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Assesement of covid-19 seroprevalence and predictors among symptom suspected quarantined individual in North West Ethiopia. Institutional-based survey of recorded reviewed

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Abstract

Novel coronavirus 2019 (COVID-19) is a worldwide spreading pandemic respiratory disease caused by a positive single strand (RNA) virus. The assiduous and persistent endeavored efforts for effective tackling of the COVID-19 pandemic remain futile and ineffectual. This study aims to assess COVID-19 seroprevalence and associated risk factors among symptom suspected quarantined individual in North West Ethiopia.

Methods: Institutional-based survey of COVID-19 symptoms suspected quarantined individuals from 21 Aprils- 30 December 2020. The collected data were edited and enter into EPI-DATA 3.1 version, then export to STATA/R-14 (SE) software for analysis. Bi-variables logistic regression was used for candidate variables transfer to multivariable logistic regression at P-value<0.25. Adjusted odds ratio with its 95% (CI) was used to declared statically significant variables at p-value<0.05.

Results: Of total 4233 quarantined individuals who received the SARS-CoV-2 IgG antibody test, 4230/99.78% were interviewed with a 99.82% response rate. The overall seroprevalence of COVID-19 symptom suspected quarantined individuals in North West Ethiopia was found 5.11: 95% CI (4.4--5.87). The overall knowledge and practice of prevention towards COVID-19 infection on isolated individuals were found 86.17% (95%CI: 85.1--87.2) and 62.82%; 95%CI: 60.75--63.8), respectively. The risks of developing COVID-19 infection among quarantined groups who had poor knowledge and poor practice were 1.49 (AOR=1.49 95%CI: 1.13--2.2, P< 0.027), and 2.9 (AOR=2.9; 95%CI: 2.2--3.9; P<0.01) times increased.

Conclusion: The seroprevalence of the quarantined population is high as compared with previously reported. The majority of the respondents know how to prevent themselves from the COVID-19, but changing this prevention knowledge into the practice of tackling is great hiatus.

Keywords: Seroprevalence• SARS-CoV-2• Quarantined Population• North West Ethiopia

Introduction

The new coronavirus (COVID-19) has been identified as the cause of acute respiratory disease since the end of December 2019. Later, the World Health organization labeled it as SARS-CoV2 single strain of RNA virus that belongs to the family coronavirus of SARS-COV and MERS-COV, for the recent origin of COVD-19 diseases. The difference between them is the genetic make-up, clinical presentations, case fatality, and the rate of spread across the world.

This disease is continued to be a global health concern due to wreaking havoc on widespread dissemination in the absence of effective treatment. The route of transmission for COVID-19 is respiratory droplets produced from an infected person while sneezing and coughing. It is also transmitted by infected surfaces and objects since the virus can survive everywhere. The main symptom of COVID-19 range from mild (asymptomatic) to severe illness characterized by fever, dry cough, dyspnea, headache, sore throat, and rhinorrhea rarely associated with hemoptysis and respiratory

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collapse. COVID-19 disease affects all age groups. However, more deteriorate and worsen in underlying medical comorbidity individuals. For instance, a patient with the chronic obstructive pulmonary disease has five-time increased risks of severity. The highly contagious nature of COVID-19 makes harsher, dangerous, and rapid spread of the virus reached from epicenter Wuhan- China, more than 213 countries around the world including Ethiopia. The aforementioned research reported that the COVID-19 pandemic has no effective treatment, but early recognition of higher-risk conditions, risky practice progresses, and early looking for supportive care will radically suppress the spread of these viruses.

