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Compliance towards infection prevention measures among health professionals in public hospitals, southeast Ethiopia: a cross-sectional study with implications of COVID-19 prevention

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Abstract

Introduction: The new coronavirus disease 2019 is an emerging respiratory disease caused by the highly contagious novel coronavirus which has currently overwhelmed the world. Realizing a comprehensive set of infection prevention measures is a key to minimize the spread of this virus and its impacts in all healthcare settings. Therefore, this study was aimed to assess the compliance towards COVID-19 preventive measures and associated factors among health professionals in selected public hospitals, southeast Ethiopia.

Methods: A descriptive hospital-based cross-sectional study was conducted among 660 health professionals in public hospitals of southeast Ethiopia from October 1 to 31, 2020. A multistage sampling technique was used to select the study participants. Data were collected by interview using structured and pretested questionnaires. Ordinary logistic regression modeling was used to estimate the crude and adjusted odds ratio. To declare the statistical significance of factors associated with the outcome variable, P -value < 0.05 and 95% confidence interval were used.

Results: A total of 654 health professionals were involved in the study; of whom, 313 participants were nurses. The overall good compliance and knowledge of health professionals regarding COVID-19 preventive measures were 21.6 and 25.5%, respectively. Working in the general hospital (AOR = 0.55; 95% CI 0.38, 0.79), service year (AOR = 2.10; 95% CI 1.35, 3.21), knowledge (AOR = 1.80; 95% CI 1.14, 2.89), and water availability (AOR = 3.26; 95% CI 2.25, 4.72) were some of the factors found to have a statistically significant association to compliance of health professionals regarding COVID-19 preventive measures.

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Conclusion: In this study, nearly one fifth of health professionals had good compliance towards COVID-19 prevention practices. Thus, a consistent supply of COVID-19 prevention materials, facilities, and improving the knowledge of health professionals through on and off-job training are crucial.

Keywords: Compliance, COVID-19, Preventive measures, Southeast Ethiopia

Introduction

Viral diseases are persistent to emerge and denote a serious issue to public health. In the preceding centuries, numerous viral epidemics such as the severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV) were identified in different periods [1]. In our time, the new coronavirus disease 2019 (COVID-19) caused by the highly contagious novel coronavirus (SARS-CoV 2) which has currently overwhelmed the world [2, 3]. The known modes of transmissions are droplets, contact, and aerosols [4].

The healthcare systems of the countries in the world became shaken and disturbed due to the COVID-19 pandemic [5]. In Africa, the COVID-19 pandemic is uncontrollably rising and the reactions to this pandemic have been challenged by a shortage of human resources, personal protective equipment (PPE), limited infrastructure, inadequate systems for the prevention, and fragile healthcare systems [6–8]. Globally, there have been more than nearly 80.3 million confirmed cases, and more than 1.8 million deaths registered up to December 26, 2020. In Ethiopia, the first patient with COVID-19 was detected on March 3, 2020, in Addis Ababa. From then until December 26, 2020, 121,880 COVID-19 confirmed cases and 1897 deaths were reported [9].

Health professionals (HPs) are at the front line in fighting coronavirus spread that put them at the risk of contracting COVID-19 [10, 11]. Keeping safety in the working environment for the health professionals and an operative plan is crucial in each phase of the pandemic. COVID-19 preventive measures recommended by World Health Organization (WHO) consist of regular handwashing, with soap and running water or using alcohol-based hand sanitizer; using face masks; avoid touching the eyes, nose, and mouth if hands are not clean; and avoiding close physical contact [12]. Realizing a comprehensive set of infection prevention measures in all healthcare settings is a collective responsibility and critical to protecting the health and lives of our precious healthcare workforce as well as the key to minimize the spread of the virus in both health care settings and the community [13].

Despite the greater destructive consequences of COVID-19 to individuals and public health, non-compliance to the preventive measures has been

reported around the world [14–16]. Previous studies conducted in different countries indicated that around one-tenth of healthcare workers remove their masks while talking to the patient, four-fifths of them reused surgical masks, and 44.9% correctly dispose of the used facemask in the yellow-coded bags. Overcrowding, limited infection prevention materials/supplies, less commitment of healthcare providers to the policies and procedures, insufficient training, and lack of policy were factors affecting COVID-19 prevention practice [16–18].

