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Adherence to COVID-19 preventive measures and associated factors in Oromia regional state of Ethiopia --Manuscript Draft--

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Corresponding Author:	Sileshi Garoma Abeya, PhD SA Health Addis Ababa, ETHIOPIA
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Adherence to COVID-19 preventive measures and associated factors in Oromia regional state of Ethiopia

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Abstract

Background: Adherence towards preventive measures of COVID-19 was among the means to tackle the transmission of the virus. However, reluctance to implement the recommended preventive measures has been reported to be a major problem everywhere specifically in Oromia Regional State.

Purpose: This research was aimed to assess the level of adherence to COVID-19 preventive measures and associated factors in the study area.

Participants and Methods: Community based cross-sectional study was conducted. Sample of 2751 adults aged ≥ 18 years were used for the quantitative study. Also, 20 FGDs and 30 KIIs were conducted in the qualitative approach. The collected data was entered into Epi info version 7.2.0.1 and analyzed using STATA 15. The qualitative data was entered into NVivo version 12 for its organization. Bivariate and multivariable binary logistic regression analyses were conducted to determine the association between the study variables. Odds Ratio with its 95%CI was calculated and P- Value < 0.05 used as a cut off points to declare the significance.

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Conclusions: The overall level of adherence to COVID-19 preventive measures was **low**. Age, level of education, occupation, knowledge were factors associated with level of adherence to COVID-19 preventive measures. Activities to increase the adherence to COVID-19 preventive measures should be implemented by the concerned bodies.

Keywords: Corona, Virus, quantitative, qualitative, Ethiopia

Background

Corona virus disease 2019 (COVID-19) reported in late December 2019 from Wuhan, China is one of the shocking pandemics for humans¹. The disease was declared as the sixth public health emergency of international concern². Therefore, this outbreak constitutes a public health risk through the international spread of disease and requires a coordinated international response². The COVID-19 pandemic reached sub-Saharan Africa by the end of February 2020 after it was declared a Public Health Emergency of international Concern by the World Health Organization (WHO) on 30, January 2020². With high levels of poverty and generally fragile health systems, sub-Saharan Africa including Ethiopia is facing a complex regional COVID-19 epidemic and could also become a difficult to control virus reservoir, from where COVID-19 may be reintroduced to other regions that may have achieved control³. The Federal Ministry of Health of Ethiopia has confirmed a Corona Virus Disease (COVID-19) case in Addis Ababa on March 13/2020⁴.

Generally, as of March 13, 2021, COVID-19 affects globally, over 119.7 million confirmed cases and 2.6 million deaths⁵. In Africa, over 4 million confirmed cases and over 107 thousand death are reported. After the first case appeared on March 13/2020 in Ethiopia, the number of cases and death raised to +172,571 and +2510, respectively in its first-year anniversary^{5,6}.

Considering its pandemicity and absence of effective treatment, authorities across the globe have designed various mitigation strategies to combat the spread of COVID-19⁷. Accordingly, to limit the transmission, the World Health Organization (WHO) recommends minimizing contact between infected and non-infected persons, early detection and isolation of cases, and general personal and collective hygiene measures^{6, 8, 9}. As part of these measures, the use of face masks, hand washing, physical distancing, cough etiquette and avoidance of crowded places are recommended⁹.

Although adherence towards preventive measures is the only means to tackle the virus, reluctance to do so has been reported to be a major problem everywhere⁷. Also, community's risk perception and poor adherence towards COVID-19 mitigation measures remains a major problem. A significant proportion of communities did not perceive the virus as a risk for health¹⁰.

People also think that it originated from a laboratory, and mostly causes mild symptoms, and affects the elderly^{10, 11}. On the other way, there is no effective treatment for the COVID-19 infection till now. Henceforth, adherence with COVID-19 preventive and control measures are the only option to stop its spread and minimize its disastrous impact in developing nations like Ethiopia, so that the knowledge and behavior changes are pillars to engage with preventive measures¹.

A study conducted in Vietnamese people showed that 88.2%, 99.5%, 94.9%, and 97.4% of the participants adhere to the physical distancing rule, wear a face mask, cover mouth and nose during coughing/sneezing, and wash hands regularly with water and soap, respectively¹. Similarly, the study conducted in Iran indicated that, Long-lasting commitment and adherence to preventive measures were vital to mitigate the disease spread and minimize its impact. The result of findings was 95.4%, 93%, and 80% of the participants adhered to hand washing with soap and water, avoiding crowded places, clean hands with other disinfectants, respectively and showed a good adherence to COVID-19 preventive measures¹².

In contrast to the above finding adherence level of COVID 19 in Africa suggested less that, according to KAP survey done in Africa, there was only 12.3% of the study participants adhered with the suggested COVID-19 preventive measures, although some preventive measures like avoidance of handshaking, eating uncooked food, gatherings, and frequent hand washing were implemented by 81.4%, 77.2%, 69.9%, and 65.8%, respectively. Similar results were reported in Egypt and Nigeria though the figures are much higher than the above findings. In that study only 36% of the participants implement all the recommended measures despite most (96%) practiced self-isolation and physical distancing¹³.

Study conducted in Uganda also shown as, only 495 (29%) of participants were adherent to all the preventive measures. However, there was a high level of adherence to some of the individual preventive measures. Overall, 96% adhered to frequent hand washing, 90% to physical distancing, and 86% to cough hygiene, whereas the use of masks was low at 33%. Other preventive measures with low adherence included disinfecting phone (42%), Laptop (26%), bag (20%), and TV remote (18%)¹⁴. In contrast study conducted in Uganda use of wearing face masks, regular hand washing and cough hygiene all reached compliance rates of over 90%,

physical distancing and avoiding to touch the face reached a compliance rate of 80-90%, and the regular use of alcohol-based gel was reported for about 65% of respondents¹⁵.

According to the study done in Gonder city Ethiopia, there were nearly half of the study participants (48.96%) had poor adherence towards COVID-19 preventive measures. Among the preventive strategies, hand washing was the commonest one practiced by the respondents (73.84%), while most (67.58%) of the participants failed to use a face mask⁷. On the other hand, the study done in Derashe district of southern Ethiopia, better results in selected preventive measures were seen that, avoidance of greeting with handshaking was 524 (81.4%), uncooked food was 497 (77.2%), and gatherings with many people's was 450 (69.9%). Wearing masks/any clean cloth (20.5%) and stay at home (22.8%) were the least practiced preventive measures. Moreover, none of the participants implement the entire recommended COVID-19 preventive and control measures, and in significant number of the participants, 35 (5.4%) did not practice any of the preventive measures so far according to the study¹.

Another study in North shoa zone of Ethiopia reveals that overall adherence level of the community towards the recommended safety measures of COVID-19 was 44.1%. Only 9% of participants did not practice hand washing with soap and 42.2% of the respondents did not utilize sanitizers to clean hand, which was almost similar to the study conducted at different part of Ethiopia². In the assessment of adherence to the national COVID-19 restrictions, most participants (92.6%) reported adhering to the 1.5- 2 meter social distancing rule; 69.5% covered their mouth and nose when they sneeze and washed their hands afterwards; 45.5% wore a face mask when going outside; staying at home was found to be extremely difficult for 7.9%, but 29.3% considered it not difficult at all. In the same assessment, 29.3% of respondents found it relatively easy to stay at home. However, the indoor confinement was extremely difficult for 7.9% of participants.

Thus, this study was designed to determine the level of adherence to COVID-19 preventive measures and associated factors in Oromia regional state by using a mixed method approach.

Methods and Materials

Study Area

This study was conducted in Oromia Regional State of ten selected zones and towns. Oromia is one of the largest and most populous regions in Ethiopia with an estimated population of 39,074,846. Oromia Regional State is divided into 20 zones, 19 towns and 333 Woredas (districts). The dominant livelihood of the residents of the region is Agrarianism, Agiro-pastoralism and Pastoralism. The region shares boundary with all regions of the country except Tigray. It is bordered by Somali Regional State to the east; the Amhara region, the Afar region and the Benishangul Gumuz region to the north; South Sudan, Gambela region and SNNP to the west and Kenya to the south. In the region, there are four specialized referral hospitals, five university hospitals, 34 general hospitals, 47 primary hospitals, 1410 health center and 7090 health post.

Study design and Period

A community-based cross-sectional design was conducted using a mixed method of quantitative and qualitative approach from September 2020 to March 2021.

Population

All adults living in the Oromia Regional State during the study period were the source population, while all adults living in the selected households of Oromia region during the study period were the study population.

Inclusion and Exclusion Criteria

Men and women aged 18 years and above who have been residing in the area for at least six months were included in to the study, while those who were critically sick, hearing difficulties and unable to communicate during the data collection time were excluded from the study.

Sample Size Determination

Quantitative

The sample is required to compare the adherence of COVID-19 preventive measures among urban population in comparison to rural population is calculated using formula to compare and test difference between two population proportions in comparative study designs. In using this formula, the following assumptions were considered: the proportion of adherence to COVID-19 preventive measures among urban population is 50% in the absence of previous study. Under null hypothesis, where the two proportions are not differing from each other, the maximum tolerable level of difference ($P_1 - P_2$) between the two population proportions of 0.05 was considered. Accordingly, $P_1 = 0.50$ and $P_2 = 0.45$. were taken. And their average (pooled proportion) was obtained by adding the two proportions and dividing by two. The following assumptions were also considered in calculating the sample size;

n_1 = an independent sample size in urban population

n_2 = an independent sample size in rural population

P_1 = proportion of respondents who adhered to of COVID-19 preventive measures an urban population,

P_2 = proportion of respondents who adhered to of COVID-19 preventive measures in rural population,

P = an average of the proportions COVID-19 preventive measures acceptance in two groups

$Z_{\alpha/2}$ = the corresponding value of confidence coefficient at alpha level of 0.05 that is 1.96

Z_{β} = the corresponding value of power at beta level of 0.2 that is 0.84

With these assumptions, considering the scenario where the alternate hypothesis is true and the proportions are significantly different and the general formulae is given as follows.

$$n = \frac{\{Z_{1-\alpha/2}\sqrt{2\bar{P}(1-\bar{P})} + Z_{1-\beta}\sqrt{[P_1(1-P_1) + P_2(1-P_2)]}\}^2}{(P_1 - P_2)^2}$$

By replacing the corresponding values for the symbols in the formulae and having design effect of two and adding for the possible non response rate, a total of **2851** respondents were obtained where 1426 from urban areas and another 1426 respondents from rural areas (*Woredas*) were selected.

