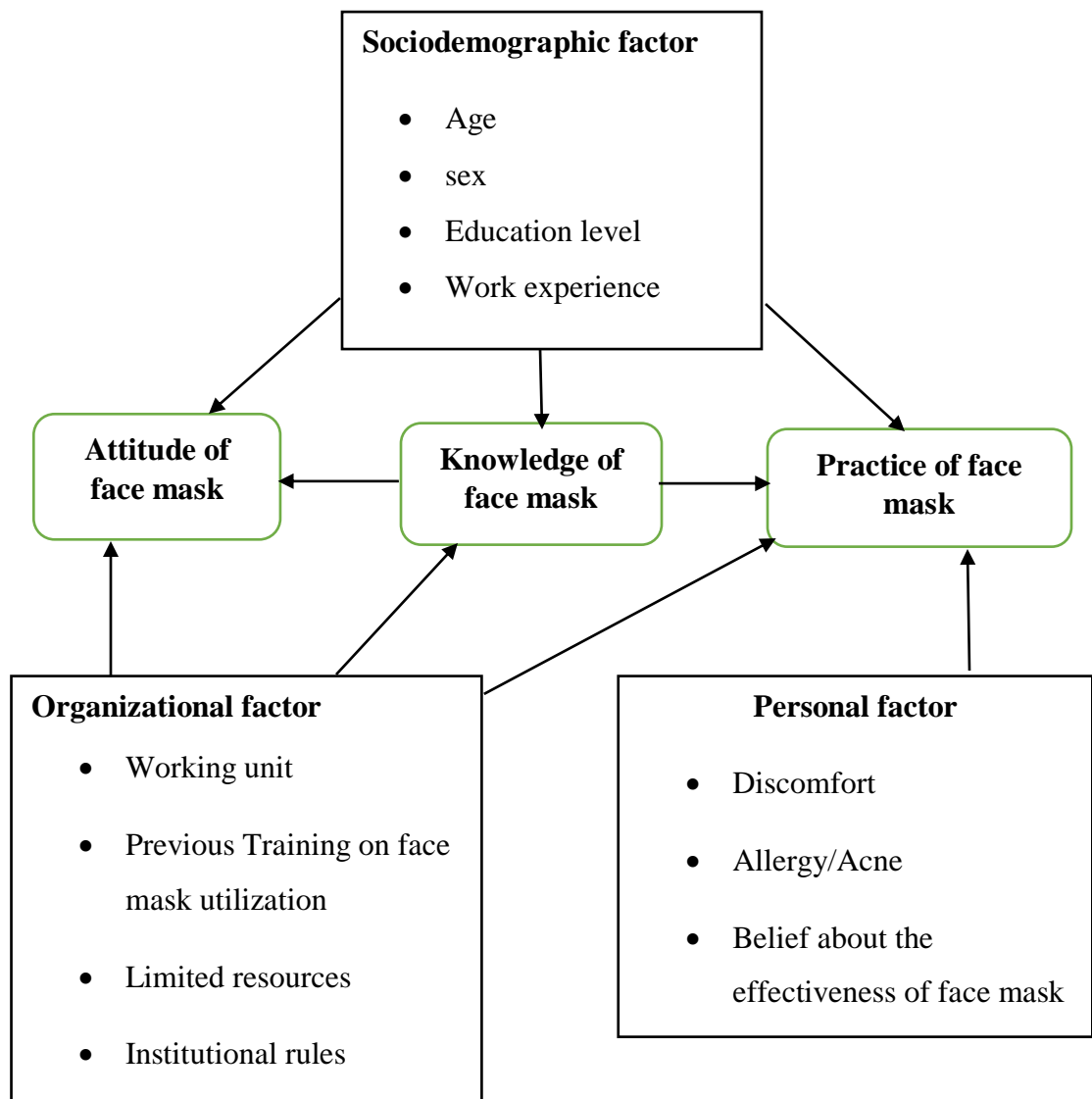
patient care. Majority (87.8%) of them use disposable facemasks more than one time. health professionals who received training related to proper utilization of PPE were 2.2 times more likely (AOR=2.2; 95% CI: 1.1–4.5) to practice the correct use of facemask than their counterparts(32). In another hand health care workers who are not received training on infection prevention nearly 10 times more likely to practice infection prevention by using proper face mask practices(33).

### **Conceptual framework**

Many studies in different parts of the world reviewed that KAP of face mask by HCW including nurses is affected by different factors. For this study according to the literature review the main indicator of KAP of face mask is identified are Sociodemographic, same organizational and personal factors are listed.

Knowledge of face mask by nurses is affected by different sociodemographic factors including sex, age, work experience and organizational factors including training and working unit. From different literatures attitude of nurses to wards face mask use during global pandemic is pretentious by a variety factors including sex, age, work experience, training, working unit and knowledge of face mask utilization. In addition, nurses' practice regarding proper face masking can be affected by sociodemographic factors including sex, age, work experience, and organizational factors including working unit, training, adequate availability of face mask, in addition personal factors including discomfort, allergy/acne, belief regarding effectiveness of face mask against COVID-19 infection and knowledge related to face mask are listed in a variety of studies.

The next conceptual frame work which represents the relationship of the variables is adapted and modified from different literature. It helps to review the affiliation among dependent, and independent variables in KAP of nurses on face mask use.



**Figure 1;** showing the conceptual framework adapted and modified from different literature (8,10,13, 20,22,23,26,28) for assessment of knowledge, attitude and utilization of HCW and nurses towards face masking.

### **Justification of the study**

Addis Ababa governmental hospital are highly crowded area with massive patient flow, Nurses are not able to implement social distancing because of the nature of their work. Asymptomatic COVID-19 infected nurses with poor KAP of face mask use can easily transmit the droplet for individuals came to hospital for seeking emergency care and chronic follow up and, who are at a higher risk of becoming seriously ill and dying with COVID-19. This is contributing to morbidity and mortality intensely increases in the hospital as well as in the country.

HCW including nurse's knowledge, attitude and practice of face mask in prevention of COVID-19 pandemic is inadequate. Even if different studies conducted to determine the KAP of HCW in face mask utilization in the globe and in Ethiopia, only little is known about nurse's KAP face mask use during COVID-19 and few studies done in different governmental hospitals, however somewhere lacks some variables. Consequently, further investigation is needed to fulfill the gap.



### **Significance of the study**

Having information & awareness about knowledge attitude and practice of nurse's face mask utilization during COVID-19 pandemic is very important to decrease the prevalence of COVID-19 pandemic among nurse's other health care workers and patients. In the same manner proper utilization of face masks is the key for those who are asymptomatic COVID-19 infected nurses regarding decreasing the risk of transmission of infection among patients who are seeking emergency care and chronic follow and having higher risk of becoming seriously ill and dying with COVID-19.

Since no adequate study tried to explain KAP of nurses in face mask utilization, the finding of this study can provide relevant information for nurses, for hospital administrator, for future planning and interventions of appropriate strategies and also help as a baseline data for those who are interested in carrying out further research with this regard.

### **3. OBJECTIVE**

#### **3.1 General objective**

- To assess nurse's Knowledge, Attitude, Practice and its associated factors in face mask utilization during COVID-19 pandemic in selected governmental hospital. Addis Ababa, Ethiopia,2021.

#### **3.2 Specific objective**

- To determine nurse's Knowledge towards face mask during COVID-19 pandemic in selected governmental hospital. Addis Ababa, Ethiopia,2021.
- To determine nurses' Attitude towards face mask during COVID-19 pandemic in selected governmental hospital. Addis Ababa, Ethiopia,2021.
- To assess nurse's Practice towards face mask use during COVID-19 pandemic in selected governmental hospital. Addis Ababa, Ethiopia,2021.
- To identify factors associated with KAP of nurses towards face mask during COVID-19 pandemic in selected governmental hospital. Addis Ababa, Ethiopia,2021.