Globally, COVID-19 caused 105.5 million morbidities and 2.4 million mortality with rocketed case fatality rate (CFR=2.38%) as 7 February 2021 WHO reported. Moreover, the number of cases for morbidity and mortality might increase alarmingly especially for low and middle-income countries (LMICs). The cases in African countries are rapidly increased, due to fragile health sectors, combined community pervasive misinformation for COVID-19 disease paid high outlay reported in the continent. The treat of coronavirus disease 2019(COVID-19) to health in African countries can be compared metaphorically to a lake in African basks of crocodile and says “The eyes of a crocodile” in the lake. This means in the lake, the eye of crocodiles is visible on the surface of the water, while the rest of the body is submerged in water. In this viewpoint, the eyes of the crocodile represent public health preparedness, while the body of the crocodile represents, Africa's disorganized and fragile health system, respectively. Accurate estimation of the true prevalence of COVID-19 in a population is needed for evaluating and optimizing disease control, policy drafting, and strategies of seasonal effect for addressing equipment and vaccine logistics. However, access to testing in Ethiopia has been a barrier to understanding the true prevalence of COVID-19 cases in the community. Despite multiple preventive measurements that have been done previously to avoid this abominable disease from the higher-level organization (WHO) to national levels, the success or failure of these efforts largely rely on behavioral changes of the clients. Community acceptance and readiness for the prevention of COVID-19 are still hindered by the false assurance of perception myths and miss understanding on were living far away from areas where COVID-19 was rampant and still no locally reported cases has reflected. Ethiopia has reported the highest number of COVID-19 confirmed cases in East Africa, 105,788 of the total 210,659 with a suspected case laboratory confirmation rate of 6.63% according to Ethiopian ministry of health reported 23 November 2020. The government of Ethiopia has declared a state of emergency to minimize the spread of this evil disease, COVID-19 infection on restriction on public transportation, avoiding grouping, using facemask during left out on public and staying. The commitment of regional province for implementing COVID-19 prevention rules were strength for distribution to risky sites. For effective mitigation and reduction of morbidity and mortality of COVID-19 needs behavioral changes, which are highly influenced by the adherence of perception for mitigations. The main aim of this study is to assess the seroprevalence of COVID-19 and associated risk factors among quarantined individuals in northwest Ethiopia.

Methods

Study area and study design

This study was conducted in Benishangul Gumuz regions in the North-Western part of Ethiopia which is located with 34° 10'N and 37° 40'E and in the latitude 09° 17'N and 12° 06' N. The capital city of the region is Assosa, located at a distance of 659 km in the west, and Pawe also located 565km Northwest direction of Addis Ababa. This region covered 0.381 (4.6%) square kilometers of national landmass coverage of Ethiopia. According to the 2019 national population projection has an estimated 1.21 million population were survived. According to the Ethiopian demographic health survey (EDHS) of 2016, 77% of those populations live in rural areas, and 23% live in the urban with five indigenous ethnic groups. Presently, this region has two general, and three primary hospitals, with one regional laboratory, which have to withstand daily health care services. Nationally, starting from the COVID-19 outbreak, the regional health bureau has established two COVID-19 suspected SARS-CoV-2 samples diagnosed and treatment centers (Assosa and Pawe). Bilaterally, the regional health bureau ordered and prepared interview plate-form for all quarantined individuals during care observation. The projection focused on awareness about the mode of transmission, clinical features, and prevention measures for multilateral community intervention during a pandemic. Entirely, in the quarantine centers, 4233 COVID-19 sy[illegible]ts to

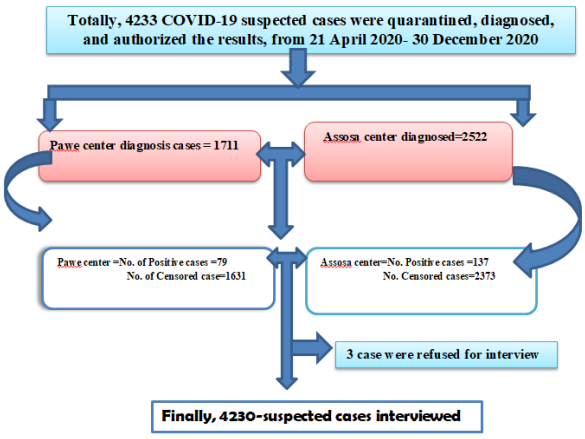

Figure1: The quarantine center COVID-19 symptom suspected individuals diagnosing and result in authorization charts.