Qualitative

The intention of the study was to explore the perception, knowledge, attitudes and practices of people towards the COVID-19 preventive measures. The required information for this purpose not only acquired through **survey** but also qualitative methods. This approach was applied based on the assumption that it allows triangulate the method and data. That is, in addition to the collection of quantifiable information using survey method, the qualitative method helps to explore the lived experiences of the study participants in the context of COVID-19. In this regard, the qualitative method supplements the quantitative findings with evidence generation. More specifically, the qualitative method mainly aimed at addressing the “why” people in the study area adhere/not adhere to the preventive practices of COVID-19 Hence, **Key Informant Interview (KIIs) and Focused Group Discussion (FGDs) were used as methods of qualitative data collection.**

Sampling Procedure

Quantitative

The region was categorized into three clusters, namely; agrarian, semi-pastoralist, and pastoralists. The main reason to use this method was based on the fact that the region is heterogeneous with regard to economic, cultural, geographic and climatic conditions. From each geographic area zones and towns were randomly selected and three woredas per zones and three sub-cities per towns were also randomly selected to have the participants from the households. After identifying households in the respective woredas and sub-cities participants were randomly selected to include in to the study. Using this method the residents have equal and independent chances of being enrolled in the study (Figure 1).

Insert Figure 1 here

Moreover, based on the aforementioned livelihood clusters, zones and towns the desired eligible sample was allocated proportionally. Using population to size proportionate methods the required sample size was determined in each study site. Then, using systematic sample by calculating interval (total HH population of the area/sample size) preferably the household heads or the available eligible were selected and included in the study (Table 1).

Insert Table 1 here

Qualitative

About 30 key informant interviews were conducted in the study with zonal health administration officials and Woreda administration officers. Thorough discussions were made with them on adherence of COVID-19 prevention methods. Also, 20 FGDs with adult women and men in all samples districts were held.

Participants for the qualitative survey were identified, screened for eligibility, and selected by purposive sampling method by the coordinators in each of the selected sites. The criteria for the selection include their detailed knowledge of COVID-19 preventive measures. The participants include policymakers, service providers and service users from each of the participating areas. Research collaborators in the six sites who are all healthcare practitioners working in the tertiary health facilities supported the recruitment of policymakers and service providers in the area. The service providers helped in the recruitment of the service users who presented for health care services during the study period (Figure 2).

Insert Figure 2 here

Data Collection

The quantitative part of the study involves the collection of quantifiable and measurable data on the implementation of COVID-19 preventive measures endorsed by the government. In this regard, the preparation of the questionnaire was based on conceptual framework of the study and previous similar research work to answer the objectives. The questionnaire was first prepared in

English, and then translated to Amharic and *Afaan Oromo* for data collection and back to English by different people to ensure its consistency. Health professionals having diploma and above were recruited based on their previous experiences of data collection and interest for data collection. Data were collected by face to face interview from the eligible. One participant was randomly selected from the household if there were two and above respondents to prevent intra-household correlation.

The qualitative component intended to explore the barriers being experienced by the people on COVID-19 preventive measures. It tries to explore the level of preparedness of Oromia Region for responding to such pandemics and examine the available policies and action plans that are currently in place. In doing so, FGDs and KIIs guides were also prepared separately in English and translated to *Afaan Oromo* to address the specific research questions. During data collection interviewers were considered and asked about their regular living situations as well as previous conditions to see implementation of COVID-19 preventive measures. The interviews and discussions were managed by face-to-face in Amharic and *Afaan Oromo* languages using trained data collectors (Sociologist and medical anthropologist). Before starting the actual data collections, pre-test was conducted and comments were acquired on the tools. In addition comments were also obtained from colleagues, advisors and other concerned bodies.

For the qualitative data collection, coordinators identified the potential participants of the study, scheduled the dates and time of the planned FGDs and KIIs after obtaining informed verbal and written consent. The participants were informed that the interview was recorded during the consent process. Interviews and discussions were then being conducted face to face by trained interviewers and discussion facilitators. Indeed, the interviewers and discussion facilitators have expertise in the conduct of FGDs and KIIs and were working with members of the central research team. The study participants were informed about the purpose of the study and were invited to participate in the interview and discussions, which lasted for approximately 40-60 minutes. The interviews and discussions were conducted using facilitators guide designed specifically for each of the intended groups. After the interview, the audio recordings were transcribed verbatim in the same days.

Quality Assurance

To enhance the quality of the instruments of the data collection, pre-testing of the questionnaire was undertaken prior to data collection. In addition, three days training was given for data collectors and supervisors concerning the objective, the tools, methodology, and ethical issues. During the data collection period, the collected data were checked for completeness and consistency by the supervisors and principal investigators. Moreover, each supervisor was given his/her own household enumerators and data collectors and reoriented them during each day before data collection. They also supervised them by cross checking the registered households and questionnaire for its completeness. Before starting data entry, unique codes were given to each questionnaire. Missing values and outliers were checked using frequency tabulations, residual plotting and managed accordingly. Data was edited and checked manually by hand for checking completeness both during collection and entering into data entry templates.

Data Management

Data was entered into Epi info version 7.2.0.1, data entry template and exported to STATA 15 software for analysis. Missing values and outliers were checked by frequency tabulations. Randomly selected 5% of the data set was double entered to check the accuracy and similarities based on the questionnaires identification numbers. Any decision or changes used on the data set was clearly documented for further explanations of unexpected errors that may happen at the end of the day. In addition, check for item and unit-missing values, outliers for accuracy, causes of outliers were considered and determined.

Data Analysis

The quantitative data was analyzed using STATA 15 software. Descriptive statistical analysis such as frequency, percentages, proportions with 95% CI, mean and standard deviation were used. The associations between level of adherence to COVID-19 preventive measures and independent variables were modeled using binary logistic regression analysis. Simple logistic regression analysis was used to assess the existence crude relationship between independent variables and level of adherence to COVID-19 preventive measures. At this level the candidate independent variables for multiple regression analysis were selected at P-value < 0.25 significance level. Multiple logistic regressions were applied to estimate the adjusted effects of

independent variables on level of adherence to COVID-19 preventive measures. The regression model was developed using forward stepwise approach. The odds of being adhered to COVID-19 preventive measures were estimated using odds ratio within 95% confidence intervals. At this level the significance of associations was declared at p-value of 0.05.

The final fitted model was assessed for assumptions like normality of continuous variables using histogram and normal curve, multicollinearity between independent variables using Variance Inflation Factor (VIF) and goodness of fit using Hosmer and Lemishow test. Moreover, the model ability to correctly classify those subjects who experience outcome of interest and those who do not was assessed using Receiver Operating Characteristics (ROC) curve. Findings were presented on frequency tables, graphs and discussed accordingly.

The qualitative data analysis was begun with the work of transcription, translation and theme development during data collection. Initially the KII and FGD were transcribed and translated. Then a workshop was prepared to develop themes by reading all translated data. The data was then entered into NVivo version 12 for its organization and management.

Operational Definitions and Measurements

Level of Adherence: Adherence towards prevention and control measures for COVID-19 was computed from the response category of the preventive measures endorsed by the government (hand washing, using a facemask, keeping physical distance, not travel to a crowded place, home stay, and not travel to anyplace during the pandemic) regularly practiced during 14 days before data collection time. The score was computed from those who properly practiced. Those respondents who scored 95% and above were labeled to have “Good adherence to COVID-19 preventive measures” and otherwise⁷.

Ethics Consideration

Ethical approval was obtained from the ethical review board of Oromia Regional State Health Bureau. Permission letters were secured from Regional and Zonal Health Offices and shared with the randomly selected health care facilities and community administrators. Assent for less than 18 years and verbal consent was obtained from participants.

Approval and permission was sought from the concerned bodies for the study. The ethical review was undertaken by all project and investigators ensured standard processes (dignity, autonomy, informed consent, confidentiality, anonymity, ability to adhere to protocol) and data security are maintained. Voluntary and informed participation, confidentiality and safety of participants constituted key principles of researcher respondent interaction. Informed verbal and written consents were obtained from residents, service users, service providers and policymakers prior to their enrolment in the study. The study was conducted according to the Helsinki declarations on ethical principles for medical research involving human subjects. Finally, the collected data was stored in a separate computer and kept confidentially. On completion of the study, both the quantitative and transcribed data were stored in password-protected computers/laptops and only the core research team has access to the data.

Results

Socio-demographic Characteristics of the Study Participants

About 2851 sample were planned of which 2724 were participated in to the study making the response rate of 95.5%. The mean (\pm SD) age of the respondents was 33.30 (\pm 11.34) years ranged from 18 to 82 years. The majority (36.8%) were within the range from 26 to 35 years. The majority of the respondents 1512 (73.6%) were from agrarian, while 203(9.9%) were agro-pastoralists cluster areas. Of the respondents 1503 (56.7%) were urban residents and more than half, 1333(51.4%) were females. Most, 1818 (68.1%) of the respondents were married during data collection period. Regarding their religion, most (41%) were Orthodox Christian followers. The majority 2170 (79.9%) of respondents were Oromo by their ethnicity and 847 (31.2%) were farmers or pastoralists by their occupation, whereas, 393 (14.3%) were students. About quarter of the respondents 681(25.1%) attended secondary school education and about one in ten 306 (11.3%) can read and write. The estimated annual income of the respondents ranged from 1000 ETB to 650,000 ETM with the median (\pm IQR) of 10,000 (\pm 649,000) ETB (Table 2).