## **4. METHODS AND MATERIALS**

### **4.1. Study Area and Period**

Addis Ababa, the capital city of the Federal Democratic Republic of Ethiopia, is located at the center of the country that has 10 sub-cities and 116 Woredas with a population of around 3.4 million according to Ethiopian population projection for all regions at Woredas level from 2014 – 2017(34). Its area is estimated to be 530 Km<sup>2</sup> with altitudes ranging from 2200 to 3000 meter above sea level, average temperature of 22.8°C and average rainfall of 1,180.4 mm. There are 51 hospitals of which 15 are governmental under federal and Addis Ababa health bureau and 40 are non-governmental. The study was conducted in five selected governmental hospitals by lottery method. TASH, Zewditu, Yekatit 12 hospital, St peters hospital, and St Paulo's hospital. All selected hospitals are tertiary hospitals in the city as well as in the country having general service and their own spatiality, many patients are visited, admitted and treated. They are providing different referral cases coming from all over the country, including medical and surgical cases, trauma services, for Addis Ababa residents and for the whole country by receiving referral cases from respective regions and city administrations. They also provide general emergency services besides known to be tertiary level hospitals in the city as well as in the country. There are 767 nurses in TASH, 280 in Zewditu memorial hospital, 480 in Yekatit 12 hospital, and 261 nurses at St peters hospital, 746 in St Paulo's hospital. The study was conducted from April to May, 2021.

### **4.2 Study Design**

- An institutional based cross-sectional study design was conducted

### **4.3 Source Population**

- All staff nurses working in selected governmental hospital.

### **4.4 Study Population**

- Nurses who are working in selected governmental hospitals and fulfill the inclusion criteria.

## 4.5. Eligibility Criteria

### 4.5.1. Inclusion Criteria

- All nurses who are working in inpatient, outpatient, emergency, operation room and management/supervision departments in selected governmental hospital.

### 4.5.2. Exclusion Criteria

- Nurses who are less than six-month work experience and who are giving free service in selected governmental hospitals.
- Nurses who are not directly contacted with patients

## 4.6. Sample Size Determination

The sample size was determined by using a single population proportion formula and considering the following assumptions.

Assumptions: A 95% confidence level, margin of error (0.05), proportion of nurses KAP on face mask 50% was taken because there is no study conducted to assess nurses KAP face mask during COVID-19. And above-mentioned values substituted in the following single population proportion formula.

$$n = \frac{(Z\alpha/2)^2 p (1-p)}{d^2}$$

$$n = \frac{(1.96)^2 (0.5) (0.5)}{(0.05)^2} = 384$$

$$n = 384 + 10\% (384) = \mathbf{422}$$

Were

n= required sample size

Z= critical value for normal distribution at 95% confidence level which equals to 1.96 (z value at  $\alpha = 0.05$ )

P=50% because there is no study conducted to assess nurses KAP of face mask during COVID-19 pandemic.

d= 0.05 (5% margin of error); and adding non-response rate 10%.

#### 4.7. Sampling procedure

From a total of fifteen Governmental Hospitals in Addis Ababa, five hospitals were selected by simple random sampling and based on the total number of nurses in each selected hospital, proportional number of study subjects was allocated for each study hospital and to their respective departments by systematic random sampling.

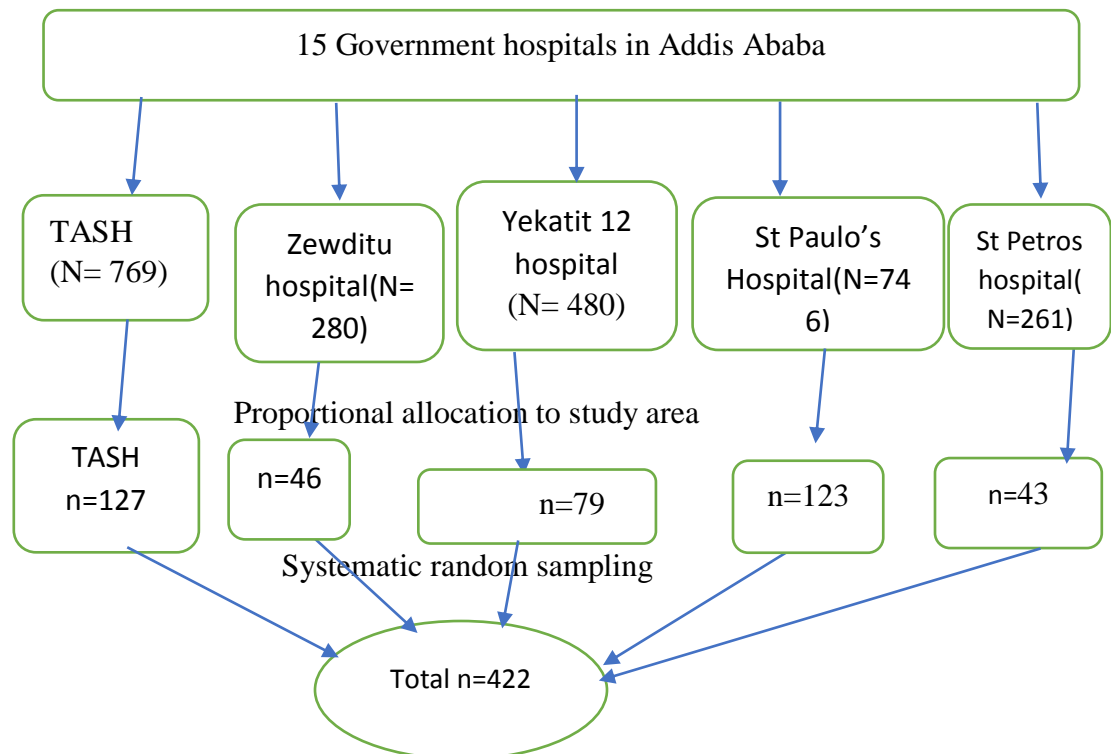


Figure 2;- The schematic presentation of sampling procedure selects study participants hospital

## **4.8. Variables**

### **4.8.1. Dependent variable**

- Nurses' knowledge, attitude and practice towards face mask during COVID-19 pandemic

### **4.8.2. Independent variables**

#### Sociodemographic characteristics

- Age
- Sex
- Education level
- Work experience

#### Organizational characteristics

- Previous Training on face mask utilization
- Inadequate resources
- Working unit
- Institutional rules

#### Personal characteristics

- Discomfort during face masking
- Allergy/Acne
- Belief about the effectiveness of face mask

## **4.9. Data collection methods**

### **4.9.1. Data Collection Tool and method**

Data was collected using structured by self-administered questionnaire. The questionnaire has four parts: part I; Sociodemographic characters and other associated factors, part II; Knowledge of nurse's towards face mask, part III; Attitude of nurses towards face mask and part IV; Practice of nurses towards face mask including Participant Information Sheet and informed consent on the first two pages. The questionnaire were carefully designed and English version was used for data collection. The questionnaire were adapted by reviewing literatures of similar studies and WHO guidelines on face mask use in context of COVID-19.

### **4.9.2. Data Collection Procedure**

The data were collected by 10 trained BSc nurses and controlled by 3 BSc nurses having previous experience in data collection. Continuous follow-up and supervision were made by principal investigator throughout the data collection period.

### **4.9.3. Data Quality Assurance**

In order to maintain quality of the data, data collectors and supervisors were trained in data collection procedures by the principal investigator. Before actual data collection time, the questionnaire was checked for clarity, and comprehensiveness by an expert and pretested for reliability on 10% of the total sample at Gandhi hospital. Then, based on the finding of the pretest, the questions were modified for wording and clarity. The data from the pre-test were used to assess reliability and internal consistency using Cronbach's alpha. The results showed acceptable reliability and internal consistency with Cronbach's alpha= 0.72 for knowledge question, 0.80 for attitude questions, and 0.78 for practice question. Then, the collected data were reviewed and checked for completeness and consistency by the principal investigator on a daily basis.

### **4.9.4. Data Processing and Analysis**

The data were entered in to EPI-data version 3.1, and then cleaned and analyzed by using Statistical Package for Social Science (SPSS) version 25 statistical software. Descriptive statistics were used. Bivariate and multivariate logistic regression were computed to assess

statistical association between the outcome variable and independent variables using Odds Ratio; significance of statistical association was assured or tested using 95% confidence interval (CI) and *p*value (<0.05) and variables with *p* value less than 0.25 were re analysis with multivariate logistic regression analysis to control associated variables.