In Ethiopia, multiple interventions were implemented to prevent the COVID-19 pandemic before it causes a substantial impairment to the community. The government declared a state of emergency, and established a COVID-19 taskforce at national who were informing disease prevention measures, deliver regular situational updates, and organize massive awareness creation efforts using diverse social and mass media stages. The COVID-19 catastrophe sends a solid message to resistant health systems that can only be realized with a committed health workforce. Protecting everyone requires urgently addressing shortages of health workers, updating infection prevention measures, investing in capacity building, and warranting safe working environments [19, 20].

Currently, there are no conclusive cure and specific antiviral therapeutics that are suggested for preventing or treating the COVID-19. Thus, preventive measures ranging from individuals to large-scale societal level practices are the only available means to control the spread of the virus and minimize its impacts [13, 21]. In this regard, the findings of this study are crucial to health professionals, health facilities, or higher administrators and researchers to halt the spread of COVID-19 [17, 22]. Therefore, this study was aimed to assess the compliance towards COVID-19 preventive measures and associated factors among health professionals in selected public hospitals, southeast Ethiopia, 2020.

Methods

Study settings and design

A descriptive hospital-based cross-sectional study was conducted in selected public hospitals found in three zones (Bale, East Bale, and West Arsi) of southeast Ethiopia from October 1 to 31, 2020. The purposively selected zones consist of 164 health centers and 12 hospitals (4 primaries, 6 general, and 2 referral public

hospitals); of these, 7 hospitals were included in this study. According to Zonal Health Departments data of 2020, more than 4346 health professionals are employed with around 4.5 million populations in the catchment area of selected hospitals.

Source and study population

All health professionals who were working in hospitals found in three zones (Bale, East Bale, and West Arsi) were the source population. And all health professionals who are working in selected hospitals of three zones were the study population.

Sample size and sampling procedure

The sample size was calculated using the single population proportion formula by considering a 95% confidence interval (CI), 5% margin of error (d), proportion (P) 50%, and 1.5 of design effect. Considering 10% of the nonresponse rate, the final sample size 660 was obtained. A multistage sampling technique was used to select the study participants. Initially, the hospitals were stratified into primary, general, and referral hospitals. Accordingly, from each stratum, 2 primaries, 3 general, and 2 referral hospitals were selected using a simple random sampling technique. Based on the number of health professionals in each hospital, the total sample was proportionally allocated and each study participant was selected from the sampling frame using simple random sampling (lottery method).

Data collection tool, technique, and quality control

The questionnaire was developed first in English and translated to local languages by an expert of both languages “Amharic” and “Afan Oromo” and then back to English to check for consistency of the translation. The questionnaire was adapted and modified in the local settings from formerly available studies [23–25], CDC [26, 27], and WHO guidelines [28].

Data were collected by interviewer-administered, structured, and pretested, questionnaires containing health professionals’ socio-demographic characteristics, compliance, and knowledge regarding COVID-19 preventive measures. To assure the data quality, data collection instruments were pretested on 5% of the total sample size, and to minimize over-reporting of compliance to COVID preventive measures, the questionnaire was also set in PK (practice and knowledge) order.

Data processing and analysis

Data were entered using Epi-Data version 3.1 and analyzed using STATA version 14. Descriptive statistics were used to generate frequency tables, graphs, and ordinary logistic regression modeling was used to estimate crude (p -value < 0.25) and adjusted odds ratio.

To declare the statistical significance of factors associated to outcome variables, P -values < 0.05 and 95% confidence interval were used.

Operational definition

Compliance with COVID-19 preventive measures

In this study compliance to COVID-19 prevention measures was measured by using 18 questions with “Always, sometimes, and never” response options. A score of 1 was given for “always” and “0” for “sometimes and never” responses. Accordingly, the probable sum score of overall compliance to the COVID-19 prevention measure was ranged from 0 to 18. Respondents who score < 50% (score below 9), 50–79% (score 9–14 out of 18 items), and 80–100% (score 15–18 out of 18 items) were considered having poor, moderate, and good compliance towards COVID-19 prevention measures. Similarly, the knowledge of health professionals was assessed using 10 COVID prevention measure-related questions. Respondents who score < 50% (score below 5 out of total items), 50–79% (score 5–7), and 80–100% (score 8–10) were considered having poor, moderate, and good knowledge towards COVID-19 prevention measures [29, 30].

Adequate natural ventilation is when working and staff room have at least two air inlets and outlet with room area 12 m² and below.

Functional handwashing facility is functional handwashing sink with water and soap during data collection time.

