

## Preventive practice and associated factors among health care workers towards COVID-19 in Addis Ababa covid care center

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### ABSTRACT

**Background:** COVID-19 has made exceptional challenges to public health globally. Healthcare experts who are at the frontline of the outbreak reaction are at increased risk of getting infected. The high infection rate of COVID-19 has been reported among frontline healthcare workers which might be linked to low prevention practices. However, in the context of Ethiopia, studies ascribed to the prevention practice against COVID-19 among healthcare workers are limited. Therefore, this study aimed to assess the Preventive practice against COVID-19 and associated factors among healthcare workers.

**Methods and materials:** Institution-based cross-sectional study design was conducted on 240 healthcare workers at the Millennium Covid Care Center and a pretested structured questionnaire was used for the data collection. The data was entered into epi data version 4.4.2.2 and exported to SPSS window version 25 for analysis. Descriptive statics and binary logistic regression were used. Odds ratio with a 95% confidence interval and  $p$ -value  $\leq 0.05$  were quantified to measure the effect sizes of independent variables and to declare statistical significance respectively.

**Result:** This study showed that 55% of healthcare workers have good preventive practice. In line with this, lack of personal protective equipment(AOR=2.978, 95%CI(1.426-6.220)), designed isolation area (AOR=2.251, 95%CI(1.056-4.799)), availability of chemical disinfectant (AOR=5.055, 95%CI (2.283-11.191)), training on covid case management(AOR=6.04, 95%CI(2.569-14.204)), infection prevention guideline availability (AOR=2.59, 95%CI(1.192-5.627), and discomfort while using PPE (AOR=4.125 95%CI (1.779-9.561)) showed significant association with the preventive practice of frontline health care workers towards covid 19.

**Conclusion:** The overall finding of this study revealed that healthcare workers had poor preventive practice (45%) towards covid 19. Addressing these identified factors will enable the reduction of infection rates among healthcare providers.

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## 1. Introduction

Coronavirus disease (COVID-19) is an infectious disease caused by a virus, officially known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). (1) The World Health Organization (WHO) declared the coronavirus 2019 as a pandemic on the 11th of March 2020, 11 days after being declared a public health emergency. It was reported as a continuing global epidemic since it occurred in December 2019 in Wuhan City, China. (2, 3)

COVID-19 is featured by rapid transmission via respiratory droplets and near contact with an infected individual while sneezing and coughing. The common symptoms of COVID-19 have been recognized as fever, dry cough, fatigue, myalgia, shortness of breath, and dyspnea. (3,4)

Infection control measures to decrease the means of transmission of COVID-19 include universal source control, early identification, and isolation of patients with suspected infection, use of appropriate Personal protective equipment in the working unit, and environmental cleansing within the health care settings. (5)

COVID-19 infection has outreached all over the world where the total affirmed number of cases are more than 172 million and over 3 million deaths have been reported globally due to COVID-19 until Jun 8, 2021. Africa is the final landmass to be hit by this pandemic; and around 3,563 825 cases and 88274 deaths were reported until Jun 8, 2021. Ethiopia has become one of the influenced nations as of March 13, 2020, the date on which one imported case was first identified. According to the World health organization (WHO), the number of affirmed cases in Ethiopia reached 272 805 cases and 4,201 deaths as of June 8, 2021 report. (6)

COVID-19 has a devastating impact on social, financial, and political crises that will cause profound scars on casualties of the virus. Poor infection prevention practice among healthcare providers will cause a challenge in the supportive treatment, and it enhances the widespread of the pandemic. (7)

Healthcare workers (HCWs) have been confronting serious work-related health risks when involving caring for COVID-19 patients and testing suspected cases, especially during the early stage of the pandemic. They are at a high chance of COVID-19 infection since they are not only regularly exposed to infected people with inadequate isolation facilities and inadequate personal protective equipment, but also, they are working under a high load for long hours being fatigued and stressed.