Insert Table 2 here

Knowledge about COVID-19

The majority of the respondents, **2525 (91.6%)** have heard about COVID-19, but only 61.3% believe the existence of COVID-19 in their area. Moreover, less than one in ten, 258 (9.36%) of the respondents believes as COVID-19 is a killer disease (Figure 4).

Insert Figure 4 here

The qualitative data also shows that people have information about the disease. However, due to lack of COVID-19 cases and morbidity some believe that their area is free from the disease. For instance, a FGD discussant in Bale Zone Dinsho woreda said,

“I believe this disease does not exist in our area. In our neighbor, people also believe in a similar way. The communities have awareness on corona and maintain physical distancing. All schools were closed except 8th grade. Children were not allowed to play

together. We wear face masks when we went to market and in transport to strictly protect ourselves.” A 37 years male

Moreover, it was also found that there was a difference between rural and urban communities with regard to the knowledge of COVID-19 including its preventive measures . A male FGD held in East Wollega illustrated that people in urban area have more access to sources of information and are knowledgeable than rural people. A participant in the FGD said,

“There is a difference between people in rural and urban area of our community with regard to knowledge. The people in urban area have more knowledge than the rural area in having information from different source but they are reluctant in implementing prevention measure. They relate COVID-19 with politics so that awareness creation campaign becomes ignored. This factor by itself is also one of the hindering factors of application of prevention measure than lack of knowledge.” A 45 years male

Regarding media and other source exposure, more than one in six (63.09%) of the respondents have got information about COVID-19 from radio and the Health workers conveyed for about 43.88% of the respondents. The least proportion (14.4%) heard information about the COVID-19 from their close friends (Figure 5).

Insert Figure 5 here

It was also reported that people have multiple sources of information about the disease regardless of age difference. For example, a female key informant in Nekemte described, that *“we have enough information from different sources like mainstream media. Awareness creation was also made previously so we know ways of its transmission and prevention. In my area, everybody including children and elders know COVID-19.”* 35 years Female

The participants in the qualitative method also reported that social media such as Facebook, telegram, WhatsApp and Twitter were the main sources of information about COVID-19. A key informant in Borana Zone Health Office illustrated that *“we have got the information from social Medias of global and national individual and institutional actors informing that the disease is highly spreading worldwide.”* A 28 years male

Of the respondents, most (67.7%) and (63.56%) have information about protection measures and symptoms, respectively. The least proportion (23.8%) informed about the risks/ complications of COVID-19 (Figure 6).

Insert Figure 6 here

Regarding information about the preventive measures of COVID-19, the vast majority (80.9%) of the participants reported to have information about regularly hand washing using hand rub or soap and water, while about (7.5%) didn't know the prevention measures of COVID-19 during the data collection time (Figure 7).

Insert Figure 7 here

Regarding the perception of the study participants on the transmission of COVID-19, the majority (65.6%) perceived that the droplets spitted from infected person is the most transmission way of COVID-19 to other people. About 9% perceived the transmission way by sexual intercourse. Also, about 2.3% of the respondents didn't perceive anything about the transmission way for COVID-19 (Figure 8).

Insert Figure 8 here

The study participants were also asked about the symptoms experienced by a person infected with COVID-19 when sick. Accordingly, about eight in ten (79.4%) and (75.93%) mentioned cough and fever, respectively, as the main symptom of COVID-19 when a person get sick. Whereas, nearly 1% of the participants responded as there is no symptom from the COVID-19 infected person when sick (Figure 9).

Insert Figure 9 here

The composite knowledge score was calculated from the above knowledge related variables and accordingly 1606 (58.4) have good level of knowledge 19 and 1139 (41.5%) were labeled to have poor knowledge about COVID-19 and its preventive measures.

Attitudes towards COVID-19 preventive measures

The attitudes of the study participants were explored using Likert scale measures, accordingly 2355 (86.6%) agreed for the COVID-19 is a killer disease, whereas, 223 (8.2%) disagreed for its severity. On the other hand, the majority of the study respondents 2378 (87.6) agreed as COVID-19 is preventable diseases. The majority of the study respondents 1220 (44.9%) disagreed for the government responsibility of implementing the preventive measures of COVID-19, while most 2229 (82.2%) of the respondents agreed for the communities responsibility in implementing COVID-19 preventive measures. Also, about nine in ten, 2427 (89.8%) agreed in the individuals responsibility to apply all the preventive measures against COVID-19. Conversely, one in three 871 (32.2%) have favorable attitudes towards COVID-19 Preventive measures (Table 3).

Insert Table 3 here

In addition the qualitative methods have explored various attitudes towards COVID-19. It was found that some people believe that COVID-19 affect people differently. In this regard there was an assumption in the community believing that the disease does not affect young people. The male FGD participant conducted in Nekemte said,

“There is misconception that corona virus have no serious effect on younger people especially for less than 40 years old. So, when you ask young people why they are not wearing facemask they say the virus is not risky for us, rather let the older ones wear.” If wearing is mandatory, they wear masks on their beard. Generally, the reasons for not implementation of prevention measure are that I didn’t have seen corona virus.” A 46 years male

Moreover, there were people who do not believe even in the existence of the disease. Due to lack of confirmed or COVID-19 morbidity some people considered that the disease does not exist in their area. For instance, a FGD discussant in South West Shoa mentioned that he do not believe the existence of the disease as he didn’t see pain on COVID-19 infected people. To put in his own words,

“There is hospital in this town called Luke hospital that serve as COVID-19 treatment center so we hear that one person dead of covid-19. Firstly, government sectors was creating an awareness about all prevention measures, but daily we are seeing people discharging from isolation center and said we never feel any pain so that we realized that

there is no COVID-19 around. In other word, our people deny that there was no disease called COVID-19.” A 30 years male

The study participants also alleged that COVID-19 was politicized. For instance, a key informant interview in Yabelo town described that “some of the community member believe that there is no disease. The government talks about it for political purpose.” Moreover, another informant in Woliso also mentioned that “there is no corona virus rather the government is politicizing it but we are telling the community that the virus is real and life threatening disease and no political need behind.” Similarly, another key informant who was working as health officer in Borena Zone illustrated that “*there are attitudes towards the disease assuming that it is political game for postponing election.*”

Furthermore, some discussants and informants of the study related COVID-19 to spirits than a real disease and consider it as a wrath of God and evil spirit. A key informant in Bule Hora town mentioned as follows:

“Some of the community members believe that there is no disease even preached at some religious institutions. The town closed three Protestant churches following this wrong act against COVID-19. The religious members consider it as an evil spirit or Satan’s act on human being and nothing to do.” A 41 years male

Practice and Adherence of the COVID-19 Preventive measures

The study participants were asked about the measures that were taken at least once since the start of COVID-19 pandemic. Accordingly, the vast majority 2131 (84.0%) have tried in washing hands regularly using hand rub or soap and water. Also, about 70.8% and 83.1% of the study participants have practiced for avoiding hand shaking or hugging and covering their mouth and nose, respectively. Moreover, 85.4% of the study participants practiced at least one of the preventive measures endorsed by the government. However, about 4.4% of the study participants did nothing to prevent COVID-19. When the adherence level for the preventive measure were computed for the regular and usual practices for 14 days prior to data collection time **8.3% (95%CI: 7.7%, 8.9%)** used to have the practices for about 95% and above and labeled to have a good level of adherences to COVID-19 preventive measures and otherwise (Table 4).

Insert Table 4 here

When asked for the reasons for not or poor adhering to COVID-19 preventive measures a month prior to a survey, the vast majority (82%) kept quiet or no response to the questions and the insignificant number (4%) believed in their own religion for not to have COVID-19 infection. Also about 6% perceived as COVID-19 is not a killer disease and no need for the frequent use of preventive measures (Figure 10).

Insert Figure 10 here

Participants were asked about COVID-19 preventive measures whether it was practiced within their family members. Accordingly, the vast majority (93.76%) have practiced in covering their mouth and nose during coughing and sneezing. Moreover, about quarter (24.83%) of the family members have practiced at least any one of the preventive measures (Figure 11).

Insert Figure 11 here

The difference between awareness, knowledge, attitude and adherence to COVID-19

Even though the awareness level of people was extremely high decreasing trend is seen across the knowledge, attitude and adherence to COVID-19 preventive measures (Figure 12).

Insert Figure 12 here

Factors associated with Adherence to COVID-19 Preventive measures

Binary Logistic regression analysis was performed to identify factors associated with level of adherences to COVID-19 Preventive measures since the introduction by the government. The Regression model was fitted using forward stepwise model development approach. First the crude association between dependent and independent variables were examined using simple logistic regression analysis to select candidate variables for multiple logistic regression models. At this level P-value < 0.25 was used as a rule of thumb to select candidate variable for multiple logistic regression model. Accordingly Geographical Cluster, participant's age, Occupation,

level of education, Level of knowledge, and attitudes were found significantly associated with level of adherence to COVID-19 Preventive measures at Bi-variable level. All candidate variables selected by simple logistic regression analysis were subjected to multiple logistic regression models to estimate their adjusted effect on level of adherence to COVID-19 Preventive measures. In this model the independent effect of explanatory variables were estimated by controlling the effects of possible confounders. Accordingly after adjusted for possible confounders' Participants age, level of education and level of knowledge were found significantly associated with level of adherence to COVID-19 Preventive measures at P-value < 0.05.

Based on the current study finding being older age group of 36- 45 years were four times [AOR, 4.00; 95% CI: 1.50, 10.45] more likely to have good adherence to COVID-19 preventive measures compared to those aged of 18- 25 Yrs. The odds of good level of adherences towards COVID-19 preventive measures increases with level of education. Accordingly, compared to study participants who attended Colleges and above, being Illiterate [AOR, 38; 95% CI: 0.15, 0.93], can read and write [AOR, 0.26; 95% CI: 0.10, 0.72], and attended primary [AOR, 0.30; 95% CI: 0.13, 0.70] were less likely to have good level of adherence to COVID 19 preventive measures. Being merchant were less (AOR; 95% CI: 0.29, 0.96] likely to adhere to COVID-19 preventive measures compared to farmers. The study also showed that the odds of having good adherence to COVID-19 preventive measures lower [AOR, 0. 20; 95% CI: 0.01, 0.11] among participants with poor level of knowledge on COVID-19 (Table 5).