#### 4.10. Operational definitions

- I. **Good knowledge:** Nurses who answered the correct response of >7 out of 9 questions (>80%) of the knowledge related question(10).
- II. **Poor knowledge:** Nurses who answered less than /equal to  $\leq 7$  out of 9 questions (80%) of the knowledge related questions correctly(10).
- III. ~~Satisfactory attitude: Those nurses who's mean scored points more than the median in the attitude questionnaire(10).~~ **Positive attitude:** Nurses who's mean scored points more than or equal to the median in the attitude questionnaire(10).
- IV. ~~Unsatisfactory attitude: Those nurses who's mean scored points less than or equal to the median in the attitude questionnaire(10).~~ **Negative attitude:** Nurses who's mean scored points less than the median in the attitude questionnaire(10).
- V. **Practice:** The practice-based question has choose your practice based question and always, sometimes and never based question. Therefore, 1 is given for correct practices and 0 is given for incorrect practice and 0 is given for Sometimes and Never, and 1 is given for Always (5).
- VI. **Good practice:** Nurses who were score >12 out of 15 questions (>80%) and selecting always for Likert scale questions considered as good practice(10).
- VII. **Poor practice:** Nurses who were score the correct response and  $\leq 12$  ( $\leq 80\%$ ) and selecting sometimes and never for Likert scale questions considered as poor practice related to face mask utilization(10).



#### **4.11. Ethical consideration**

Ethical clearance was obtained from AAU, College of Health Sciences, Department of Nursing and Midwifery, Institutional Review Board (IRB) research committee. An official letter was taken, and permission letter provided to selected governmental hospitals, before data collection. The study participants were informed about the objective, rationale, and expected outcomes of the study and written consent was provided for guaranteeing their choice of participation or refusal. All the information was recorded in secret and confidentiality was assured throughout the study.

#### **4.12. Dissemination of the result**

The final report of the study will be presented and submitted to Addis Ababa University, College of Health Sciences, Department of Nursing and Midwifery, Governmental Hospitals where study is conducted. In addition, efforts will be made to present the findings on scientific conferences like professional associations and peer reviewed journal publications will also be considered.

## 5. RESULT

### 5.1. 5.1 Socio-Demographic Characteristics

~~A total of 422 nurses were included in the study, of which 404 gave responses to the study items completely, which made the response rate of the study to be 95.7%. Among the participant 56.9% (230) were females and the mean age of the participant was 33.5 (SD=8.08). above half 245 (60.6%) of the participants were greater than or equals to age of 30 years, and ranges from 22 up to 62 years. The majority of the respondent 325 (80.4%) were BSc degree holder. Concerning their work experience 224(55.4%) are working for less than 10 years and 182(45%) of participants had 10 and above years' work experiences.149(36.9%) of participants were from inpatient department and, 117(29.0%) were from outpatient department.~~

~~Among a total of 404 respondents 222(55%) participants had no training on face mask utilization, in addition 226(55.9%) of respondents states in adequate face mask supply is the factor that affect their face mask utilization, 174(43.1%) of respondents states discomfort as a factor for their face mask utilization, 73(18.1%) Allergy/acne is developed when they put on face mask for long period of time, 58(14.4%) says they have uncertain belief on surgical face mask regarding prevention of COVID-19 infection, and 86(21.3%) of nurses said that I put on face mask because it is a rule.~~

### Socio-Demographic Characteristics

A total of 422 nurses were included in the study, of which 404 gave responses to the study items completely, which made the response rate of the study to be 95.7%. Among the participant 56.9% (230) were females and the mean age of the participant was 33.5 (SD=8.08). above half 245 (60.6%) of the participants were greater than or equals to age of 30 years, and ranges from 22 up to 62 years. Concerning educational level, 325 (80.4%) were BSc degree holder, and half of them 224(55.4%) are less than ten years work experiences, and the rest 182(45%) of participants had ten and above years' work experiences.

**Table 1;** Socio-Demographic characteristics of nurses who are working in selected governmental hospital, Addis Ababa Ethiopia, April 2021.

Variable	Category	Number	Percent
Age	<30	159	39.4

	>=30	245	60.6
<b>Sex</b>			
	Male	174	43.1
	Female	230	56.9
<b>Educational level</b>			
	Diploma	30	7.4
	Degree	325	80.4
	>=master	48	11.9
<b>Work experience</b>			
	<10years	224	55.4
	>=10years	180	44.6

## 5.2. Personal characteristics

Near to half 166(41.1%) of respondent's are feeling discomfort when they put on face mask. 73(18.1%) developed Allergy/acne when they started to put on face mask for long period of time during COVID-19 pandemic, and only 58(14.4%) of nurses have uncertain belief on surgical face mask regarding prevention of COVID-19 infection.

**Table 2;** personal characteristics of nurses who are working in selected governmental hospital, Addis Ababa Ethiopia, April 2021.

Variable	Category	Number	Percent
<b>Do you Feeling discomfort when you put on face mask</b>			
	Yes	166	41.1
	No	238	58.9
<b>Do you have Allergy/acne related to face mask use</b>			
	Yes	73	18.1
	No	331	81.9
<b>Did you belief the effectiveness of surgical face mask against COVID-19</b>			

Yes	346	85.6
No	58	14.4

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### 5.3. Organizational characteristics

Among a total of 404 respondents 149(36.9%) of participants were from inpatient department and, 117(29.0%) were from outpatient department. 225(55.7%) participants had no training on face mask utilization, in addition above half 226(55.9%) of respondent's states there is no adequate face mask supply in their working place, and 86(21.3%) of nurses said that put on face mask is rule in your working place.

**Table 3;** Organizational characteristics of nurses who are working in selected governmental hospital, Addis Ababa Ethiopia, April 2021.

Variable	Category	Frequency	Percent
<b>Working unit</b>			
	In patient	149	36.9
	Outpatient	117	29.0
	OR	50	12.4
	Emergency	69	17.1
	Other*	19	4.7

**Training related to face masking**

Yes	179	44.3
No	225	55.7

**Are you supplemented adequate face mask from your hospital during COVID-19 pandemic**

Yes	178	44.1
No	226	55.9

**Is put on face mask is rule in your working place**

Yes	86	21.3
No	318	78.7

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NOTE \* supervision, infection prevention, social work

**5.4. Knowledge and factors affecting nurses knowledge towards face mask during COVID-19 pandemic**

Knowledge of nurses were assessed by using 9 knowledge-based questions. The mean knowledge score was 6.3, and ranging from 2 up to 9 scores. Of the total of 404 respondents, 300(74.3%) of them had poor knowledge about face mask use the rest 104(25.7%) has good knowledge. Regarding specific knowledge-based questions, almost all 363 (89.9%) of Nurses knows white side of surgical face mask should be facing in, above half 242(59.9%) ,233(57.7%), and 225(55.7%) of respondents has responded the correct answer of surgical face mask has three layers, the middle layer of surgical face mask has filtration media barrier, and 95% BFE & PFE is a type of mask actually protecting against COVID-19 infection, respectively. Concerning the Length of time used by surgical mask two thread 283(70.0%) of participants were respond correctly. 335(82.9%) and 355(87.9%) knows the extant of surgical face mask should cover and the purpose of metal Streep, respectively. Above half of 225(55.7%) nurses responded Close face mask is effective as surgical face mask (Table 4).

**Table 4;** - Nurses' knowledge towards face mask during COVID-19 pandemic ~~Of the total of 404 respondents, 300(74.3%) of them had poor knowledge about face mask.~~

~~Regarding specific knowledge-based questions, almost all 363 (89.9%) and 242 (59.9%) of Nurses knows whit side of surgical face mask is facing in, and standard surgical face mask has three layers, respectively. 338(83.7%) of respondents knows wearing surgical face mask has protection effect against COVID-19 infection. 233(57.7%) and 225 (55.7%) of the participants knows the middle layer of face mask has filtration media barrier, and 95% BFE & PFE face masks is actually protected from COVID-19 infection, respectively. Concerning the recommended length of time of surgical face mask use 283(70%) of participants were responded correctly. 335(82.9%) and 355(87.9%) responded correctly regarding with the extant of surgical face mask should cover, and the purpose of metal strip, respectively. Near to half of respondents 179 (44.3%) of them know Close face mask has less effective than surgical face mask (Table 2).~~

in selected governmental hospitals Addis Ababa, Ethiopia, April 2021.