Results

Socio-demographic characteristics of the study participants

Six hundred fifty-four health professionals were involved in the study with a 99% response rate, of which, 419 (64.1%) participants were males and 501 (76.6%) were in the age category of 25–35 years. Regarding health professionals, about 313 (47.9%) were nurses, and 318 (48.6%) were from the general hospital. About 227 (34.7%) and 264 (40.4%) of health professionals reported that working and staff rooms have no adequate natural ventilation. Regarding the COVID-19 prevention facility, 227 (34.7%) and 279 (42.7%) of health professionals reported that there were no functional handwashing facilities and continuous water supply at their workplace respectively (Table 1).

Compliance/practice to COVID-19 prevention measures

In this study, 141 (21.6%) of health professionals had good compliance with COVID-19 prevention measures. And the remaining 185 (28.3%) and 328 (50.2%) had moderate and poor compliance regarding

Table 1 Socio-demographic- and institution-related characteristics of health professionals in selected public hospitals, southeast Ethiopia ($n = 654$)

| Variables | Frequency | Percent |
|--|-----------|---------|
| Levels of hospitals | | |
| Referral | 293 | 44.8 |
| General | 318 | 48.6 |
| Primary | 43 | 6.6 |
| Working departments of respondents | | |
| Outpatient department | 276 | 42.2 |
| Inpatient department | 288 | 44.0 |
| Others | 90 | 13.8 |
| Sex of respondents | | |
| Male | 419 | 64.1 |
| Female | 235 | 35.9 |
| Age of respondents | | |
| ≤ 24 years | 74 | 11.3 |
| 25–35 years | 501 | 76.6 |
| 36–45 years | 62 | 9.5 |
| ≥ 46 years | 17 | 2.6 |
| Profession of respondents | | |
| Doctors | 87 | 13.3 |
| Nurses | 313 | 47.9 |
| Midwives | 98 | 15.0 |
| Laboratory technicians (technologist) | 37 | 5.7 |
| Health officer | 39 | 6.0 |
| Others* | 80 | 12.2 |
| Educational status of respondents | | |
| Diploma | 137 | 20.9 |
| First degree | 490 | 74.9 |
| Second degree and above | 27 | 4.1 |
| Working rooms have adequate ventilation | | |
| Yes | 427 | 65.3 |
| No | 227 | 34.7 |
| Staff rooms have adequate ventilation | | |
| Yes | 390 | 59.6 |
| No | 264 | 40.4 |
| Presence COVID-19 prevention committee | | |
| Yes | 474 | 72.5 |
| No | 166 | 25.4 |
| I don't know | 14 | 2.1 |
| Functional handwashing facility | | |
| Yes | 427 | 65.3 |
| No | 227 | 34.7 |

Table 1 Socio-demographic- and institution-related characteristics of health professionals in selected public hospitals, southeast Ethiopia ($n = 654$) (*Continued*)

| Variables | Frequency | Percent |
|--|-----------|---------|
| Availability of continuous water supply | | |
| Yes | 375 | 57.3 |
| No | 279 | 42.7 |
| COVID-19 training of respondents | | |
| Yes | 269 | 41.1 |
| No | 385 | 58.9 |

Other working departments: clinics (dental, ART, psychiatric, ophthalmic, TB, and dermatology), X-ray, laboratory, operation room, pharmacy department, and triage

*Other health professionals: psychiatric nurse, BSc in optometry, radiographer, cataract surgeon, and dermatologist

COVID-19 preventive measures, respectively (Tables 2 and 3, Figs. 1 and 2).

Knowledge regarding COVID-19 preventive measures

In this study, 342 (52.3%) and 167 (25.5%) of health professionals had moderate and good knowledge regarding COVID-19 preventive measures respectively, whereas 145 (22.2%) of them had poor knowledge. The majority of the health professionals know respiratory droplets and close contact was the main transmission route of COVID-19. Concerning handwashing, only one fourth (25.9%) of health professionals correctly identify the recommended duration of handwashing by the World Health Organization (Table 4).