Insert Table 5 here

The qualitative method also explored hindering factors for applying COVID-19 prevention mechanisms. Accordingly, socio-economic problems, lack of COVID-19 confirmed cases, low enforcement mechanisms and low level of perceiving risk were the main reasons for not practicing the prevention methods. For instance, one of the KII in Dinsho woreda described;

“economic problem, politics and culture can be the reasons for not practice COVID-19 prevention method. Massive meeting and rallies conducted in different place that we observed affected our community to decrease the practice of COVID-19 prevention methods.” A 40 years male

As mentioned in the above quotation there were political events (in support of or against the existing political system) such as rally (public meeting) and violence that brought many people together created conducive environment for the spread of the disease. These circumstances made people to be careless and avoid using prevention methods. A key informant in Bale Zone Health Office pointed out one of the incident as follows:

“The possible challenges not to use the preventive methods were the mass grievance and violence after the death of artist Hocalu Hundessa that the community said no disease but the political actors are the virus by themselves.” A 34 years male

The discussants and informants also described that there was lack of or loose law enforcement to re-enforce people in the use of the prevention methods in their area. The informant said that,

“In the beginning, law enforcement by the government had helped for proper utilization of COVID-19 prevention methods. Religious and cultural leaders are also played, major role in helping the community to proper use of COVID-19 prevention method. Later on, this law enforcement from the government declined. The people start to stop utilization of COVID-19 prevention methods. Currently, public gathering is underway without proper care in our area. Keeping social distancing and personal hygiene is not properly practiced in our zone.” A 51 years male

Furthermore, lack of commitment from the side of the government itself made the rules of the prevention measures to be over sighted. Example, the key informant from Dinsho woreda described that the government itself did not adhere to the rules. He said, *“We advised on different preventive methods and we practiced as much as we can after attentively follow. As a political concern we observed that still meeting of many people by the government during the time of corona.” A 28 years Female*

The study discussants and informant also mentioned that absence of COVID-19 related morbidity and confirmed cases as one of the main reasons for not complying with COVID-19 prevention methods. A key informant working as zonal PHEM in Borena described that *“low morbidity, absence of sign and symptoms on those who diagnosed by laboratory has significantly decreased the fear and adherence of COVID-19 prevention method our community.” A 41 years male*

Economic problems were among the key factors for lack of non-implementation of COVID-19 prevention methods. For instance, a male FGD discussant in East Wollega illustrated as follows:

“Student and other living in this town have awareness about corona virus. But they all joking in its implementation sometimes we hear that “our priority is not corona virus” Young people graduated and unemployed in this town. Generally, they all know about the disease.”

It is possible to understand from the above excerpt that the **massive unemployment** in the area is reported as one of the key challenge beyond COVID-19. Lack sustainable and adequate employment for newly graduating youths created hopelessness and doesn't create fear for the disease. Another key informant in Woliso town also mentioned that “most people in this town are hopeless because of unemployment. So, how can they hear what you are trying to teach them? This is another factor.”

Lack of adequate source of income also the key issue in making the prevention measures available for all. The study participant in Bale described that,

“as you know most of populations are in low income, as we talk of prevention measures most of them need money that may be difficult for some of our people, for instance, soap and alcohol, etc need money that some of our community can't afford.” **A 56 years male**

Moreover, some of the **livelihood activity** practiced in the study area was also found not to adhere with COVID-19 prevention rules. For example, works such as farming (working in groups such as Dabo), daily laborer, and petty trade are some the works where the respondents unable to comply stay at home, maintaining physical distance, and avoiding gathering. A female FGD participant in Adama woreda described:

“individual economic status is among the hindering factors to practice preventive measures , for example, if someone have enough money to feed his/her family, he/she can practice stay at home preventive measure but if not one cannot practice it. Even families lack money to buy face mask and sanitizer for their children.” **A 46 years female**

In the study area, the necessity of participation in **social events** such as *idder* also made the prevention mechanisms unrealistic. Membership and participation in societal events such as wedding, burial, and *idder* are vital for ones live in the communities. Hence, people were urged to participate in the gatherings otherwise they will be isolated and cannot survive. A female FGD discussant in Woliso woreda explained,

“We can’t manage the number of people during death ceremony because some of our people say “I can’t avoid this gathering as we are the same idder” so this issue may be one of hindering factor.” A 40 years female

Another female FGD discussant in Adama town illustrated that:

“Our culture of togetherness like celebrating festivals together, funeral services and other ceremonies are hindering practices of corona virus preventive measures. For example, if someone not participated on funeral services of neighbors he/she will be marginalized and disrespected in the village.” A 30 years male

Discussion

This study used a community based cross-sectional design using both quantitative and qualitative approaches aimed to assess the level of adherence to COVID-19 preventive measures , in terms of a composite score comprising of sex measures endorsed by WHO and the Government: Wash hands regularly using hand rub or soap and water (hand hygiene), Avoiding hand shaking and hugging, Covering mouth and nose (face mask use), Avoiding close contact with anyone (physical distancing), Cooking all animal products, and Avoiding unprotected direct contact with live animals and Surfaces and associated factors in Oromia region. In doing so, the level of Knowledge, attitude and practices of the COVID-19 preventive measures were computed.

During the study period the majority of the participants (**91.6%**) have heard about the world COVID-19 pandemic, and the majority has heard the information from radio. About 58.4 have good level of knowledge from the composite score calculated from related variables. It is lower than studies done in China 90% ¹⁶. This may be because the developing countries use social media less than developed countries and minimize disruption caused by the corona virus. However, it is similar with the findings from study in conducted in the studies conducted in bi-national African countries (Egypt and Nigeria) showed for 61.6% had good level of knowledge towards COVID-19 and its preventive measures¹³. The study is also corroborating with findings from a Systematic Review conducted during 2020 and study conducted in southern Ethiopia indicated for 61.78% and 63.51% of the participants, respectively had good knowledge towards COVID-19 preventive measures^{1,17}.

In the knowledge assessment even though the majority heard about COVID-19 about 38.7% do not believe the existence of the disease. Moreover, during the study period, the majority (86.6%) agreed for the COVID-19 is a killer and preventable disease, whereas, 8.2% disagreed for its severity. About 55.1%, 44.9%, and 82.2% claimed for the responsibilities of government, community, and individuals, respectively, in implementing the COVID-19 preventive measures. However, **32.2%** of the study participants have favorable attitudes towards COVID-19 Preventive measures. This is less when compared to results in a survey of selected African countries (Egypt and Nigeria and southern Ethiopia showed most of the respondents (68.9%) and 54.5% had a positive and favorable attitudes towards protective measures being advised by the

WHO or their local health authorities^{1, 13}. In the same manner, 72.39% participants had favorable attitudes about corona virus in a systematic review conducted in Ethiopia¹⁷.

In this study 85.4% of the study participants practiced at least one of the COVID-19 Preventive measures endorsed by the government. About 3.12% did nothing to prevent COVID-19. The overall level of adherence for the implementation of COVID-19 preventive measure was 8.3%. This is supporting the findings from Southern Ethiopia indicated about 12.3% adhered to the recommended COVID-19 preventive measures¹. However, it is far different from the study conducted in North Shoa and Gonder city at the beginning of the pandemic that showed the overall adherence of the community towards COVID-19 mitigation measures of 44.1% and 51.01%, respectively^{2, 7}. The difference might be due to the fact that the current study was conducted in both urban and rural areas after people's give-up and loss hope. While the later was researched in urban and just during the occurrences of few cases in Ethiopia.

In the final model, as age increases the odds of good level of adherence to COVID-19 preventive measures is increasing. This supports the notion of the older age of 64 years or greater had higher odds of having knowledge on the prevention methods of COVID-19 for about 11 times higher compared to ages below 18 years old¹⁸. Also, in another study, participants in the ≥ 65 years age group were 2.72 times more likely to have adherence to COVID-19 preventive measures as compared with the 35 and less years age group¹⁹.

The odds of good level of adherence towards COVID-19 preventive measures increases with level of education. This supports the finding from Dessie and Kombolch for the participants who were attending high-level education were 60% times more likely to have adherence to COVID-19 preventive measures compared with those who were unable to read and write¹⁹. In another study a higher level of education, was associated with better preventive behaviors¹⁵.

Being merchant were less likely of having good adherence to COVID-19 preventive measures. This is supported by the results from the qualitative methods in which most of the time merchants going from place to place are not practicing the preventive measures. One of the discussant said,

“In our village, for example, women selling onion, tomato and other daily consumables working at ‘Gulit’ may not practice physical distancing, hand washing, stay at home and almost all preventive measures because they are working to win their daily bread for their family.” A 31 years female

The study also showed that the odds of having good adherence to COVID-19 preventive measures lower among participants with poor level of knowledge on COVID-19. As knowledge is the result of awareness based on obtaining appropriate information it is supported by study conducted elsewhere⁷. This finding is congruent with a study conducted in the Netherlands²⁰ showed high information seeking behavior was associated with good adherence to COVID-19 Preventive measures. This might be due to the fact that if the population had prior information about the utilization and advantage of the prevention measures²⁰.