Variable	Category	Frequency	Percent
Correctly use a surgical face mask?			
	White side facing out	41	10.1%
	<b>White side facing in</b>	363	89.9%
How many layers are there in surgical face mask?			
	Two	153	38.9%
	<b>Three</b>	242	59.9%
	Four	9	2.2%
Wearing surgical face mask protects from COVID-19?			
	<b>Yes</b>	338	83.7%
	No	66	16.3%
Layer having filter media barrier?			
	Inner layer	136	33.7%
	<b>Middle layer</b>	233	57.7%
	Outer layer	35	8.7%
Type of mask protect against COVID-19?			

<b>95% BFE &amp; PFE</b>	225	55.7%
97% BFE & PFE	70	17.3%
91% BFE & PFE	33	8.2%
99% BFE & PFE	76	18.8%
Length of time used?		
4 hrs	109	27.0%
<b>8hrs</b>	283	70.0%
2hrs	7	1.7%
1hrs	5	1.2%
The extant surgical face mask should cover?		
Nose only	1	0.2%
Nose and mouth	68	16.8%
<b>Nose, mouth and chin</b>	335	82.9%
The purpose of metal strip?		
No purpose	12	3.0%
<b>To fit on the nose</b>	355	87.9%
To fit on the chin	37	9.2%
Is Close face mask effective as surgical face mask?		
Yes	225	55.7%
<b>No</b>	179	44.3%

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#### **5.4.1. Socio-demographic characteristics affecting nurses' knowledge of face mask**

The association of knowledge of face mask with nurses' sociodemographic characteristics was examined and the strength of the relation-ship was quantified using odds ratio (AOR) and 95% confidence interval.

In bivariate logistic regression analysis Age, sex, and work experience has associated with nurse's knowledge with a P-value < 0.05 (COR=2.3 and 95% (1.42-3.8), (COR=6.4 and 95% (3.4-10.7), and (COR=2.3 and 95% (1.5-3.7) respectively. In multivariate analysis male nurses are 4 times more knowledgeable than female nurses (AOR=4.2 and 95% CI=2.6-6.9) (Table :-5).

**Table 5;** - Bivariate and multivariate logistic regression analysis of sociodemographic characteristics with knowledge of nurses on face mask

Variable	Category	Knowledge		COR	AOR
		Poor	Good		
<b>Age</b>					
	<30	132	27	1.00	1.00
	>=30	166	79	2.3(1.42-3.8) *	1.5(0.8-3.3) **
<b>Sex</b>					
	Male	104	79	6.4(3.4-10.7) *	<b>4.2(2.6-6.9) **</b>
	Female	194	27	1.00	1.00
<b>Educational status</b>					
	Diploma	24	6	1.00	1.00
	Degree	245	80	1.31(0.52-3.1)	1.1(0.4-3.0)
	Masters	29	20	2.9(0.98-8.27) **	2.2(0.7-7.0) **
<b>Work experience</b>					
	<10	180	42	1.00	1.00
	>=10	118	64	2.3(1.5-3.7) *	1.7(0.9-3.4) **

Note \*=P value<=0.05 \*\*=p value<=0.25 1.00= reference

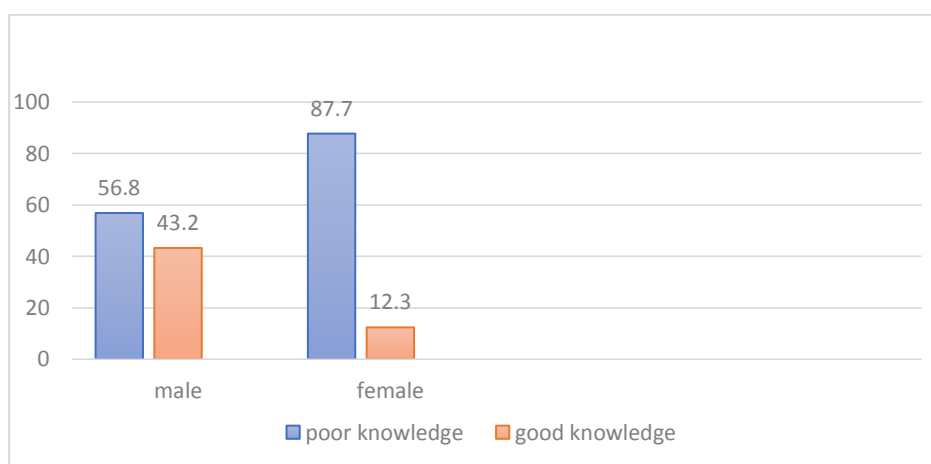


Figure 3;- Nurses' Gender and level knowledge



### 5.4.2. Organizational characteristics affecting knowledge of face mask

In bivariate logistic regression analysis nurses who have training related to face masking has association with knowledge of face masking with P-value < 0.05(COR=11.2 and 95% CI=6.31-19.8), and in multivariate analysis nurses who have training related to face mask are nine times more knowledgeable than nurses who have no training related to face masking (AOR=9.4 and 95% CI=5.4-16.2).

**Table 6;** - Bivariate and multivariate logistic regression analysis of organizational factors associated with nurse's knowledge towards face mask.

Variable	Category	Knowledge		COR	AOR
		Poor	Good		
<b>Working unit</b>					
	Inpatient	105	44	0.8(0.5-1.4)	
	Outpatient	88	29	0.5(0.2-1.16)	
	OR	41	9	0.8(0.4-1.6)	
	Emergency	51	18	0.6(0.2-2.02)	
	Administration	15	4	1.00	
<b>Training</b>					
	yes	95	89	11.2(6.31-19.8) *	<b>9.4(5.4-16.2) *</b>
	no	205	15	1.00	1.00
<b>Inadequate supply</b>					
	Yes	164	62	1.2(0.74-1.8)	
	No	134	44	1.00	
<b>Rule</b>					
	Yes	59	27	1.4(0.8-2.3) **	1.2(0.7-2.1)
	No	239	79	1.00	1.00

Note \*=P value<=0.05 \*\*=p value<=0.25 1.00= reference

### 5.4.3. Personal characteristics affecting knowledge towards face mask

In bivariate logistic regression analysis nurses who are feeling discomfort and developed allergy/acne related to face masking has association with knowledge of face mask with a

P-value  $\leq 0.05$  (COR=1.7 and 95% CI=1.1-2.6), and (COR=2.0 and 95% CI=1.9-3.5) respectively.

In multivariate analysis nurses who have allergy/ acne related to face masking is 2 times more knowledgeable than nurses who have no allergy/acne related to face masking (AOR=1.8 and 95% CI=1.0-3.1) (Table;-7).

**Table 7;** - Bivariate and multivariate logistic regression analysis of personal factors associated with of nurse's knowledge towards face mask.

Variable	Category	Knowledge		COR	AOR
		Poor	Good		
<b>Did you Feeling Discomfort when you put on face mask</b>					
	Yes	118	56	1.7(1.1-2.6) *	1.5(0.9-2.3) **
	No	180	50	1.00	1.00
<b>Did you have Allergy/acne related to face mask</b>					
	Yes	45	28	2.0(1.9-3.45) *	<b>1.8(1.0-3.1) *</b>
	No	253	78	1.00	1.00
<b>Uncertain Belief on the effectiveness of surgical face mask</b>					
	Yes	34	24	1.00	
	No	263	82	1.00	

Note \*P value  $\leq 0.05$  \*\*=p value  $\leq 0.25$  1.00= reference

**5.5. Attitude and factors affecting nurses' attitude towards face mask during COVID-19 pandemic** ~~Of the total of 404 respondents, 300(74.3%) of them had poor knowledge about face mask.~~

~~Regarding specific knowledge-based questions, almost all 363 (89.9%) and 242 (59.9%) of Nurses knows whit side of surgical face mask is facing in, and standard surgical face mask has three layers, respectively. 338(83.7%) of respondents knows wearing surgical face mask has protection effect against COVID-19 infection. 233(57.7%) and 225 (55.7%) of the participants knows the middle layer of face mask has filtration media barrier, and 95% BFE & PFE face masks is actually protected from COVID-19 infection, respectively. Concerning the recommended length of time of surgical face mask use 283(70%) of participants were responded correctly. 335(82.9%) and 355(87.9%) responded correctly regarding with the extant of surgical face mask should cover, and the purpose of metal strip, respectively. Near to half of respondents 179 (44.3%) of them know Close face mask has less effective than surgical face mask (Table 2).~~