Factors associated with compliance towards COVID-19 prevention measures

Socio-demographic-, knowledge-, and health facility-related factors to compliance towards COVID-19 prevention measures were identified using an ordinary logistic regression model. Health professionals who working in general hospitals were 45% times less likely to have good compliance towards COVID-19 prevention measures than health professionals working in referral hospitals (AOR = 0.55; 95% CI 0.38, 0.79). The odds of having good compliance towards COVID-19 preventive measures were 2 times more likely among health professionals with 3–6 service years than health professionals who had ≤ 2 service years (AOR = 2.10; 95% CI 1.35, 3.21). Health professionals who have a good knowledge regarding COVID-19 preventive measures were 1.80 more likely to have good compliance regarding COVID-19 preventive measures than their counterparts (AOR = 1.80; 95% CI 1.14, 2.89). Similarly, the odds of having good compliance were nearly 3 times more likely

Table 2 Compliance regarding COVID-19 preventive measure among health professionals in selected public hospitals, southeast Ethiopia, 2020 ($n = 654$)

| Preventive measures | Level of compliance (how often) | | |
|---|---------------------------------|-------------------------|---------------------|
| | Always, <i>n</i> (%) | Sometimes, <i>n</i> (%) | Never, <i>n</i> (%) |
| Handwashing practice at WHO critical times | | | |
| Wash hand/use sanitizer at arrival to workplace | 347 (53.1) | 287 (43.9) | 20 (3.1) |
| Wash hand/use sanitizer before patient contact | 366 (56.0) | 240 (36.7) | 48 (7.3) |
| Wash hand/use sanitizer after every patient contact | 359 (54.9) | 244 (37.3) | 51 (7.8) |
| Wash hand immediately after accidental contact with body fluids (blood or secretions) | 495 (75.7) | 138 (21.1) | 21 (3.2) |
| Wash hand/use sanitizer after touching patients surrounding | 348 (53.2) | 270 (41.3) | 36 (5.5) |
| Wash hand with soap before clean/aseptic procedure | 386 (59.0) | 209 (32) | 59 (9) |
| Wash hand/use sanitizer before leaving the workplace | 324 (49.5) | 279 (42.7) | 51 (7.8) |
| Handwashing with glove and mask utilization | | | |
| Wash hand/use sanitizer before wearing sterile gloves | 289 (44.2) | 266 (40.7) | 99 (15.1) |
| Wash hand/use sanitizer after removing gloves | 297 (45.4) | 290 (44.3) | 67 (10.2) |
| Wash hand/use sanitizer before wearing a mask | 253 (38.7) | 304 (46.5) | 97 (14.8) |
| Wash hand/use sanitizer before removing masks | 251 (38.4) | 297 (45.4) | 106 (16.2) |
| Change glove between every patient contact | 183 (28.0) | 306 (46.8) | 164 (25.1) |
| Wear a mask that covers both nose and mouth whenever approaching patients | 420 (64.2) | 212 (32.4) | 22 (3.4) |
| Disinfection practice and respiratory hygiene | | | |
| Disinfect BP apparatus or thermometer after every patient contact | 183 (28.0) | 306 (46.8) | 164 (25.1) |
| Disinfect examination bed or table between each service | 225 (34.4) | 296 (45.3) | 133 (20.4) |
| Instruct symptomatic persons to cover mouth/nose when sneezing/coughing | 407 (62.2) | 223 (34.1) | 24 (3.7) |
| Instruct symptomatic persons to dispose of used handkerchief during sneezing/coughing in a no-touch container | 381 (58.3) | 233 (35.6) | 40 (6.2) |
| Open working room windows before starting regular activities | 363 (55.5) | 254 (38.8) | 37 (5.7) |

among health professionals who know the presence COVID-19 Prevention Committee to their counterpart (AOR = 2.97; 95% CI 1.96, 4.50). The odds of having good compliance towards COVID-19 preventive measures were nearly 3 times higher among health professionals who had functional handwashing facilities (AOR = 2.66; 95% CI 1.78, 3.97) and continuous water supply (AOR = 3.26; 95% CI 2.25, 4.72) at their working place respectively (Table 5).

Discussion

Compliance with infection prevention practices is essential for minimizing transmission of infection, particularly crucial during the COVID-19 pandemic [19, 31]. This study has assessed the compliance towards COVID-19 preventive measures among health professionals in selected public hospitals, southeast Ethiopia. In this study, the overall good compliance towards COVID-19 preventive measures among health professionals was found to be 21.6%. This finding was lower than a study conducted in northwest Ethiopia, 38.7% [32], and in China, 87% [33]. The possible explanation for the

disparity of this finding might be due to the difference in the number outcome variable category (two vs. three), distribution of COVID-19 prevention supplies and facilities (at different levels of hospitals, or poor managerial attention). Moreover, the compliance disparity might be due to the duration of the study (early and late pandemic) and disease burden.