In this study the attitude of the respondents towards COVID-19 preventive measures failed to be significant in the multivariate analysis. However, in several studies those respondents having favorable attitude towards COVID-19 preventive measures were more likely to adhere towards the mitigation measures than their counterparts^{20, 21}. The possible explanation might be that the respondents who had a favorable attitude towards COVID-19 preventive measures might trust the science of mitigation measures and comply with the instructions of these guidelines²⁰. These is supported by the results from qualitative methods in which, social factors such as negative attitude towards those people practicing the prevention measures were the main factors for not adhering to the prevention measures. People consider those wearing facemask and using sanitizer as *foreigners and those who fear death*. Hence, people do not practice the prevention measures not to be labeled as such and not to be unique. Moreover, the key informant in Borena Health Office also indicated that “stigma is also among the factor that affected use of prevention method.” Moreover, some people claimed that there is no corona virus in the country.” The key informant further states,

“the government only propagates the existence of the disease to get the foreign aid. Even some of the health professional claimed that it is only to get per diem. There are also people who say we are protected by our almighty God. So, no need of use of prevention method.”

Limitations of the study

Firstly, due to the cross-sectional nature of the study design, it might be difficult to ascertain the cause effect relationship between the study variables. Secondly, social desirability bias might be introduced despite their poor actual implementation. Thirdly, the tool used in this study was developed by the research team based on the context and not previously validated and the reliability was checked using Cronbach's alpha.

Strength of the study

Through this community based survey, it was possible to conduct a face-to-face interview and Observation with maximum precaution than a simple telephone survey as others during the pandemic to evaluate the real response and adherence of the community towards mitigation measures. This study conducted in a highly spreading time of the pandemic being an input for the government and others actors to intervene.

Conclusions

This study found that highest awareness level (**91.6%**), moderate level of knowledge (**58.4%**) and low favorable attitudes (**32.2%**) towards COVID-19 Preventive measures were observed. About 85.4% practiced at least one of the preventive measures endorsed by the government. The overall level of adherence to COVID-19 preventive measure was very low (**8.3%**). Age group, level of education, having poor level of knowledge on COVID-19 [AOR, were factors associated with level of adherence to COVID-19 preventive measures. In qualitative method, political context, unemployment nature of livelihoods, and necessity of social events were mentioned as a reason for the poor adherences to COVID-19 preventive measures.

Based on the findings of the current study is possible to recommend that, activities to increase the knowledge, attitude and adherences towards COVID-19 and its preventive measure through appropriate information outlets such as radio on continuous bases. Much work is needed from the concerned bodies like the government and or the health sectors in improving the adherence of

the community towards the recommended safety measures of COVID-19. Moreover, it is crucial to enforce the health regulations towards the preventive measures endorsed by the government. Preparation and dissemination of teaching aids prepared in local languages considering the socio-demographic, political and cultural factors are crucial to improve community's adherence towards COVID-19 preventive measures. The government officials have to consider some of their action including meetings, gathering at different level since it might passes wrong message to community in believing that as if COID-19 does not exist. Legal enforcement for COVID-19 prevention has to be revitalized as well as possibility with serious precaution to be followed and implemented.

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Disclosure

All the authors have declared no potential conflicts of interest

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Figures and Tables

Figure 1: Schematic presentations of the Sampling Procedures to select the zones and towns, Oromia region, September 2020 to March 2021.

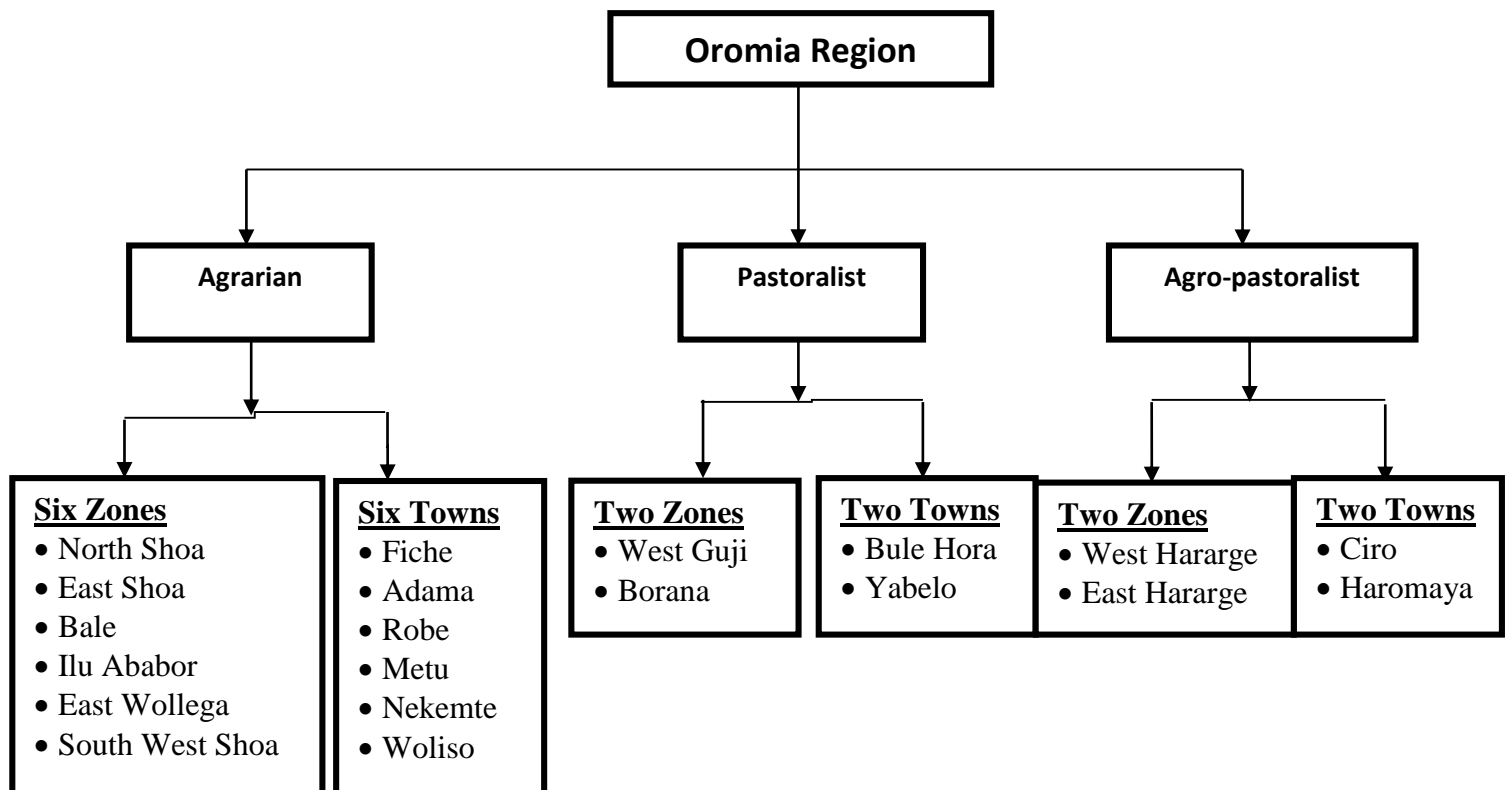


Figure 2: Schematic presentation of Sampling Procedure for qualitative methods, Oromia region, September 2020 to March 2021.

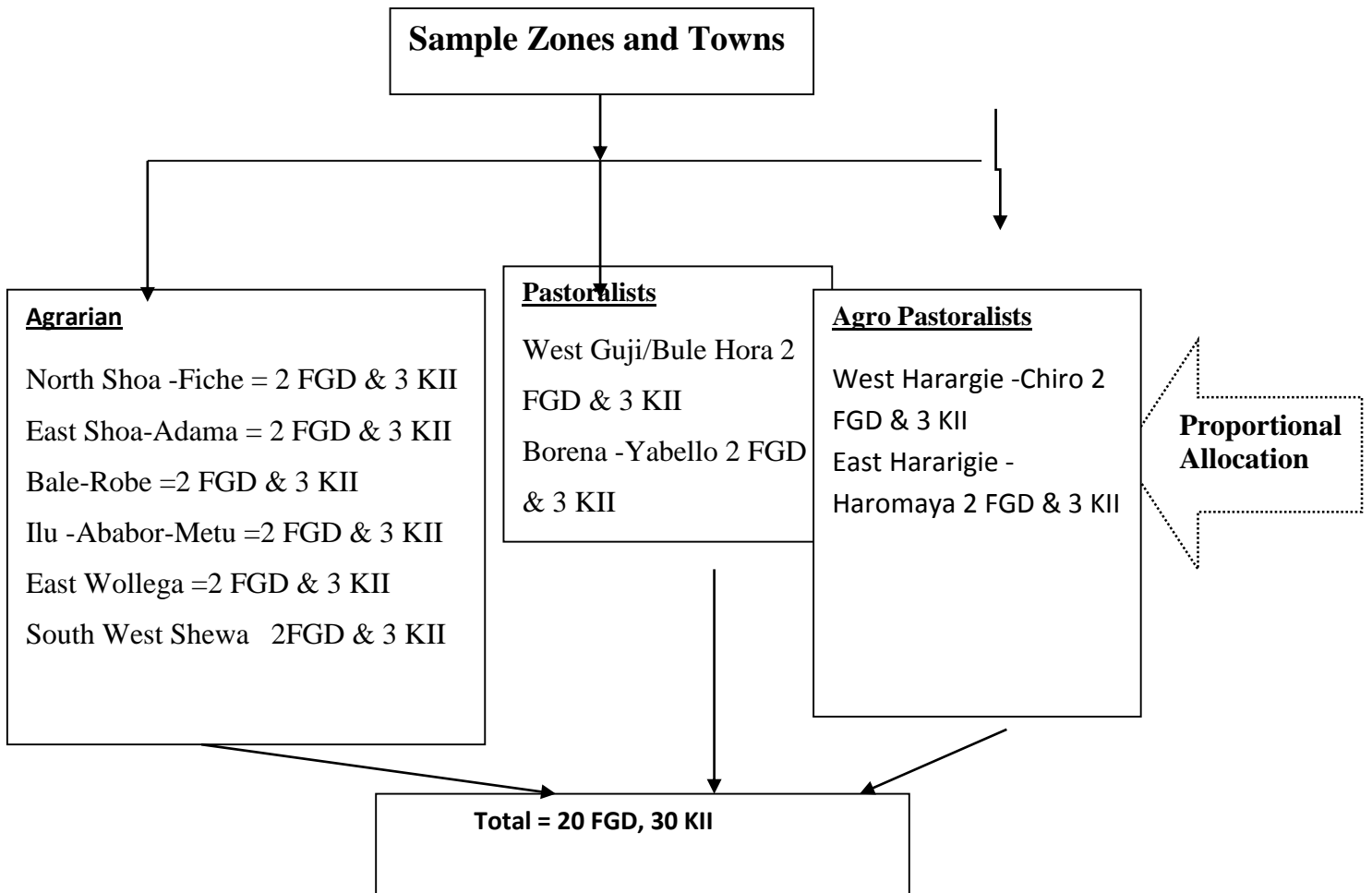


Figure 3: Perception of respondents about COVID-19, Oromia region, Ethiopia, September 2020 to March 2021.