Attitude of nurse's face mask utilization was assessed by using 12 Likert scale questions. The mean attitude score was 34.4 ( $\pm 6.1$  SD), ranging from 9 up to 45 scores. Regarding specific attitude items 365(90.3%) and 379(93.8%) of nurses had positive attitude related to willing to know the correct steps of wearing face mask, and face mask should be carefully put-on and taken off, respectively. In addition, 369(91.3%) of respondents had positive attitude on face mask is keep individuals from touching secretions from mouse and nose. Concerning the effectiveness of face mask in preventing the spread of droplets, near to one tenth 33(8.2%) of them had negative attitude. 159(39.4%) of nurses registered negative attitude in changing face mask is not necessary before going to another patient, while the rest 245(60.6%) has positive attitude with changing face mask is necessary before going to another patient. Only 269(66.6%) of participants had registered positive attitude with wearing face mask is necessary, even if I am not afraid of COVID-19 infection. The large majority of 357(88.4%) of participants had positive attitude with mask is effective only when used with other COVID-19 prevention practices (Table 8).

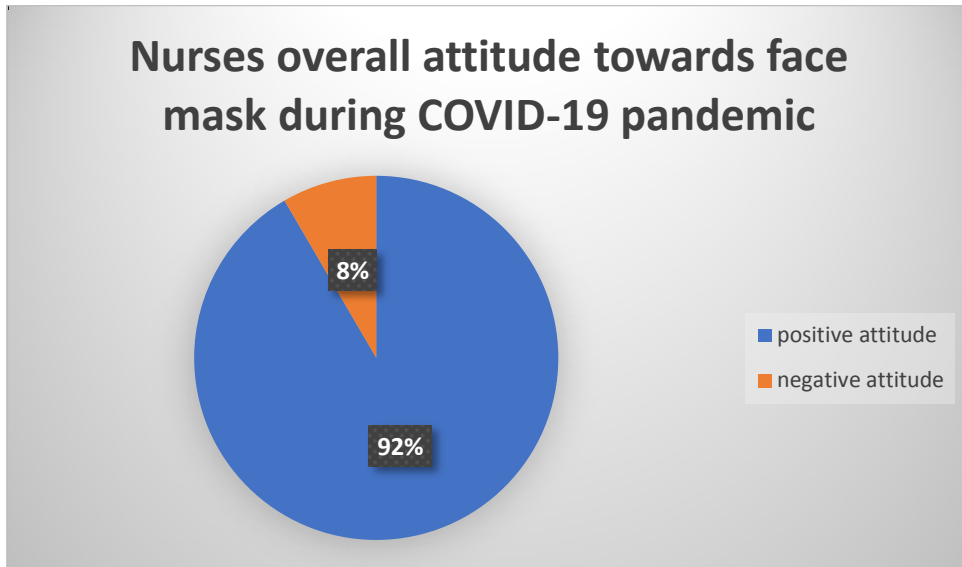


Figure 4 Nurses overall attitude towards face mask during COVID-19 pandemic

Table 8

; - Nurse's attitude towards face mask who are worked in Addis Ababa governmental hospitals

Variable	Negative attitude		Positive attitude	
	Neutral			
	Number (percent)		Number(percent)	
Willing to know the correct steps of wearing.	<del>69</del> (17.1%)	<del>39</del> (9.7%)	<del>335</del> (82.9%)	<del>365</del> (90.3%)
Need to be carefully put on taken off.	<del>49</del> (12.1%)	<del>25</del> (6.2%)	<del>355</del> (87.9%)	<del>379</del> (93.8%)
Keep individuals from touching mouth and nose.	<del>72</del> (17.9%)	<del>35</del> (8.7%)	<del>332</del> (82.2%)	<del>369</del> (91.3%)
Very effective from at preventing potentially infectious droplets.	<del>65</del> (16.1%)	<del>33</del> (8.2%)	<del>339</del> (83.9%)	<del>371</del> (91.8%)

Necessary to change face mask before going to another patient.	<del>231(57.1%)</del> <u>159(39.4%)</u>	<del>173(42.8%)</del> <u>245(60.6%)</u>
Necessary to wear face mask when in contact in patient.	<del>86(21.3%)</del> <u>56(13.9%)</u>	<del>318(78.7%)</del> <u>348(86.1%)</u>
Wearing face mask is not necessary if am not afraid COVID-19 infection.	<del>187(46.3%)</del> <u>217(53.7%)</u>	<del>217(53.7%)</del> <u>187(46.3%)</u>
COVID-19 infection is the worst thing that could happen to a patient.	<del>199(48.9%)</del> <u>135(33.4%)</u>	<del>205(50.8%)</del> <u>269(66.6%)</u>
Masks are effective only when used with other COVID-19 prevention practices.	<del>71(17.5%)</del> <u>47(11.6%)</u>	<del>333(82.4%)</del> <u>333(88.4%)</u>

### 5.5.1. Socio-demographic factors affecting attitude of nurses towards face mask

The association of nurse's attitude towards face mask during COVID-19 with sociodemographic characteristics was examined. The strength of the relationship was quantified using odds ratio (AOR) and 95% confidence interval.

In bivariate logistic regression analysis work experience was associated with attitude of nurse's face mask with P value  $\leq 0.05$  (COR=3.4 and 95% CI=1.4-8.0), and In multivariate logistic regression analysis nurses who have work experience greater than ten years are four times better attitude than nurses who have less than ten years work experience with ((AOR)=4.4 and 95% CI=1.6-12)(Table ; -9).

**Table 9 ; - Bivariate and multivariate logistic regression analysis of sociodemographic characteristics with Attitude of nurses with face mask.**

Variable	Category	Attitude		COR	AOR
		Unsatisfactory	satisfactor y		
<b>Age</b>					
	<30	42	286	0.6(0.3-1.0)	0.9(0.7-2.9) **
	≥30	4	72	1.00	1.00
<b>Sex</b>					

	Male	17	166	1.33(0.7-2.5)	
	Female	29	192	1.00	
<b>Educational status</b>					
	Diploma	4	26	1.00	
	Degree	38	287	1.2(0.4-3.5)	
	>=masters	4	45	1.7(0.4-7.34)	
<b>Work Experience</b>					
	<10	33	189	1.00	1.00
	>=10	13	169	3.8(1.7-8.0) *	4.4(1.8-10.8) **
<b>Working unit</b>					
	Inpatient	16	133	0.9(0.2-4.6)	
	Out-patient	12	105	1.0(0.2-5.0)	
	OR	7	43	0.7(0.14-3.8)	
	Emergency	9	60	0.8(0.6-4.0)	
	Other	2	17	1.00	
<b>Training</b>					
	Yes	11	171	2.9(1.4-5.9) *	2.7(1.33-5.6) **
	No	35	187	1.00	1.00
<b>Other Factors affect</b>					
	Inadequate supply	23	203	1.3(0.7-2.4)	
	Discomfort	17	157	1.3(0.7-2.5)	
	Allergy/acne	7	66	1.3(0.53-2.5)	
	Belief	5	53	0.7(0.26-1.9)	

	Rule	7	79	0.6(0.3-1.47)	
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Variable	Category	Attitude		COR	AOR
		Negative	Positive		
<b>Age</b>					
	<30	17	142	0.6(0.3-1.3) **	1.7(0.7-1.5)
	>=30	17	208	1.00	1.00
<b>Sex</b>					
	Male	12	162	1.4(0.7-3.0)	
	Female	22	208	1.00	
<b>Educational status</b>					
	Diploma	4	26	1.00	1.00
	Degree	28	297	1.2(0.4-3.5)	1.2(0.5-4.7)
	>=masters	2	47	1.7(0.4-7.34) **	3(0.5-18.6) **
<b>Work Experience</b>					
	<10	33	189	1.00	1.00
	>=10	13	169	3.4(1.4-8.0) *	<b>4.4(1.6-13) *</b>

Note \*=P value<=0.05 \*\*=P value<=0.25 1.00= reference

### 5.5.2. Organizational factors affecting nurses' attitude towards face mask

In bivariate logistic regression analysis training related to face masking was associated with attitude of nurse's face mask with P value<=0.05 with (COR= 4.1 and 95% CI=1.7-10.0).