In this study, about 64.2% of health professionals reported using face masks at the workplace whenever approaching COVID-19 suspected or confirmed patients. Despite wearing the face mask is mandatory within the health facility, our findings showed that only around two thirds of health professionals (HPs) use masks, which means, about one third of HPs significantly facilitate the chance to acquire or transmit the disease. This might be because some HPs may have difficulty of using masks due to uncomfotability and shortage of masks [29]. This finding is comparable with the study conducted in eight teaching hospitals in Ethiopia, 67.3% [34]. This consistency might be due to the shortage of masks which similarly affects all healthcare facilities found in Ethiopia. In this study, around 56% and

Table 3 The level of compliance to COVID-19 prevention measures among health professionals (HPs) in public hospitals, southeast Ethiopia, 2020 (*n* = 654)

| Variables | HP's compliance to COVID-19 preventive measures | | | P-value |
|--|---|------------------------|--------------------|---------|
| | Poor, <i>n</i> (%) | Moderate, <i>n</i> (%) | Good, <i>n</i> (%) | |
| Levels of hospitals | | | | |
| Referral | 122 (41.6) | 101 (34.5) | 70 (23.9) | 0.003 |
| General | 182 (57.2) | 73 (23.0) | 63 (19.8) | |
| Primary | 24 (55.8) | 11 (25.6) | 8 (18.6) | |
| Working departments of respondents | | | | |
| Outpatient department | 134 (48.6) | 79 (28.6) | 63 (22.8) | 0.07 |
| Inpatient department | 139 (48.3) | 91 (31.6) | 58 (20.1) | |
| Others | 55 (61.1) | 15 (16.7) | 20 (22.2) | |
| Sex of respondents | | | | |
| Male | 220 (52.5) | 115 (27.4) | 84 (20.0) | 0.25 |
| Female | 108 (46.0) | 65 (27.7) | 57 (24.3) | |
| Age of respondents | | | | |
| ≤ 24 years | 46 (62.2) | 18 (24.3) | 10 (13.5) | 0.02 |
| 25–35 years | 253 (50.5) | 142 (28.3) | 106 (21.2) | |
| 36–45 and above 46 years | 29 (36.7) | 25 (31.6) | 25 (31.6) | |
| Service years | | | | |
| ≤ 2 years | 134 (63.5) | 56 (26.5) | 21 (10) | < 0.001 |
| 3–6 years | 99 (45.8) | 63 (29.2) | 54 (25.0) | |
| 7–10 and above 10 years | 95 (41.9) | 66 (29.1) | 66 (29.1) | |
| Professions | | | | |
| Doctors and health officers | 64 (50.8) | 36 (28.6) | 26 (20.6) | 0.98 |
| Nurses and midwives | 208 (50.6) | 115 (28.0) | 88 (21.4) | |
| Lab technician and others | 56 (47.9) | 34 (29.1) | 27 (23.1) | |
| Educational status of respondents | | | | |
| Diploma | 60 (43.8) | 43 (31.4) | 34 (24.8) | 0.24 |
| First degree and above | 268 (51.8) | 142 (27.5) | 107 (20.7) | |
| Presence COVID-19 prevention committee | | | | |
| Yes | 199 (42.0) | 148 (31.2) | 127 (26.8) | < 0.001 |
| No | 129 (71.7) | 37 (20.6) | 14 (7.8) | |
| Functional handwashing facility | | | | |
| Yes | 160 (37.5) | 137 (32.1) | 130 (30.4) | < 0.001 |
| No | 168 (74.0) | 48 (21.1) | 11 (4.8) | |
| Availability of continuous water supply | | | | |
| Yes | 129 (34.4) | 127 (33.9) | 119 (31.7) | < 0.001 |
| No | 199 (71.3) | 58 (20.8) | 22 (7.9) | |
| COVID-19 training | | | | |
| Yes | 127 (47.2) | 71 (26.4) | 71 (26.4) | 0.042 |
| No | 201 (52.2) | 114 (29.6) | 70 (18.2) | |
| Knowledge of health professionals | | | | |
| Poor | 82 (56.6) | 40 (27.6) | 23 (15.9) | 0.015 |
| Moderate | 180 (52.6) | 91 (26.6) | 71 (20.8) | |
| Good | 66 (39.5) | 54 (32.3) | 47 (28.1) | |
| Overall level of compliance, <i>n</i> (%) | 328 (50.2%) | 185 (28.3%) | 141 (21.6%) | |