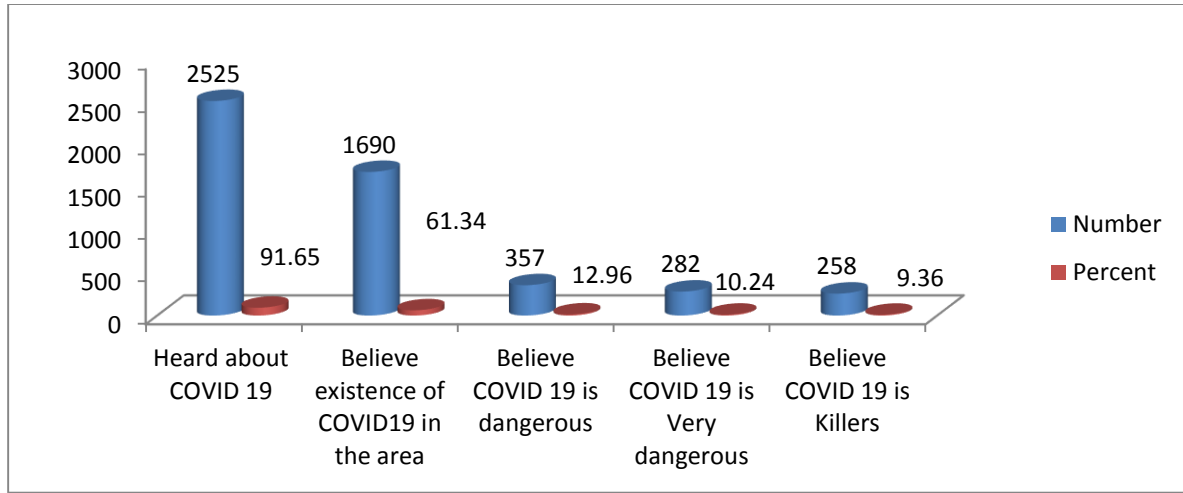
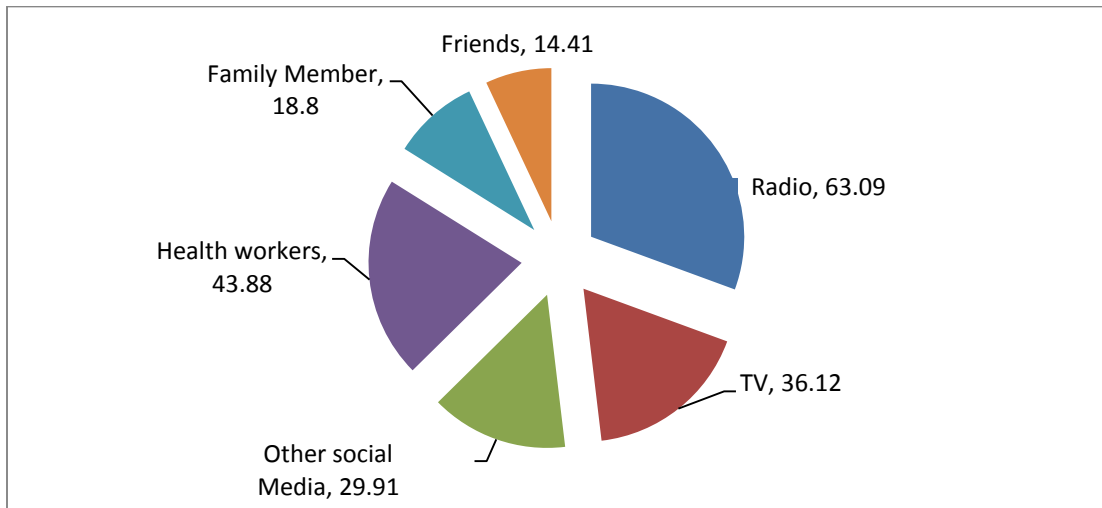
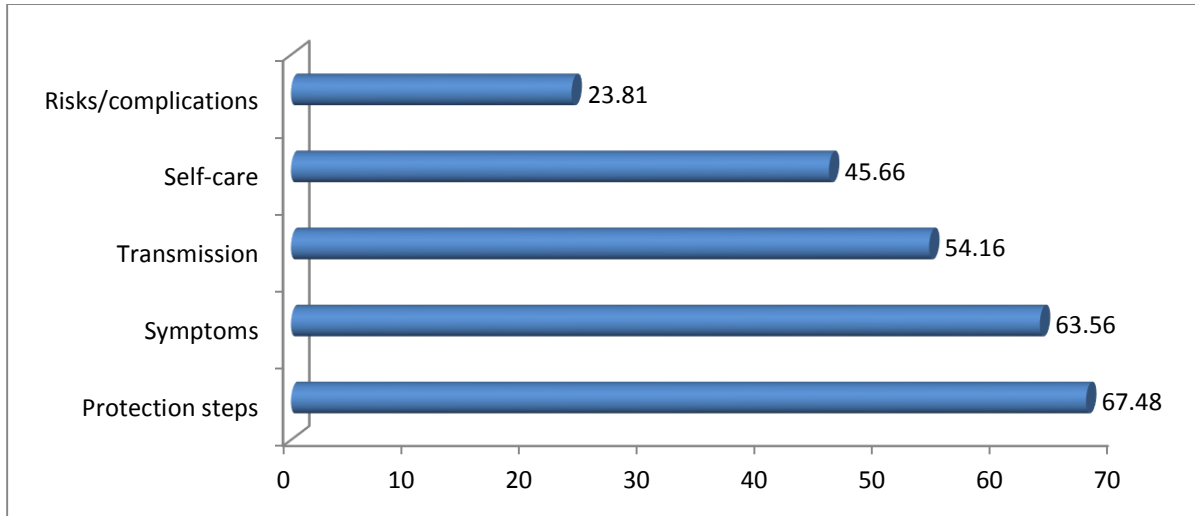


Figure 4: Percentage of Source of information, Oromia region, Ethiopia, September 2020 to March 2021.



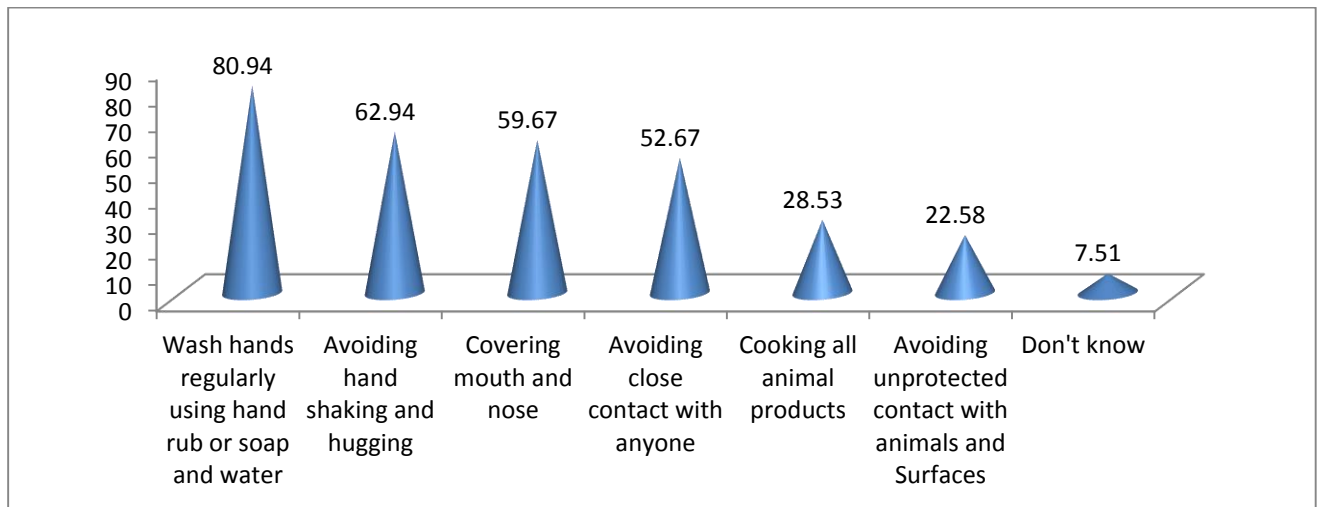
NB: Percentage may not add 100% as multiple responses were possible

Figure 5: Percentage on Kinds of information on COVID-19, Oromia region, Ethiopia, September 2020 to March 2021.