**Table 10;** - Bivariate logistic regression analysis of organizational characteristics with Attitude of nurses with face mask

Variable	Category	Attitude		COR
		Negative	Positive	
<b>Working unit</b>				
	Inpatient	11	138	0.9(0.2-4.6)

Out patient	10	107	1.0(0.2-5.0)
OR	4	46	0.7(0.14-3.8)
Emergency	9	60	0.8(0.6-4.0)
Other	0	19	1.00
<b>Training</b>			
Yes	6	173	<b>4.1(1.7-10.) *</b>
No	28	197	1.00
<b>Inadequate supply</b>			
Yes	16	210	1.3(0.7-2.4)
No	18	160	1.00
<b>Rule</b>			
Yes	5	81	0.6(0.3-1.47)
No	29	289	1.00

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Note \*=P value<=0.05 1.00= reference



### 5.5.3. Personal characteristics affecting nurses' attitude towards face mask

The association of nurse's attitude of face mask use during COVID-19 with personal factor was examined. In bivariate logistic regression analysis, none of the listed personal characteristics are associated with nurse's attitude towards face mask during COVID-19 pandemic.

Table 11 ; - Bivariate logistic regression analysis of personal characteristics associated with nurses' attitude towards face mask.

Variable	C	Attitude	COR	A
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	actø	aet		
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		y		
<b>Age</b>				
	< 42	28	0.6(0.3-1.0)	0
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				-
				2

					9
					*
					*
	>	4	72	1.00	1
	=				0
	<				0
<b>Sex</b>					
	M	17	16	1.33(0.7-2.5)	
	a		6		
	l				
	e				
	F	29	19	1.00	
	e		2		
	n				
	a				
	l				
	e				
<b>Educational status</b>					
	E	4	26	1.00	
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Variable	Category	Attitude		COR
		Negative	Positive	
<b>Discomfort</b>				
	Yes	13	161	1.3(0.7-2.5)
	No	21	209	1.00
<b>Allergy/acne</b>				
	Yes	5	68	1.3(0.53-2.5)

No	29	302	1.00
<b>Belief</b>			
Yes	4	54	0.7(0.26-1.9)
No	5	81	1.00
<b>Knowledge of face mask</b>			
Poor knowledge	28	270	1.00
Good knowledge	6	100	1.7(0.7-4.3) **

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Note \*\*=P value<=0.25    1.00=reference

### **5.6. practices and factors affecting nurse’s practice towards face mask during COVID-19 pandemic**

Nurses assessed for their practices of face mask by using 12 practice-based questions, the mean practice score was found to be 9.3 (SD =2.6). Among the total nurses 318(78.7%) of them had poor practical face mask use. Concerning specific questions, 306(76.5%) of respondents do not remove their face mask in their working place the rest 23.5% remove their mask when they feel shortness of breath, and during talk to patients,123(30.4) of respondents said I always store the used surgical mask in a bag for later use. only 133(32.9) of them are always wash their hands, sanitized and/or put on a clean pair of gloves prior to donning surgical face mask, 99(24.5%) did not use anything to protect their surgical face mask from contamination. 98(49.0%) of nurses put their mask in chin, ear or neck, and hold it by hand when they want to eat, drink, or smoke. Only 61(15.0%), and 90(22.3%) of nurses replace their face mask with other new when their mask is soiled,



splash of body fluid from clients and after they use it for 8 hours, and nurses never reused their single used surgical face mask, respectively.

In this study 15 nurses were observed with observation check list to assess their practices with face mask use, among those only 4 are sanitized their hands prior to donning their surgical mask, all observed nurses are identifying the “inside” of the face mask before donning, and pull the top and bottom of the mask to expand the folds. About 11 nurses press the noseband to conforms the metal Streep is on nose, and the rest 4 nurse put the nose band on their mouth without including their nose and there is visible gap between their nose and the mask, almost all observed nurses touch their mask without sanitized their hand and touch continuously to pull up and down during talking with their clints and coworkers. One third of observed nurses are touché the front part of the mask during removal of their used surgical face mask and 3 of nurses are remove their mask and put on their chin when they want to talk to their coworkers and patients. no one of observed nurses discarded the used mask and replace with other new when they finish their working time and go to their home, and none of the observed participants is decontaminating their hand secondary to removal of their used surgical face mask.

**Table 11;- Nurse’s Practices towards face mask who are working in selected Addis Ababa governmental hospitals Addis Ababa Ethiopia 2021.**

Variable	Poor practices	Good practices
	Never/sometimes	Always
	No (%)	No (%)
If you are not sick, do you store the used surgical mask in a bag for later use	281(69.5)	123(30.4)
Did you wear a face mask in public	75(18.6)	329(81.4)
Did you wear a face mask in hospital	55(13.7)	349(86.4)
Wash your hands/hand sanitizer and/or put on a clean pair of gloves prior to donning the mask	271(67.1)	133(32.9)

Identify the “inside” of the face mask before donning?	110(27.2)	294(72.8)
Pull the top and bottom of the mask to expand the folds?	122(30.2)	282(69.8)
Press the noseband whether it conforms to your nose bridge or not?	121(29.9)	283(70)
Discard the mask after 8hr in use	314(77.7)	90(22.3)

### 5.6.1. Socio-demographic factors affecting practices nurses towards face mask

The association of nurse’s sociodemographic characteristics and practices of face mask was examined. The strength of the relation-ship was quantified using odds ratio (AOR) and 95% confidence interval. In bivariate logistic regression analysis nurses’ practice towards face mask is associated with age, sex, and work experience with P value<=0.05 (COR=2.3, and 95% CI=1.4-4.1), (COR=2.0 and 95% CI=1.2-3.35), and (COR= 2.6 and 95% CI=1.6-4.2) respectively. In multivariate logistic regression female nurses are two times better practical face mask use than male nurses with (AOR)=2.1 and 95% CI= (1.2-.3.4), in addition nurses who have work experience greater than ten years have two times better practice than that of nurses who are less than ten years work experience with (AOR)=2.1 and 95% CI= (1.0-4.2) (Table 13).

Table 12; - Bivariate and multivariate logistic regression analysis of sociodemographic characteristics associated with nurses’ practices towards face mask.

Variable	Category	Practice		COR	AOR
		Poor	Good		
<b>Age</b>					
	<30	138	21	1.00	1.00
	>=30	180	65	2.3(1.4-4.1) *	1.3(0.6-3.1)**
<b>Sex</b>					
	Male	155	31	1.00	1.00
	Female	168	51	2.0(1.2-3.3) *	<b>2.1(1.2-3.4) *</b>
<b>Educational status</b>					
	Diploma	24	6	1.00	

Degree	261	64	1.1(0.4-2.7)	
>=Master	38	11	1.2(0.38-3.6)	
<b>Work experience</b>				
<10	192	32	1.00	1.00
>=10	126	54	2.6(1.6-4.0) *	<b>2.1(1.0-4.2) *</b>

Note \*=P value<=0.05 \*\*=P value<=0.25 1.00= reference

### 5.6.2. Organizational factors affecting practices of nurses towards face mask

The association of organizational characteristics affecting nurse's practices of face mask was examined. In bivariate logistic regression analysis none of the organizational characteristics have association with practices of nurses towards face mask use (Table;- 13).

**Table 13** ;- Bivariate logistic regression analysis of Organizational factors associated with Practice of nurse's face mask use.

Variable	Category	Practice		COR
		Poor	Good	
<b>Working unit</b>				
	Inpatient	119	30	0.98(0.3-3.2)
	Out patient	90	27	1.24(0.38-4.02)
	OR	42	8	0.7(0.2-2.7)
	Emergency	87	12	0.98(0.27-3.3)

	Other	15	4	1.00
<b>Training</b>				
	Yes	146	36	0.85(0.52-1.4)
	No	172	50	1.00
<b>Rule</b>				
	Yes	72	14	1.5(0.8-2.8) **
	No	246	72	1.00
<b>Inadequate supply</b>				
	Yes	179	47	0.9(0.5-1.5)
	No	139	39	1.00

Note \*=P value<=0.05 1.00= reference

### 5.6.3. Personal characteristics affecting practices of nurses towards face mask.

The association of personal characteristics affecting nurse's practices of face mask was examined, and the strength of the relationship was quantified using odds ratio (AOR) and 95% confidence interval. In multivariate logistic regression nurses who have good knowledge about face mask use are two times better face mask practice than nurse who have poor knowledge of face mask with (AOR= 1.8 and 95% CI=1.1-2.9).