Study Design and Periods

Institution-based survey of 4233 COVID-19 symptoms suspected cases since 21, April 2020-30 December 2020 in two quarantine centers.

Source Populations

Population assumed to be more likely within high-risk for COVID-19 acquiring. The risk might be due to having traveling history overseas, relatives for COVID-19 confirmed cases, merchant and hotel hostess, health workers, street children, prisoners, bus

station workers, whom those all have COVID-19 like sign and symptoms from 21, April 2020-30 December 2020 and entered in two quarantine center.

Outcome variable

COVID-19 serum result (positive/negative)

Independent variables

Socio-demographic factors: Individual-backed ground information (sex, age, resident, marital status, levels of education, types of religions, economic status, comorbidity status, etc.)

Source of information about COVID-19: Includes access to exposure information sources and types used to like (Televisions, Radio, health facility, friends and family), and social media like (access to Facebook, intranet service, mobiles).

Operational Words

Quarantine individuals

A person having COVID-19 like sign and symptoms, until checking SARS-CoV-2 samples collection, diagnosing and declared as positive for COVID-19 antibody test or negative for COVID-19 antibody test.

Seroprevalence

The numbers of quarantined individuals after testing the SARS-CoV-2 IgG antibody test declared having COVID-19 positive results.

Survey Questionnaire

Knowledge

The assessment part of knowledge includes awareness about COVID-19 pandemics, using five different dimensions COVID-19 background knowledge using (three items), on sign and symptom (two-item), mode of transmission(six items), and on prevention methods (5) items, and by employing Bloom's cut off point classification range for Knowledge, attitude, and practice question classification guideline. Which considered “good” was scored ranges 80%-100%, and “poor” was considered ≤79% ranges.

The practice of prevention

The expression for the practice of prevention items for COVID-19 respondents considered as "good" was scored ranges 80%-100%, and "poor "was scored ranges considered ≤79% ranges. The prepared survey questionnaire was adopted from WHO (2020) survey tools for COVID-19 prevention practice, with the consolidation of different national survey findings. The prepared structured questionnaires’ contained the category of “yes” labeled as “1” and “No” labeled as “0” with each item weighted one point.

Data Collection Procedure and Quality Control

Data regarding the socio-demographic, source of information for exposure risk, and prevention practicing for COVID-19 were collected through face-to-face interviews using a structured questionnaire adapted from different literature, and WHO (2020) Survey tools for COVID-19 prevention measures. The proposed survey data collection tools were developed and validated by a multidisciplinary working group of infectious disease physicians, lecturers, and public health professionals, and environmental team members. Three B.Sc nurses and two laboratory technicians with collected data were strictly supervised by two public health officers, who managed the overall data collection process. A one-day data training was given to the data collection tools, collection techniques, and ethical issue insides quarantine rooms of the study participants. Interviewers wrote down all responses. The collection process was cascaded by consolidation and collaborative logistic supply of the regional health bureau. The collection process was started after a day quarantined and registered for serum sample collection, followed result declaration consecutive days was preceded.

Data Processing and Analysis

The data entry was performed using statically programs Epi-Data version 3.1 and then exported into STATA/R version 14(SE) for analysis. The descriptive statics was presented by narration and tabulations. The internal consistency and reliability of the knowledge and practice questions were tested by the reliability test of Cronbach's alpha coefficients, and it is credible ranges i.e. 0.76. Binary logistic regression was performed to identify candidate transferee variables for multivariable logistic regression using a cut-off p-value<0.25. At Adjusted odd ratio with a 95%Confidence interval (CI) was claimed to declare statically significant variables based on p-value<0.05 in multivariable binary logistic regression. Confounding and effect modification was evaluated by observing the regression coefficient variation greater than or equal to 15%, and multi-colinearity was checked using the variance inflation factor using a value of < 10 as a cut point. Variables with a p-value<0.2 .The Hosmer and Lemeshow goodness of fit test was mad at p>0.05.