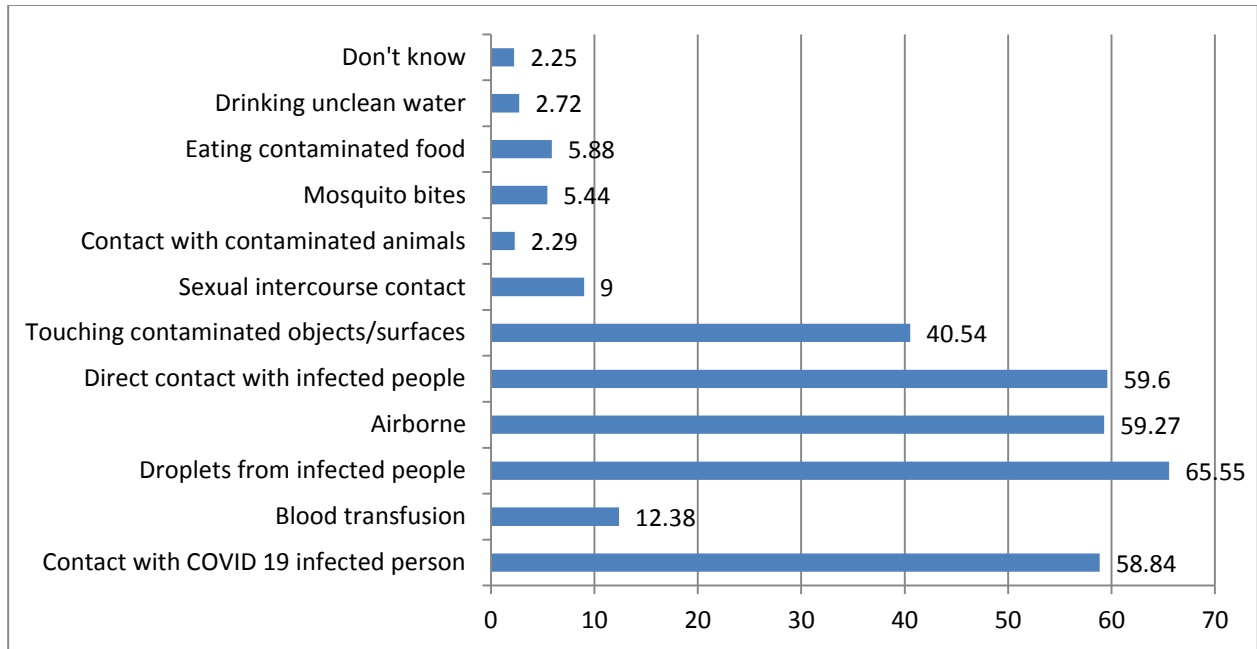
NB: Percentage may not add 100% as multiple responses were possible.

Figure 6: Percentage of information among respondents about COVID-19 preventive measures, Oromia region, Ethiopia, September 2020 to March 2021.



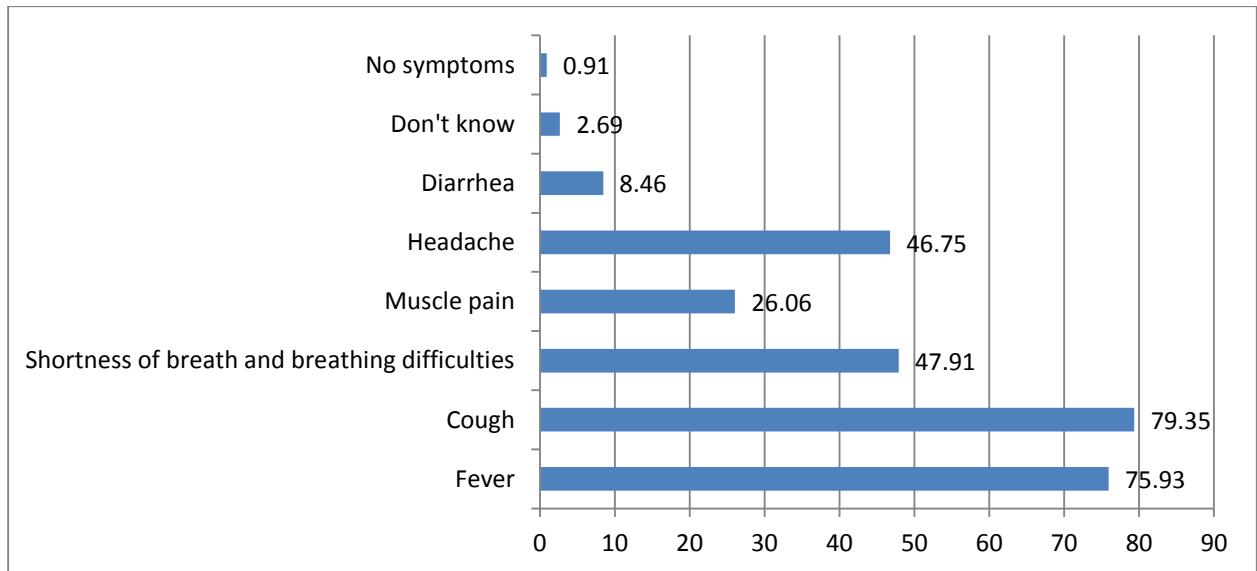
NB: Percentage may not add 100% as multiple responses were possible

Figure 7: Percentage of respondent's perception on the transmission of COVID-19, Oromia region, Ethiopia, September 2020 to March 2021.



NB: Percentage may not add 100% as multiple responses were possible

Figure 8: Percentage of the symptoms of COVID-19 mentioned by the respondents, Oromia region, Ethiopia, September 2020 to March 2021.



NB: Percentage may not add 100% as multiple responses were possible

Figure 9: Reason for not adhering to COVID-19 preventive measures among study participants, Oromia region, Ethiopia, September 2020 to March 2021.

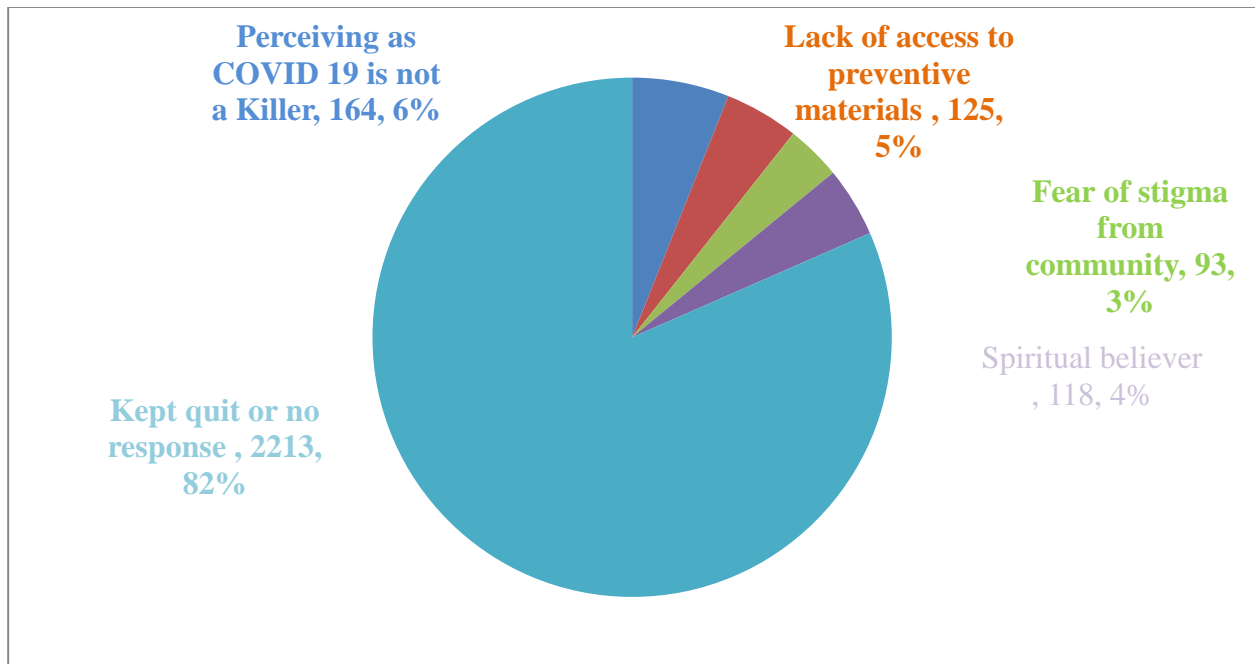
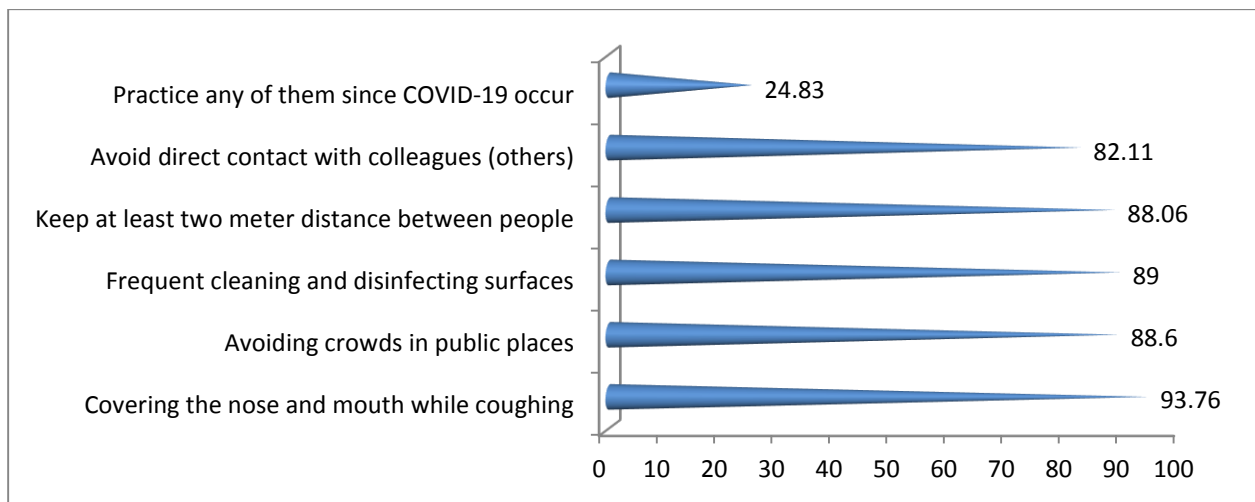


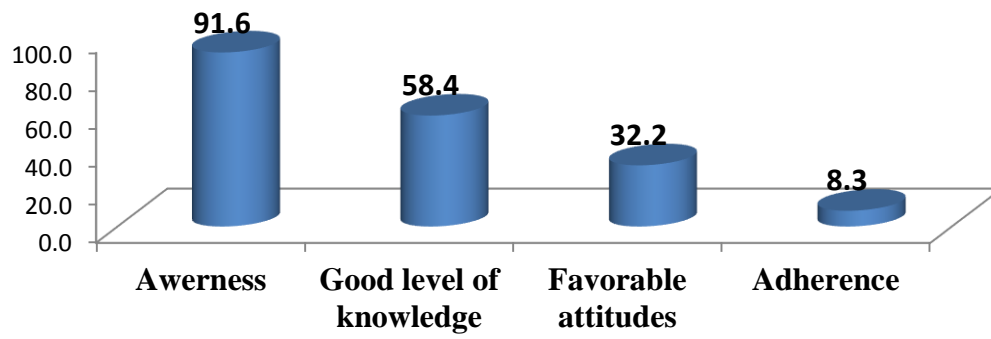
Figure 10: Percentage of measures taken by respondents, Oromia region, Ethiopia, September 2020 to March 2021.