Controlling and preventing the spread of COVID-19 in health facilities becomes a top priority as the spread will get out of control if HCWs also become patients. Poor practices of HCWs can result in delayed diagnosis, inaccurate treatment, and increment the chance of infection transmission in other patients, HCWs, and visitors. Evidence shows that proper infection prevention and control (IPC) measures during outbreak management could change the course of the outbreak. (8)

Since Health care workers are at the frontline of COVID-19 control and prevention, they are at higher risk for COVID-19 infection. To the best literature search, few studies were conducted on the level of infection prevention practice of healthcare workers. Thus, this study aimed to assess the level of infection prevention practices and associated factors towards COVID-19.

## 2. Methodology

A cross-sectional study design was conducted to assess the preventive practice and associated

factors against covid-19 among healthcare workers of Millennium Covid Care center in Addis Ababa from January 8 to June 30, 2021. The target population of the study includes all healthcare workers actively working at MCCC. Participants were selected randomly using the human resource workers registered list. The sample size of the study was determined with single population proportion formula. Following this, a 95% confidence level, a 5% tolerable error a 50% postulated variability of preventive practice were assumed. As well, since the total number of healthcare workers in the setting was less than 10,000 population reduction formula was used. As a result, the total sample size of the study was 240. And all health care workers who were working at Millennium Covid Care Center were included in the study.

In measuring the brand variable of the study, practice: the level of preventive practice among health care workers was assessed using 12 items containing a standardized questionnaire. In the same vein, healthcare workers with a preventive practice score of  $>8.6$  were categorized under a good level of practice, and less than the aforementioned cutoffs of a score as under a poor practice level.

#### **Data collection tools and procedure**

A pretested self-administered questionnaire which is adopted from different reviewed literature with some modifications was used.<sup>(4)</sup> It contained three sections, socio-demographic characteristics of the participant which contains seven questions, questions assessing the level of preventive practice which has twelve questions, and questions assessing associated factors of preventive practice contained 15 questions. Data collectors were approaching the participants politely and respectfully and the questionnaire was distributed to randomly selected healthcare

workers. The supervisors were monitoring the data collection process.

#### **Data quality control**

Six BSc nurse data collectors and two MSc supervisors were recruited for data collection. Half-day training was given to the data collectors and supervisors. One week before the actual data collection, a pre-test was conducted on 5% of the samples in St. Pauls hospital Covid care center. Each questionnaire was checked for completeness, missed values, and unlikely responses. Those incomplete questionnaires were omitted from the analysis. The principal investigator was making spot-checking and reviewing the completed questionnaires to ensure the completeness and consistency of the information.

#### **Data processing and analysis**

Data were coded and entered into the computer using Epi data version 4.4.2.2. After data was exported to windows of SPSS version 25 for data analysis. During the process of analysis, descriptive statistics were used to provide an overall and coherent presentation and description of the data.

Binary logistic regression was done to measure the overall statistical significance and effect size of individual independent variables with dependent variables. As a result, variables with a P-value of  $\leq 0.25$  during the bivariate analysis were entered into a multivariable logistic regression to control potential confounders. After adjustment, to dictate effect size and statistical significance of associations of independent variables with the outcome variable, AOR with 95% confidence level and p-values were computed respectively. In the meantime, variables with a p-value of  $< 0.05$  were declared to be significantly associated with the outcome variable of the study.

In the process, ethical issues related to sampling and data collection were considered. Thus before project implementation, ethical clearance was obtained from the IRB of St.Paul Millennium medical college and subsequent permission was obtained from Millennium covid care center research development office.

### 3. Results

#### Socio-demographic characteristics

**Table1: Socio demographic characteristics of study participants**

No	Variables	Frequency	Percent (%)	
1.	Age	20-30	167	70
		>30	73	30
2.	Sex	Male	160	66.7
		Female	80	32.3
3.	Marital status	Single	120	50.0
		Married	114	47.5
		Divorced	6	2.5
4.	Educational status	Diploma	61	25.4
		BSC	137	57.1
		MSC	42	17.5
5.	Profession	Nurse	179	74.6
		Doctor	23	9.6
		Laboratory	16	6.7
		Pharmacy	15	6.3
		Health officer	7	2.9
6.	Year of experience	<5yrs	151	62.9
		5-10	75	31.3
		10-15	14	5.8

A total of 240 participants were involved in the study, of which, more than three-fourths (67%) were males. The mean age of the study participants was 29 years (SD  $\pm$ 4.4). On the other hand, 179 (75%) participants were nurses. Moreover, 137 (57%) study subjects had a BSc degree. One hundred and fifty-one (63%) participants had less than five years of work experience (Table 1).