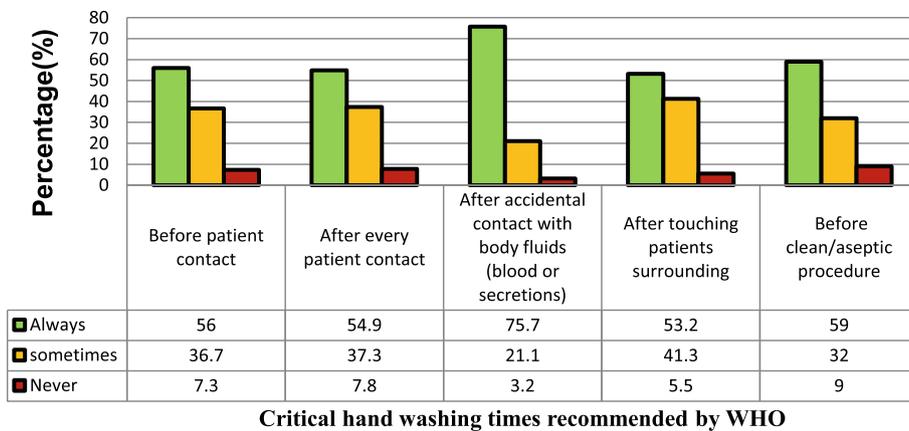


Fig. 1 Handwashing practice/use sanitizer at WHO critical times among health professionals in selected hospitals of Southeast Ethiopia, 2020

54.9% of health professionals’ practice frequent hand-washing before and after patients contact respectively. Again, this finding is under expected; only half of HPs reported having compliance towards one of the critical handwashing times recommended by the World Health Organization. This might be due to 65.3 and 57.3% of health professionals reported having a functional hand-washing facility and continuous water supply at their workplace, respectively. Regarding working environment disinfection, only 34.1 of HPs disinfect examination tables and beds found in working rooms before and after each procedure. This might be due to no access to disinfectants or less attention to the values of disinfection or believing as this activity belongs to cleaners or non-health professionals. This finding was slightly higher than the study finding, in Amhara Regional state Ethiopia, 29% [32]. This difference might be due to the inconsistency of health professional’s commitments

regarding disinfection. Similarly, about 28% of HPs disinfect the blood pressure apparatus or thermometer after every patient contact. This might be due to the forgetfulness of health professionals or less attention, which may trigger the transmission of COVID-19 through direct contact.

This study shows that 25.5% of the health professionals have a good knowledge regarding COVID-19 prevention measures. This finding is lower than the study conducted, in Amhara Region, 70% [30]; northwest Ethiopia, 73.8% [32]; and in China, 88.4% [35]. The possible reason for this variation might be due to the study settings; participant’s negligence to focus on all items listed to evaluate knowledge, and only 41.1% of HPs taken training on COVID-19 prevention measures. This study indicated that the good compliance and knowledge of HPs regarding COVID-19 preventive measures were somewhat comparable, 21.6 and 25.5%, respectively. This

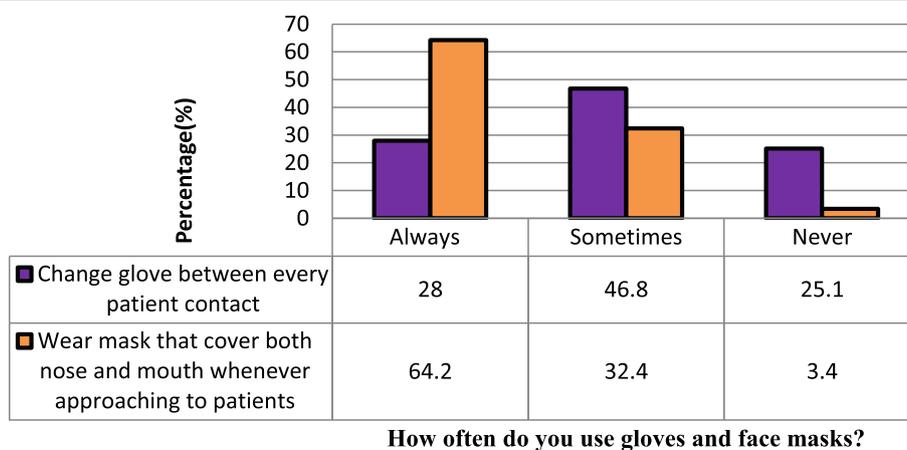


Fig. 2 Glove and mask utilization among health professionals in selected public hospitals of Southeast Ethiopia, 2020