**Table 14;-** Bivariate and multivariate logistic regression analysis of personal characteristics associated with Practice of nurse's face mask use.

Variable	Category	Practice		COR	AOR
		Poor	Good		
<b>Feeling Discomfort</b>					
	Yes	137	37	0.7(0.4-1.1) **	0.7(0.4-1.1) **
	No	181	49	1.00	1.00
<b>Allergy/Acne is developed when I put on face mask</b>					
	Yes	62	11	0.6(0.3-1.2) **	0.6(0.3-1.3) **

No	256	75	1.00	
<b>Uncertain Belief on surgical face mask against COVID-19.</b>				
Yes	50	8	1.8(0.8-4.0)	
No	267	78	1.00	
<b>Knowledge of face mask</b>				
Poor knowledge	241	57	1.00	1.00
Good knowledge	77	29	0.6(0.9-1.1) **	<b>1.8(1.1-2.9) *</b>

Note \*=P value<=0.05 \*\*= P value<=0.25 1.00= reference



Figure 5;-Nurses Knowledge, Attitude and Practice of face mask with training

## **6. DISCUSSION**

The main purpose of this research is to assess knowledge attitude and practices of face mask and its associated factors during COVID-19 pandemic among nurse's who are working in Addis Ababa governmental hospitals. Though there are a few studies that were done in an international and national context aiming to assess the knowledge, attitude, practice and its associated factors towards health care workers face mask utilization in case of COVID-19, there is almost no study conducted that was focused on only nurses in international basis as well as national basis.

Put on face mask with proper utilization is one of the key recommendations by WHO among the lists of COVID-19 prevention practices (2). A systematic review and meta-analysis conducted to assess the efficacy of face mask in preventing respiratory virus transmission were showed that having proper practice of face masking prevent health care workers and non-health care workers from respiratory tract infection by 80% (13).

In this study the level of nurse's knowledge towards face mask is only 25.7%, in line with the study done in Addis Ababa (21.3%) (10). There are different studies conducted for different purpose having optimal level of knowledge compared with this result, HCW work in TASH and St. Paul's has 83% of good knowledge regarding using of surgical face mask in tuberculosis infection control (19), and 66.5% of knowledge of HCW regarding use of respiratory protection equipment's at Iran hospital(13), and 35.2% level of knowledge in HCW who are working in Pakistan Pfau Civil Hospital (13), this variation might be due to the study's aim difference, difference in study population and method of the research.

In this study Sex was found to be factor that affects nurse's knowledge towards face mask. Male nurses were four times more likely to have good knowledge about face mask as compared to female nurses. While a study done in Addis Ababa showed that female health care workers are 2.2 times knowledgeable than male health care workers (AOR = 2.2, 95% CI: 1.25-3.86) (10). This can be explained by difference in study area and study population.

Based on this study nurses who have training on face mask has eight times knowledgeable than those who have no training with AOR=9.4 and 95% CI=(5.4-16.2), in the same manner a study conducted in Nigeria 74.4% of nurses received training with the overall level of knowledge is 91.9% and recommended frequent training of nurses on appropriate use of PPE based on findings of their study(24).

Newly yielded significant variable based on this study for knowledge of face mask were allergy/acne related to face masking, Nurses who have developed allergy/acne related to face masking are two times knowledgeable than nurses who have no allergy /acne, this might be explained as nurses who have allergy/acne related to face masking are increased knowledge related to searching for the cause of their problem, but it needs further investigation.

With regard attitude of nurses towards face masking, in current study, 91.6% of nurses had a positive attitude towards face masking during COVID-19 pandemic, its two times higher than 39.3% of nurses face mask utilization in Addis Ababa, Ethiopia (10), this difference might be related to increased availability of training and currently different social media and service providing organization stressfully mention the effectiveness of put-on face mask against COVID-19.

Work experience is the factor affecting nurses' attitude towards face mask use in line with Addis Ababa HCW (10), this might explain as experienced nurses have more job experience received more training on infection prevention and personal protective equipment's and had a better attitude on use of PPE and prevention of infection.

current study identified that only 21.3% of the nurses had good face masks practice. The result was nearly the same with nurses practice in Addis Ababa (26.4%) and higher than a study conducted in Madda Walabu University, Goba Referral Hospital, HCW having good

practice was 8.5%(32), this variation might be due to the difference of tool and difference study population as well as study period, this study is conducted during increased COVID-19 related morbidity and mortality.

Practice of nurse's face mask in individuals with higher job experience was better. These findings consistent with other studies in Addis Ababa, and Iran hospitals HCW (10,13). This could be credited to the truth that these nurses with higher job experience received more training on the job safety and health issues and had a better understanding of hospital acquired infection hazards and prevention practices.

According to this study good practices of face mask is not statistically associated with having training related to face masking, while a study conducted in Madda Walabu University, Goba Referral Hospital HCW who have no training related to proper utilization of personal protective equipment were 2.2 times less likely to practice the correct use of facemask than their counterparts (25), this variation might be related to limitation of resources.

In the finding of this study male nurses were four times knowledgeable than female, but practice of female nurses were two times better than male nurses, this might be related to character difference, female are more responsible and obey commands, while male are inconsiderate even if they are aware more.

In this study knowledge and practice are a strong relation regarding use of face mask. In line with Addis Ababa police health facility Professionals(10), and in contrast with a study conducted in Iran hospital showed that a weak significant relationship was found between knowledge and practice concerning the use of RPE(22) this might be likely other more vital factors than knowledge that affect practice of face mask.

### **Strength**

- Conducted in five selected governmental hospitals and proportionally allocated to insure the representativeness of all governmental hospitals.
- The practical face mask assessment was well addressed by observational check list.



## **Limitation**

- On practice based self-administer question participants may answered unpractical activity as a practical.

## **7. CONCLUSION**

This study identified the knowledge, attitude, and practice of face mask among nurses who are working in selected governmental hospitals in Addis Ababa Ethiopia, the level of knowledge and practice of nurses in Addis Ababa governmental hospitals towards face mask use is extremely low.

In this study sex and face mask related training were significantly associated with nurse's knowledge. Nurses who have training related to face masking, male nurse and nurses who are developed allergy/acne due to face masking are good knowledge than complements.

Attitude of nurses towards face mask is significantly associated with training and work experience, nurses who have training, and have work experience more than ten years positive than counterparts

Sex, work experience and knowledge of face mask use were significantly associated with practices of nurse's face mask. Female and nurses have more than ten years work experience were better practical face mask utilization than counterparts.

## **8. RECOMMENDATION**

### **FMOH**

- Continues and comprehensive training should be addressed to increase knowledge, attitude, and practice of face mask utilization for all nurses.

### **Hospitals**

- Update professionals by training focused on face mask utilization
- Update and prioritized female nurses to increase the level of knowledge, and for those nurses who have less than 10 years' work experience.
- Supervise professionals on the effective utilization of face mask

### **Professional nurses**

- Adherence to proper use of face mask is the vital in prevention of COVID-19 infection.

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### **Appendix I:** Participant Information Sheet

Good morning/ afternoon?

My name is Asmeret leake. Now I am at Addis Ababa University, College of Health Sciences, School of nursing and midwifery, adult health nursing department, second year master's program student. And now I am conducting a research to assess nurses Knowledge, Attitude, Practice and associated factors on face mask during COVID-19 pandemic in selected governmental hospital, Addis Ababa, Ethiopia,2021.

**Title of the research:** Knowledge, Attitude, and Practice of nurse's towards face mask and its associated factors during COVID-19 pandemic in selected governmental hospital, Addis Ababa, Ethiopia,2021.