#### Institutional and healthcare provider-related factors

The study finding showed that 107 (44.6%) healthcare workers respond as there is no adequate PPE. More than three-fourths of healthcare workers did not take COVID-19 case

management training. Moreover, 83 (34.6%) of HCWs have no disinfectant access and only 65 (27.1%) of healthcare workers use social media as a source of information. Besides, 151 (62.9%) of HCWs did not use a mobile phone and other personal materials while at work (Table 2).

**Table 2: level Preventive practice of health care workers towards Covid 19**

	Yes		No	
	N	%	N	%
Do you wash your hands	205	85.4	35	14.6

Do you regularly use a facemask at the point of care	201	83.8	39	16.3
Do you use a facemask when you have flu-like symptoms	202	84.2	38	15.8
Do you use non-conventional remedies	140	58.3	100	41.7
In recent times, have you worn a face mask when leaving your home	185	77.1	55	22.9
Do you wash your hands before donning	164	68.3	76	31.7
Do you wear a facemask in a gown dressing room	174	72.5	66	27.5
Do you change gloves after the procedure	170	70.8	70	29.2
Do you apply PPE while caring for the patient	174	72.5	66	27.5
Do you avoid unnecessary close contact and practice social distance	127	52.9	113	47.1
Do you keep yourself warm and hydrated	133	55.4	106	44.2
Do you avoid close contact with people having flu-like symptoms	179	74.6	61	25.4

### The preventive practice of healthcare workers toward Covid 19

Of all participating healthcare workers, 108 (45.0%) had poor preventive practice, while 132 (55.0%) had good preventive practice towards COVID-19. The study result also revealed that 85.4% and 83.1% of the study subjects wash their

hands and use a face mask at the point of care respectively. One-hundred-forty (58.3%) healthcare workers use non-conventional remedies when they have flu-like symptoms. Furthermore, 66 (27.5%) of participants do not apply full PPE while providing care, and 113 (47.1%) do not avoid unnecessary contact (practice social distance) (Table 3).

**Table 3: Frequency distribution of factors associated with the preventive practice of covid 19**

	Yes		No	
	N	%	N	%
Is there adequate PPE	133	55.4	107	44.6
Functional wash service	131	54.6	109	45.4
Is there a designed area	153	63.7	87	36.3
Disinfectant access	157	65.4	83	34.6
proper doffing unit	73	30.4	167	69.6
are there rapid tests and management for those who have contact with a covid patient	174	72.5	66	27.5
Had training on doffing and donning	178	74.2	62	25.8
Received training on covid case management	88	36.7	152	63.3
Using social media as a source of information	65	27.1	175	72.9
IP guideline availability	174	72.5	66	27.5
Workload lower IP practice	172	71.7	68	28.3
Discomfort while using PPE	171	71.3	69	28.7

drink alcohol	145	60.4	95	39.6
Don't use a mobile phone and other materials in the working unit	151	62.9	89	37.1
Living with family	162	67.5	78	32.5

### Factors associated with the preventive practice of HCWs toward COVID-19

Binary logistic regression was done to measure the overall statistical significance and effect size of individual independent variables with the dependent variables. As a result, variables with a P-value of  $\leq 0.25$  during the bivariate analysis were entered into a multivariable logistic regression to control potential confounders. In bivariate logistic regression analysis, age, sex, lack of adequate PPE, access to disinfectants, training on donning and doffing, lack of designed isolated

area, lack of IP guideline, training on covid case management, discomfort while using PPE, and use of social media as a source of information had a P-value of  $< 0.25$  and transferred to the final model for confounder adjustment.