Table 4 Knowledge of health professionals regarding COVID-19 preventive measure in public hospitals, southeast Ethiopia, 2020 (*n* = 654)

| Variable | Response | Frequency | Percent |
|---|--|-----------|---------|
| COVID-19 is caused by | Viral | 562 | 86.1 |
| | Bacterial | 67 | 10.3 |
| | I don't know | 25 | 3.7 |
| What is the main transmission route of COVID-19 | Respiratory droplets and close contact | 583 | 89.3 |
| | Water | 52 | 8.0 |
| | Food | 17 | 2.6 |
| | I don't know | 2 | 0.2 |
| | | | |
| How long is the incubation period for COVID-19 | 2–14 days | 457 | 70.0 |
| | 3–7 days | 92 | 14.1 |
| | More than 14 days | 101 | 15.5 |
| | I don't know | 4 | 0.5 |
| | | | |
| Who is susceptible to COVID-19 | People are generally susceptible | 404 | 61.9 |
| | The old and children | 97 | 14.9 |
| | Young adults | 69 | 10.6 |
| | People with pre-existing disease | 81 | 12.4 |
| | I don't know | 3 | 0.3 |
| The main clinical manifestations of COVID-19 | Fever and dry cough | 563 | 86.1 |
| | Fatigue | 42 | 6.4 |
| | Sore throat and myalgia | 43 | 6.6 |
| | Diarrhea | 6 | 0.8 |
| | | | |
| Patient with underlying chronic disease are at a higher risk of infection | Yes | 588 | 90.0 |
| | No | 44 | 6.7 |
| | I don't know | 22 | 3.2 |
| | | | |
| Treatment option for COVID-19 | Supportive care | 500 | 76.6 |
| | Antiviral treatment provision | 113 | 17.3 |
| | No definitive management | 37 | 5.7 |
| | I don't know | 4 | 0.5 |
| WHO recommended duration of handwashing with soap and water | 40–60 s | 169 | 25.9 |
| | 20–30 s | 450 | 68.9 |
| | 1 h | 35 | 5.2 |
| WHO recommended duration of alcohol hand rub using sanitizer | 20–30 s | 229 | 35.1 |
| | 10 s | 307 | 47.0 |
| | 20 s | 118 | 17.9 |
| Recommend physical distance | 0–1 m | 36 | 5.5 |
| | 2 and above m | 618 | 94.5 |

implied that the health professional's compliance towards COVID-19 preventive measures was not over-reported when compared to their knowledge.

Based on the ordinary logistic regression model; service years of health professionals, level of hospital, knowledge of health professionals, presence of the COVID-19 prevention committee, handwashing facility, and water availability were factors associated with compliance regarding COVID-19 preventive measures. The odds of having good

compliance were nearly 1.8 times higher among health professionals who had good knowledge regarding COVID-19 preventive measures. This might be attributed to adequate training (duration of training), the presence of reading materials/internet services, and personal commitments. The odds of having good compliance towards COVID-19 preventive measures were 2 times more likely among health professionals with 3–6 service years than health professionals with ≤ 2 service years. This finding

Table 5 Factors associated with compliance regarding COVID-19 prevention measures among health professionals in selected public hospitals, southeast Ethiopia ($n = 654$)