NB: Percentage may not add 100% as multiple responses were possible

Figure 11: Percentage differences across awareness, knowledge, attitude and adherence to COVID-19 preventive measures, Oromia region, Ethiopia, September 2020 to March 2021.

Percentage



Tables

Table 1: Proportion of Sample size allocated to zones and towns of the study area, Oromia Region, September 2020 to March 2021

Description	Urban sample size 1426 Rural sample size =1426				
	Zones pop ⁿ	Zone popn Minus Urban	Sample per zone	Town pop ⁿ	Sample per/town
Agrarian			703		1125
North Showa/Fiche	1690403	1645269	141	45134	70
East Shoa/Adama	1615178	1229941	105	385237	600
Bale /Robe	1886779	1813919	155	72860	113
Ilu-Ababbora/Metu	991,257	943105	81	48152	75
East Wollega /Nekemte	1634387	1510903	129	123484	192
South West Shoa / Woliso	1126028	1077684	92	48344	75
Pastoralists			703		1125
West Guji/Bule Hora	1523137	1465246	125	57891	90
Borena /Yabello	566406	539682	46	26724	45
Agro pastoralist			172		135
West Harargie /Chiro	2667000	2611725	223	55275	86
East Harargie/ Haromaya	3882018	3831573	328	50445	79

Table 2: Socio-demographic characteristics of the respondents, Oromia region, Ethiopia, September 2020 to March 2021

Variables	Response Category	Number	Percent
Cluster of Respondent (n= 2055)	Agrarian	1512	73.6
	Agro-Pastoralists	203	9.9
	Pastoralist	340	16.5
Residence of Respondent (n=2651)	Urban/Town	1503	56.70
	Rural/Woreda	1148	43.30
Sex of Respondent (n=2591)	Male	1258	48.6
	Female	1333	51.4
Age	18- 25 yrs	725	28.1
	26- 35 Yrs	949	36.8
	36- 45 Yrs	603	23.4
	46- 55 Yrs	171	6.6
	≥ 55 Yrs	133	5.2
Marital Status of Respondent (n= 2670)	Single	706	26.4
	Married	1818	68.1
	Widowed/Divorced/separated	146	5.5
Religion of Respondent (n=2723)	Orthodox	1111	41
	Muslim	982	36
	Protestant	555	20
	Others*	75	3
Ethnicity of Respondent (n=2717)	Oromo	2170	79.9
	Amhara	344	12.7
	Tigre	32	1.2
	Others**	171	6.3
Occupation of Respondent (n= 2724)	Farmer or pastoralist	847	31.2
	Merchant	632	23.3
	Student	393	14.5
	Gov./NGO worker	408	15.0
	Others ***	433	16.0
Level of Education for Respondent (n=2709)	Illiterate	498	18.4
	Read and write	306	11.3
	Primary	590	21.8
	Secondary	681	25.1
	Colleges and above	634	23.4
Estimated annual Income	Less or equal to 10, 000 ETB	932	50.4
	10,001 - 25,000 ETB	384	20.8
	25,001 - 50,000 ETB	297	16.1
	50,001- 100,000 ETB	185	10.0

NB: Others include * Catholic and Wakefata

***** Sidama, Wolayita and Gurage***

****** Work in private organization, house maid, and daily laborer***

Table 3: Attitudes of the respondents towards COVID-19 preventive measures, Oromia region, Ethiopia, September 2020 to March 2021

Variables	Response Category	Number	Percentage
COVID-19 is a killer disease (n=2718)	Agree	2355	86.6
	Neutral	140	5.2
	Disagree	223	8.2
COVID-19 is preventable (n=2716)	Agree	2378	87.56
	Neutral	198	7.29
	Disagree	140	5.15
Government is responsible for implementing the preventive measures of COVID-19 (n=2716)	Agree	1213	44.7
	Neutral	283	10.4
	Disagree	1220	44.9
Community is responsible for implementing preventive measures of COVID-19 (n=2713)	Agree	2229	82.2
	Neutral	166	6.1
	Disagree	318	11.7
Individuals are responsible to apply all the preventive measures of COVID-19 (n=2703)	Agree	2427	89.8
	Neutral	127	4.7
	Disagree	149	5.5
Attitude score	Unfavorable	1838	67.8
	Favorable	871	32.2

Table 4: Practices and adherences of study Participants to COVID-19 preventive measures, Oromia region, Ethiopia, September 2020 to March 2021

Preventive measures	Number	Percent	95%CI
Wash hands regularly using hand rub or soap and water (n=2537)	2131	84.0	83.27, 84.73
Avoiding hand shaking and hugging (2457)	1739	70.8	69.88, 71.72
Covering mouth and nose (n=2502)	2079	83.1	82.35, 83.85
Avoiding close contact with anyone (n=2238)	1034	46.2	45.20, 47.20
Cooking all animal products (n= 2071)	670	23.4	22.50, 25.30
Avoiding unprotected direct contact with live animals and Surfaces (n=1981)	302	15.2	14.39, 16.01
Practice at least one of the above	2434	85.4	84.68, 86.12
Did nothing (1952)	86	4.4	3.30, 5.50
Level of Adherences (1970)			
• Poor	1807	91.7	91.08, 92.32
• Good	163	8.3	7.55, 9.05

NB: Percentage may not add 100% as multiple responses were possible except for the adherence Category

Table 5: Factors associated with level of adherence to the prevention of COVID-19 among respondents, Oromia Region, Ethiopia, September 2020 to March 2021

Variables	Response Category	Level of Adherence		COR [95%CI]	AOR [95%CI]
		Poor	Good		
Cluster	Agrarian	937 (91.0)	99 (9.0)	1:00 (Ref.)	1:00 (Ref.)
	Agro-Pastoralists	131 (95.6)	12 (4.4)	0.87 [0.46, 1.62]	1.23 [0.48, 3.14]
	Pastoralist	194 (96.8)	6 (3.3)	0.29 [0.13, 0.68]*	2.25 [0.62, 8.24]
Age	18- 25 Yrs	488 (93.7)	33 (6.3)	1:00 (Ref.)	1:00 (Ref.)
	26- 35 Yrs	602 (92.3)	50 (7.7)	1.23 [0.78, 1.94]	1.40 [0.56, 3.42]
	36- 45 Yrs	379 (87.3)	55 (12.7)	2.15 [1.37, 3.40]**	4.00 [1.50, 10.45]*
	46- 55 Yrs	121 (89.0)	15 (11.0)	1.83 [0.97, 3.48]	3.03 [0.91, 10.10]
	> 56 Yrs	84 (92.3)	7 (7.7)	1.23 [0.53, 2.88]	1.95 [0.50, 8.10]
Ethnicity	Oromo	1444 (91.7)	131 (8.3)	1:00 (Ref.)	1:00 (Ref.)
	Amhara	212 (89.8)	24 (10.2)	1.25 (.79, 1.97)	
	Others [∞]	129 (97.7)	3 (2.3)	0.26 (0.08, 0.82) *	
Occupation	Farmer or pastoralist	578 (91.5)	54 (8.5)	1:00 (Ref.)	1:00 (Ref.)
	Merchant	451 (94.5)	26 (5.5)	0.62 [0.38, 0.90]*	0.53 [0.29, 0.96]*
	Student	251 (92.6)	20 (7.4)	0.85 [0.50, 1.45]	0.82 [0.20, 3.34]
	Gov./NGO worker	249 (86.5)	39 (13.5)	1.68 [1.08, 2.60]*	0.40 [0.11, 1.11]
	Others ^{∞∞}	262 (91.9)	23 (8.1)	0.94 [0.56, 1.56]	0.25 [0.10, 1.10]
Level of Education	Illiterate	330 (93.0)	25 (7.0)	0.52 [0.32, 0.85]*	0.38 [0.15, 0.93]*
	Read and write	216 (94.7)	12 (5.3)	0.38 [0.20, 0.73]**	0.26 [0.10, 0.72]*
	Primary	400 (92.4)	33 (7.6)	0.57 [0.36, 0.89]*	0.30 [0.13, 0.70]*
	Secondary	433 (93.1)	32 (6.9)	0.51 [0.32, 0.80]**	0.49 [0.23, 1.03]
	Colleges and above	406 (87.3)	59 (12.7)	1:00 (Ref.)	1:00 (Ref.)
Level of knowledge	Poor	791 (97.9)	17 (2.1)	0.15 [0.09, 0.25]***	0.20 [0.01, 0.11]***
	Good	1016 (87.4)	146 (12.6)	1:00 (Ref.)	1:00 (Ref.)
Level of Attitude	Unfavorable	1165 (95.7)	92 (7.3)	0.70 [0.50, 0.97]*	0.84 [0.50, 1.46]
	Favorable	619 (89.8)	70 (10.2)	1:00 (Ref.)	1:00 (Ref.)

NB: * $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$

Others include [∞] = Tigre, Sidama, Wolayita and Gurage

^{∞∞} = Work in private organization, house maid, and daily laborer