Afterward, in multivariate logistic regression analysis, lack of adequate PPE, designed isolated area, lack of disinfectant, training on covid case management, IP guidelines availability, and discomfort while using PPE had a significant association with the preventive practice of health care workers towards COVID-19 (Table 4).

**Table 4: factors associated with preventive practice to COVID-19 among HCWs**

Variables		Nurses practice level		Crude OR (CI)	Adjusted OR (CI)	P-value
		Poor	Good			
Sex	Male	64	96	1.00	1.00	
	Female	44	36	0.55 (0.32-0.94)	0.54 (0.26-1.15)	0.111
Adequate PPE	No	70	37	1.00	1.00	
	Yes	38	95	4.73 (2.73, 8.18)	2.98(1.43-6.22)*	0.004
Designed isolation area	No	50	37	1.00	1.00	
	Yes	58	95	2.21 (1.30-3.79)	2.25(1.06-4.80)*	0.036
Disinfectant access	No	60	13	1.00	1.00	
	Yes	48	109	5.92(3.29-10.67)	5.05 (2.28-11.19)*	0.000
Received training on Covid case management	No	82	70	1.00	1.00	
	Yes	26	62	2.79 (1.60-4.89)	6.04 (2.57-14.20)*	<0.001
IP guideline availability	No	42	24	1.00	1.00	
	Yes	66	108	2.86 (1.59-5.15)	2.59 (1.19-5.63)*	0.016
Discomfort while using PPE	No	38	31	1.00	1.00	
	Yes	70	101	1.77 (1.01-3.11)	4.12 (1.78-9.56)*	0.001
Use of social media as a source of information	No	72	103	1.00	1.00	
	Yes	36	29	0.56(.317-1.00)	0.70(0.30-1.59)	0.391

The odds of COVID-19 preventive practice were tripled among HCWs with adequate PPE access compared to their counterparts. ( $p=0.004$ ,  $AOR=2.978$  CI (1.43-6.22)). Likewise, those HCWs who had designed isolation rooms were two times more likely to have good preventive practice than their counterparts ( $p=0.036$ ,  $AOR=2.251$  CI (1.056-4.799)). The odds of COVID-19 preventive practice among HCWs who had disinfectant access were five times ( $p=0.000$ ,  $AOR=5.055$  CI (2.283-11.191)) higher than those who lack access to disinfectant. HCWs who received covid case management training were six times more likely to have good practice than those who don't have taken ( $p=0.000$ ,  $AOR=6.04$  CI (2.569-14.204)). Furthermore, HCWs that have IP guideline is nearly three times more likely to have good prevention practice than those who don't have IP guideline ( $p=0.016$ )  $AOR=2.59$  CI(1.192-5.627). HCWs who feel discomfort while using PPE ( $p=0.001$ ,  $AOR=4.125$  CI (1.779-9.561)) were four times more likely to have good practice.

#### 4. Discussion

The Coronavirus disease-2019 has made exceptional challenges to public health. Healthcare experts who are at the frontline of the outbreak reaction are at a higher chance of exposure and enduring the infection. The low prevention practice toward COVID-19 among HCWs can lead to improper reaction and a high chance of infection. Hence, this study aimed at determining the level of preventive practice and identification of factor associated with it.

In this study, the level of preventive practice was 55% (95% CI: 48.5, 61.4), which was relatively similar to the study done in Deberetabor hospital (49%)(9). This consistency can be due to the similar study subject and study design. However, it was lower than the findings of the studies done

in Vietnam (83.1%), Pakistan (73.4%), Zambia (75%), Nigeria 68.4%, and Amhara regional hospital 62%. (7)(10)(11) (12) (13) This discrepancy can be due to the difference in the economic development between these countries (Vietnam and Pakistan) (11,13), which can influence access to PPE and prevention measures. Additionally, our study area provides more extensive care for a huge number of critical patients compared to the regional covid care centers like Amhara regional hospitals. (10) This can be also due to the difference in study subjects, where the Zambian study included only laboratory staff. (12)

Conversely, the finding of this study is higher than the study done in Lebanon 35%. (14) This can be due to the study subject difference in the study population, where the study in Lebanon only includes dentists (doctors only). It is also higher than the study done in Gamo zone Ethiopia 35.3%. (15) This is due to the higher sample size in this study.