**Objective:** To assess Knowledge, Attitude, Practice and its associated factors of nurse's face mask during COVID-19 pandemic

**Participants:** Randomly selected nurses who are worked in selected hospitals on the time of data collection

**Potential Risks:** There is no foreseen risk by being in this study.

**Benefits:** No financial advantages are associated with this research. But you, by participating in this research, Input would be provided for the provision of facilities in the hospital. There are a few questions I would like to ask you. Your honest answer to the questions will make the study achieve its goal. All the information that you give will be kept private and confidential. The details would only be available to the principal investigator and interviewer. You are kindly asked to voluntarily respond. You can also pick no

Asmeret leake

E-mail:asmeretleakeret@gmail.com

**Appendix II: Informed consent**

Addis Ababa University

College of Health Science

Department of Nursing and Midwifery

I'm here with the declaration:

- The aims of this research are clarified to me and are straightforward.
- The content of the consent is checked in order for me to participate in the research.

I recognize that participation is entirely voluntary in this study and that I can withdraw without offering reasons at any time. I consent to participate in this report, given my privacy is assured. I pledge to respond honestly to all fair responses when signing this consent form to participate in the research.

Respondent's signature \_\_\_\_\_

If no, skip to the next participant

Date: \_\_\_\_\_ Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

Data collectorName \_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_

Supervisor's name \_\_\_\_\_ signature \_\_\_\_\_



Thank

you

## Annexe I

### Part 1: Socio –demographic characteristics

S/n	Socio –demographic	Response	Remark
Q101.	Gender	1. Male 2. Female	
Q102	Age	_____in complete year	
Q103	Educational status	1. Diploma 2. Degree 3. Masters 4. PhD	
Q104	Level of experience	_____in year	
Q105	Working unit	-----	
<b>Other associated factors</b>		<b>Yes</b>	<b>No</b>
Q106	Are you trained on face mask utilization		
Q107	Did you supply adequate face mask from the hospital		
Q108	I feel discomfort (shortness of breath when I put on face mask)		
Q109	I am allergy/ Acne is developed when I put on surgical face mask for long period of time.		
Q110	I don't belief using surgical face mask can protect me from COVID- 19		
Q111	I wear face mask because it is rule.		

Part 2: Knowledge of nurses in face masks utilization

S/n	Practice	Response	Remark
Q201	Which is the correct way of using surgical face mask to protect against COVID-19	1. White side facing out 2. White side facing in	
Q202	How many layers are there in a surgical mask	1. Two 2. Three 3. Four	
Q203	Can wearing a surgical mask protect you from COVID-19	1. Yes 2. No	
Q204	Which layer acts as a filter media barrier	1. First layer 2. Middle layer 3. Last layer	
Q205	Which type of masks actually protect against COVID-19	1. 95% BFE and PFE 2. 97% BFE and PFE 3. 91% BFE and PFE 4. 99% BFE and PFE	
Q206	How long surgical face mask in used	1. 4hours 2. 8 hours 3. 2 hours 4. 1 hour	
Q207	For proper wearing, to which extent the surgical mask should cover?	1. Nose only 2. Nose and mouth 3. Nose, mouth, and chin	
Q208	What is the purpose of the metal strip on a surgical mask	1. No purpose 2. To fit on the nose 3. To fit on the chin	
Q209	Is the cloth facial mask as effective as a regular surgical facial mask	1. Yes 2. No	

BFE, bacterial filtration efficiency; PFE, particle filtration efficiency

### Part 3: Attitude nurses in face mask utilization

S/n	Question	S.Dis agree (1)	Disa gree( 2)	Neut ral (3)	Ag ree (4)	S.Agr ee (5)
Q301	I am willing to know the correct steps of wearing a face mask					
Q302	Face masks need to be carefully put on and taken off in order to prevent self-contamination					
Q303	Face mask keep individuals from touching mucous membranes (mouth and nose) with their potentially contaminated hands					
Q304	Face mask are very effective at preventing potentially infectious droplets from spreading					
Q305	It is necessary to changing mask before going to another patient					
Q306.	It is necessary to wear masks when in contact with patients.					
Q307	It is not necessary to wear face mask as I am not afraid of getting Corona virus infection.					
Q308	Becoming Corona virus infected is the worst thing that could happen to patients so It is necessary to changing mask before going to another patient					
Q309	Masks are effective only when used in combination with frequent hand-cleaning with alcohol-based hand rub or soap and water					

### Part 4: Practice of nurses in facemask utilization

S/N	Question	Response
Q401	During clinics, when will you remove your mask	1. when I need to talk to the

		<p>patient</p> <p>2. I never remove</p> <p>3. other</p>
Q402	If you are not sick, do you store the used surgical mask in a bag for later use	<p>1. Always</p> <p>2. Sometimes</p> <p>3. Never</p>
Q403	Did you wear a face mask in public places	<p>1. Always</p> <p>2. Sometimes</p> <p>3. Never</p>
Q404	Did you wear a face mask in hospital premises	<p>1. Always</p> <p>2. Sometimes</p> <p>3. Never</p>
Q405	<b>When I wear a surgical face mask</b>	
Q405_1	Did you wash your hands, use hand sanitizer and/or put on a clean pair of gloves prior to donning the mask	<p>1. Always</p> <p>2. Sometimes</p> <p>3. Never</p>
Q405_2	Did you identify the “inside” of the surgical/medical mask before donning?	<p>1. Always</p> <p>2. Sometimes</p> <p>3. Never</p>
Q405_3	Did you confirm the metal noseband should be on the top?	<p>1. Always</p> <p>2. Sometimes</p> <p>3. Never</p>
Q405_4	Did you pull the top and bottom of the mask to expand the folds?	<p>1. Always</p> <p>2. Sometimes</p> <p>3. Never</p>
Q405_5	Did you press the noseband whether it conforms to your nose bridge or not?	<p>1. Always</p> <p>2. Sometimes</p> <p>3. Never</p>
Q405_6	How did you protect your mask from contamination?	<p>1. I don't touch my mask with naked hand</p>

		<p>2. I wash my hand, or hand sanitizer, or put-on glove to touch my face mask</p> <p>3. I didn't use anything to protect my face mask</p>
Q405_7	What did you do to your mask while you want to eat, drink, or smoke?	<p>1. I put it in my chin, ear or neck</p> <p>2. I put it in clean handler</p> <p>3. I hold it by my hand</p> <p>4. Other</p>
Q405_8	How did you remove your mask?	<p>1. I touch only the band without touching the inside</p> <p>2.I touch only the centre without touching the band</p>
Q405-9	What did you do after you remove your face mask	<p>1. I clean my hand with water and soap /sanitize with alcohol-based hand sanitizer</p> <p>2. I clean my hand with water only</p> <p>3. I didn't do any thing</p>
Q405_10	When did you dispose your mask?	<p>1. When soiled or wet.</p> <p>2. After I use it for 8 hours</p> <p>3. When there is splash of body fluid from clients</p>
Q406_11	Did you re-use masks?	<p>1. Always</p> <p>2. Sometimes</p> <p>3.Never</p>

## ANNEX II

Part 5: Checklist for observation of nurses on face mask utilization during COVID-19 pandemic based on WHO guideline on face mask utilization (12)(16).

S/N	Question	Response	Remark
Q502	The mask is not removed during talking, coughing and sneezing	Yes No	
Q503	put their face mask by clean handler during eating, drinking or smoking	Yes No	
<b>How to put on a face mask</b>			
Q505_1	Clean hands with soap and water or hand sanitizer before touching the mask	Yes No	
Q505_3	Determine which side of the mask is the top	Yes No	
Q505_4	Determine which side of the mask is the front.	Yes No	
Q503_5	Pinch the stiff edge to the shape of the nose	Yes No	
Q503_6	covers mouth and nose with mask and there are no gaps between face and the mask.	Yes No	
Q504	<b>How to remove a face mask</b>		
Q504_1	Clean hands with soap and water or hand sanitizer before touching the mask	Yes No	
Q504_2	Avoid touching the front of the mask.	Yes No	
Q503_5	Clean hands with soap and water or hand sanitizer after the mask is trashed	Yes No	











## Document Information

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<b>Submitted by</b>	Niguse Tadele
<b>Submitter email</b>	niguse.tadele@aaau.edu.et
<b>Similarity</b>	16%
<b>Analysis address</b>	niguse.tadele.aauni@analysis.urkund.com

## Sources included in the report

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