| Variables/factors | Unadjusted and adjusted ordinary logistic regression | | | | Base outcome (poor) |
|--|--|---------|---------------------|---------|---------------------|
| | COR 95% CI | P-value | AOR 95% CI | P-value | |
| Level of hospital | | | | | |
| Referral | 1 | | 1 | | |
| General | 0.60 (0.45, 0.81)* | 0.001 | 0.55 (0.38, 0.79)** | 0.001 | |
| Primary | 0.62 (0.33, 1.14) | 0.123 | 0.99 (0.49, 2.04) | 0.99 | |
| Working departments | | | | | |
| Outpatient department | 1.48 (0.92, 2.39) | 0.103 | | | |
| Inpatient department | 1.43 (0.89, 2.29) | 0.14 | | | |
| Others | 1 | | | | |
| Sex | | | | | |
| Male | 1 | | | | |
| Female | 1.29 (0.96, 1.75) | 0.09 | | | |
| Age | | | | | |
| ≤ 24 years | 1 | | | | |
| 25–35 years | 1.63 (1.02, 2.65)* | 0.049 | | | |
| 36–45 and above 46 years | 2.84 (1.54, 5.25)* | 0.001 | | | |
| Service years | | | | | |
| ≤ 2 years | 1 | | 1 | | |
| 3–6 years | 2.21 (1.52, 3.20)* | < 0.001 | 2.10 (1.35, 3.21)** | 0.001 | |
| 7–10 and above 11 years | 2.65 (1.84, 3.83)* | < 0.001 | 2.40 (1.50, 3.84)** | 0.001 | |
| Educational status | | | | | |
| Diploma | 1 | | | | |
| First degree and above | 0.75 (0.52, 1.06) | 0.102 | | | |
| Presence COVID-19 prevention committee | | | | | |
| Yes | 3.61 (2.51, 5.19)* | < 0.001 | 2.97 (1.96, 4.50)** | < 0.001 | |
| No | 1 | | 1 | | |
| Functional handwashing facility | | | | | |
| Yes | 5.14 (3.63, 7.28)* | < 0.001 | 2.66 (1.78, 3.97)** | < 0.001 | |
| No | 1 | | 1 | | |
| Availability of continuous water supply | | | | | |
| Yes | 4.87 (3.52, 6.74)* | < 0.001 | 3.26 (2.25, 4.72)** | < 0.001 | |
| No | 1 | | 1 | | |
| COVID-19 training | | | | | |
| Yes | 1 | | | | |
| No | 0.75 (0.56, 1.01) | 0.056 | | | |
| Knowledge of health professionals | | | | | |
| Poor | 1 | | 1 | | |
| Moderate | 1.22 (0.84, 1.78) | 0.29 | 1.17 (0.78, 1.78) | 0.45 | |
| Good | 1.99 (1.30, 3.03)* | 0.00 | 1.8 (1.14, 2.89)** | 0.014 | |

* $p < 0.05$ = crude OR** $p < 0.05$ = adjusted OR

was comparable with the study finding in Amhara Region, Ethiopia [30]. This could be because as the HPs service years increase, the exposure and fear for such pandemic will increase and may practice prevention measures more strictly. On the other hand, the odds of having good compliance towards COVID-19 preventive measures were nearly 3 times more likely among health professionals who know the presence COVID-19 prevention committee in hospitals than their counterparts. This might be due to the committee informing HPs of the key COVID-19 preventive measures that are to be practiced during regular internal supervision.

Limitation of the study

This study had some limitations that include hospitals currently serve as COVID-19 treatment and isolation centers were not included. As the study assessed self-reported compliance regarding COVID-19 prevention measures, it may be affected by social desirability. Despite these limitations, our findings provide valuable information about health professionals' compliance regarding COVID-19 prevention measures.

Conclusions

Regardless of the above limitation, around one fifth of health professionals in selected public hospitals of south-east Ethiopia had good compliance towards COVID-19 preventive measures. Nearly one fourth of health professionals had good knowledge of COVID-19 preventive measures. In this study, level of hospital, service years, presence of COVID-19 prevention committee, knowledge on COVID-19 preventive measures, availability of functional handwashing facility, and continuous water supply at the workplace were factors associated with compliance of health professionals towards COVID-19 preventive measures. Thus, a consistent supply of COVID-19 prevention materials, facilities, and improving knowledge of health professionals through on- and off-job training is recommended. Moreover, local health authorities should work in cooperation with fruitful stakeholders to fulfill gaps and monitor the operation of all COVID-19 preventive measures in hospitals.

Abbreviations

COVID-19: Coronavirus disease 2019; HPs: Health professionals; WHO: World Health Organization; AOR: Adjusted odds ratio; COR: Crude odds ratio

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Authors' contributions

Primary author and all co-authors were involved in the conception, design, supervision, data analyses, interpretation, report writing, and preparation of the first draft of the manuscript. Finally, the authors read, commented on, edited, and approved the final version of the manuscript.

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Availability of data and materials

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

Ethical approval was obtained from Mada Walabu University Institutional Review Board before the initiation of the study, and written informed consent has been obtained from every participant before the data collection. All the participants have been up-to-date about the objectives of the research, benefit, and risks. The participants had been informed that their namelessness and confidentiality were kept secured and as there were no risks related to their participation. Their involvement was entirely voluntary and notified that they had the right to refuse or stop at any point of the data collection.

Consent for publication

Not applicable

Competing interests

The authors declare that they have no competing interests.

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