Result

Characteristics of the study population

Of the overall sample required (N=4233), 4230 individuals were included in this study and giving an overall response rate of 99.8%. The mean (± SD) age of the respondent was 37.5(± 18.5) years of age, and ranging from 18 years to 98 years. More than two-five, 1,823 (43.10%) respondents were in the age groups 41-65 years, followed by 1,524 (36.03%) age >= 65years. Likewise, more than half, 2,280 (53.90%) of the study participants were male, and two-thirds of them 2,833 (66.97%) were urban dwellers. The majority, 1,536 (36.31%) of the study participant had no formal educations vs. 1,106(26.15%) having diplomas and above certificates. Thoroughly, the highest proportion 1,158 (27.38%) of respondents were orthodox religion followers vs. 923 (21.82%) bottom number was catholic

believers. Nearly two-five study participants were farmers, but 1,812 (42.84%) government employers. More than half of the participants had married and 1,369 (32.36%) were economically generated below <1000 birr per month.

Source of information towards COVID-19 preventions

The achievement of the world's fight against COVID-19 depends upon people's adherence to the control measures. Of the total 4230 participants, they were aware of the pandemic virus, 2,812 (66.48%) and 2,656(62.72%) for (staying at home, social distance, wearing the facemask) of COVID-19 prevention measures adopted from TV and radio, respectively. The majority, 1,658 (39.2%) of respondents have information for COVID-19 from health institutions before entered, and the least response was from religious leaders 594 (14.04%). Nearly ten percent (9.07%) of the respondent had a history of comorbidity follow-up before 14 days present details.

Seroprevalence of suspected adult population

Of the total 4233, COVID-19 suspected and received SARS-CoV-2 IgG antibody tested, 216 individuals were positive for COVID-19 infections. The largest number of 137cases out of 2522 COVID-19 diagnosed individuals were from the Assosa quarantine center, whereas the remaining 79 cases out of 1711 suspected individuals were from Pawe quarantine centers, respectively (Figure 1). Nevertheless, 4,017 (94.19%) suspected and quarantined individuals were censored for SARS-CoV-2 antibody tests, even if having overseas travel history and being relatives or friends for confirmed cases of COVID-19 infection. Therefore, the overall seroprevalence of COVID-19 for symptom suspected quarantined individuals was found 5.11: 95% CI (4.47–-5.87).

Knowledge of respondents towards COVID-19 preventions

The majority, 4,025 (95.15%) of participants (fever, fatigue, dry cough, muscle pain, sore throat, and diarrhoea were responding as the main symptoms of COVID-19. Of all participants, 3,889(91.94%) agreed frequent hand washing by soap and water prevents the risk of COVID-19. Whereas, 3,987 (94.26%) quarantined individuals were wearing facemask during let out home prevent the risk of airing COVID-19pandemic. Generally, eighty-six per cent of the study participant had good knowledge of COVID-19 mode of transmission, clinical presentations, and knowledge on prevention measures present detail.

Practice of prevention respondents towards COVID-19

Among the top practiced preventive behaviors implemented by quarantined individuals before quarantining, frequent hand washing, avoiding handshaking, and stopping going in crowded places were reported as follows as 3,772 (89.17%), 3,296(77.92%), and 3,204 (75.74%), respectively. The overall practice of prevention towards COVID-19 infection on symptoms suspected isolated individuals were found 62.82%; 95%CI: 60.75–-63.8) present detail.