Healthcare workers who had adequate PPE access are almost three times ( $p=0.004$ ,  $AOR=2.978$  CI (1.43-6.22)) more likely to have good preventive practice than those who don't have adequate PPE. Similarly, the odds of good practice among HCWs who had disinfectant access were five times ( $p=0.000$ ,  $AOR=5.055$  CI (2.283-11.191)) higher than those who have lack of disinfectant access. This finding was supported by the study conducted in seven public hospitals in western Ethiopia and Amhara regional hospital. (16 & 10) Having adequate access to disinfectants and other PPE helps HCWs to use without any restriction; therefore they could have good preventive practice than their counterparts. This is because disinfectants and sanitizers are essential preventive agents against coronavirus disease. (17)

Likewise, those Health care workers who had designed isolation rooms were two times more likely to have good preventive practice than their counterparts ( $p=0.036$ ,  $AOR=2.251$  CI (1.056-4.799)). The possible justification might be, having isolation rooms help to reduce the risk of aerosolization and droplet transmission when suspected or confirmed COVID-19 cases are detected among the HCWs.

Healthcare workers who received covid case management training were six times more likely to have good practice than those who didn't take it ( $p=0.000$ ,  $AOR=6.04$  CI (2.569-14.204)), which is supported by the study conducted in western Ethiopia, a study in Zambia and Amhara regional hospitals. (10,12,16) Since COVID-19 is a new disease with no well-understood pathogenesis, COVID case management training can boost the knowledge of healthcare workers and, thus, improve the level of preventive practice. (18)

Healthcare workers that have IP guidelines in their working unit are nearly three times more likely to have good prevention practice than those who don't have IP guidelines ( $p=0.016$ ,  $AOR=2.59$  CI (1.192-5.627)). This finding is supported by a study in Amhara regional hospital. Since IP guideline aims to provide users with the latest evidence-based recommendations for infection prevention and control in the context of COVID-19 in health care and community settings. Hence, those HCWs who have access to IP guidelines have good prevention practice than those who don't. (19)

Healthcare workers who feel discomfort while using PPE ( $p=0.001$ ,  $AOR=4.125$  CI (1.779-9.561)) were four times more likely to have a good preventive practice. This may imply that participants who feel discomfort while using PPE were applying preventive protocols and PPEs for a long period and persistently. Reports also

supported this evidence in that prolonged use of PPEs is associated with physical adverse effects such as headache, dyspnea, acne, skin breakdown, allergic reaction, and dehydration. (20)

The use self-administered questionnaire to collect the data is the main limitation of the study since it may be exposed to social-desirability bias.

### Limitations

Shortage of similar studies in Ethiopia and the study used only structured questionnaires that may have bias.

### 5. Conclusion

The overall result of the study showed that the level of preventive practice among healthcare workers towards COVID-19 is too far below the level of what it has to be. Lack of adequate PPE, designated isolated area, lack of disinfectant, training on Covid case management, IP guidelines availability, and discomfort while using PPE were independently associated with the preventive practice of healthcare workers towards COVID-19.

### Abbreviation

HCW: Health care workers

MCCC: Millennium covid care center

CI: Confidence interval

PPE: Personal protective equipment

OR: Odds ratio

SPSS: statically package for social science

WHO: World health organization

### Author Contributions

HAB generated the concept and wrote the proposal after being approved by MGT and WCZ. MGT, MSM, HAB designed the study and formulated the tool was involved in the conception, design, analysis, interpretation, report, and manuscript writing. WCZ, EGM, TMA,

AHS, KGT, and MAM participated in the data collection and entry as well as cleaning. Then, MGT, HAB & MSM performed the statistical analysis and HAB wrote the first draft of the manuscript. MGT & MSM edited and formatted the manuscript for publication. Finally, all the authors read, critically revised, and approved the final version of the manuscript as well as agreed to be equally responsible for any aspect of this manuscript.

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### Conflict of Interest

The authors declare that they have no competing interest.

### Data Availability

All data supporting the study is available with the reasonable request.

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