Factors Associated with Knowledge of Quarantined respondents

Multiple logistic regression analysis the study found that Absence of Television, merchant, religion, educational status, and the resident was found to be significantly associated with knowledge on COVID-19 clinical presentation, mode of transmission, and mitigation of preventions of risk exposed among quarantined individuals. As depicted in and presented in being a rural resident for quarantine individuals nearly two times (AOR=1.6: 95%CI; 1.29 –1.98; P<0.02) increased the risks of COVID-19 as compared with urban tenants. In addition, having a diploma& above educational status has nearly two times AOR= 1.9: 95%CI; 1.5–-2.2; P<0.01) increased the risks of developing COVID-19 infection as compared to farmers' quarantine groups. On the contrary, being Catholic and Muslim religion follower 37.2% (AOR=0.67: 5%CI; 0.51–-0.86; P< 0.01) and 22.1% (AOR=0.78:95%CI; 0.62–-0.97; P< 0.04) times reduced to develop COVID-19 infection as compared orthodox followers, respectively. Moreover, being a merchant as if grocery workers in northern Ethiopia nearly three (AOR =2.8:95%CI; 2.31–-3.12, P<0.04) times increased the risks of developing COVID-19 infection as compared with the farmer. News media had played great roles in COVID-19 prevention measures, globally, however, the absence of functional Television in the house to get updated COVID-19 infections among respondent's had nearly three (AOR 2.7(1.89 –-3.53, P< 0.01) times increased the risks of gettingCOVID-19 infection as compared counterpart. As levels of education increased, the likely hood of being exposed to COVID-19 infection is knowledge on COVID-19 clinical presentation, mode of transmission, and mitigation measures will be increased. However, in this report having a diploma and above education certificate had two (AOR=1.9: 95%CI; 1.5–-2.2; P<0.01) times increased the risk of developing COVID-19 infections as compared to elementary and below educational group present details.

Factors Associated on Practice of Prevention for COVID-19

In the first bi-variable logistic regression economic status, sex, education, occupations, social availability of Radio and TV in the house, age, marital status, resident, and religions were associated and transferred into multi-variable logistic regression models Present detail.

According to this researches report being male respondents had three (AOR=3.4 95% CI 2.3, 5.7; p< 0.001) times increased risks to develop COVID-19 infection as compared to female quarantined respondents. Likewise, the odds of exposed risk getting by COVID-19 infection for age >= 65years and above were nearly three times (AOR=2.5:95% CI 1.7, 3.9; P<0.001) higher as compared with age <15-45 year. The odd of developing COVID-19 infection among risk-exposed groups of rural resident symptom suspected isolated individuals were nearly two times more likely to higher than (AOR=1.75: 95%CI 1.3, 2.29; P<0.001) urban dwellers. The odds of has no TV in their house among quarantined groups were 2.05 (AOR=2.05:95%CI 1.5, 2.7; P<0.001) times higher than their

counterpart. Furthermore, nearly two 1.8 (AOR=1.8:95%CI 1.4, 2.4 ;P< 0.001) times higher risks of developing COVID-19 infection among respondents who didn't have functional Radio in their house as compared with having a radio in their house groups. The odd of not implement the practice of COVID-19 prevention rules respondents who had the previous comorbidity had nearly two (AOR=1.82:95%CI: 1.3 –2.6, P<0.013) times increased the risks of developing COVID-19 infection as compared with counter groups. The odds of developing COVID-19 infection among quarantined groups who do not use social media for updating COVID-19 infection practice of prevention were two (AOR= 1.99:95%CI; 1.49–-2.65, P<0.001) times increased as compared counter groups. The risk of infection by COVID-19 infection among quarantine individuals who monthly economic generated less than 1000 birr/month were nearly three (AOR= 2.6: 95%CI; 1.7, 4.1, P<0.001) times increased as compared who could generated economy greater ≥ than 10,000 birrs/month present details.

Discussion

This is among the first study done to determine COVID-19 seroprevalence, knowledge, and prevention mitigations on symptoms of suspected individuals. The overall seroprevalence of 4230 surveyed quarantined individuals in North West regions was reported 5.11:95% CI (4.47–-5.77). This study finding is higher than the finding in Dire Dawa 3.2%, Sweden 4.2%, Canada 1.8%, Germany 0.12%. This might be low utilization for mass media (radio' TV, mobiles, and internet) to encode transmitted COVID-19 preventive messages, in addition to high community myth behavioral non-adherence for prevention message of COVID-19 in Ethiopia. Likewise, the existence of fragile health sectors, favor undoubtedly the distribution of COVID-19 as compared to the sophisticated health system in western countries. However, the report of this study is lower than the study finding in Peru 70.0%, Mexico 27%, Brazil 12%, the Philippines 94.0%. This might be due to all those studies were population-based estimation, whereas our study is a survey among quarantined populations. This report is nearly comparable with the online survey finding of Ethiopia 91.1% and china 89.1%.

Knowledge of Quarantined Individuals towards COVID-19 Infection

This study found that the respondent's overall good knowledge about transmission, clinical sign, and prevention of COVID-19infection was found 86.45%: 95%CI (85.2 –-87.12). The level of good knowledge on COVID-19 on clinical sign and symptoms, transmission, and prevention measure was higher than found in Addis Zemen 33.9%, Addis Ababa 48%, Gonder city 51.04, Dessie city 51.4%, Kombolcha district 54.11%, Amara regions 70%report in Malaysia 70.3%. This discrepancy might be attributed to the types of research participants, and the study period when the survey was conducted. Nevertheless, this study report is lower than online survey finding in Ethiopia 91.2%, Dessie city 92.7%, and central Nepal population 91.8%. The possible difference could be the due difference in socio-demographic characteristics of the level of education, residence types, and the economic status among the quarantined population.

The overall poor knowledge of respondent for the risks of developing COVID-19 infection among quarantined individuals were nearly two (AOR=1.49: 95%CI 12.814.9, P<0.027) times increased as compared with good knowledge on COVID-19 clinical sign and symptoms, mode of transmission, and knowledge on prevention rules. This is a lower finding as compared with Dessie and Kombolcha City 54.11%, Gurage zone 45.14%, finding northeast Ethiopia on 49.8%. The difference might be due to the time of studies conducted in which information delivered and awareness creation program about pandemic are continual and ongoing in Benishangul Gumuz for improving time to time.

Practice of Prevention towards COVID-19 Infection

According to the report of this research, sixty-three percent of respondents had the good preventive practice of prevention for COVID-19 infection. This is higher than the finding on reported Gondar City residents 51.04%, 44.6% reported in Dessie city resident, Dessie Health center 41.7%, FMOH reported 49%, systemic reviewing and meta-analysis in Ethiopia 52.83%, and Uganda 32%. This finding is lower than reported in Guragie zone 76.2% and online survey finding in Ethiopia 76%. This might be due to the existence of high social cohesion and interdependency Ethiopia makes it difficult to implement practicing rules of COVID-19 infection prevention rules easily. The overall poor practice of COVID-19 prevention by quarantined individuals were three times (AOR=2.9:95%CI; 2.2-3.89, P<0.001) times increased developing COVID-19 infection as compared with counter groups. According to the United Nations economic class, Ethiopia was found among 48-listed setout least developing countries (LDC) by socio-economic indicators less than generate US$ 1035-US $ 1242 per year. The majority of the Ethiopian population has lived below this economic class this makes difficult to implement always for COVID-19 prevention measures by purchasing soaps, sanitizer face masks.

Conclusion

The overall seroprevalence of the quarantined population in North West regions is high as compared with previously reported. However, the majority of the quarantined population knows how to prevent themselves from the COVID-19 pandemic, but changing this prevention knowledge into the practice of tackling is great hiatus. Even though the respondents having good knowledge for COVID-19 exposed risk prevention but implementing mitigation prevention practice for COVID-19 infection is lower as compared with their levels of knowledge.

Limitations of the Study

This study has different limitations, firstly this data was collected by face-to-face interviews caused social desirability biases, and secondly which the data involved only quarantined individuals while the difficulty of inferred result for the community. There were no previously standardized and validated tools to assess and address

the knowledge, attitude, and practice of community preventions. Therefore, we could not find sufficient erstwhile research to compare and contrast our findings with others, and it makes our discussion narrow.

Lists of Abbreviations FMOH: Ethiopia federal ministry of health; SARS-CoV-2; Severe Acute Respiratory Syndrome Coronavirus 2WHO: world health organization.

Ethics Approval and Consent to Participate

The ethical clearance and data collection permission obtained from Benishengul Regional health bureau (Ethic Ref. No: BHSC/-984/16/12). During the data collection, oral willingness was assured beyond addressing permission letters for data collection for two quarantine centers. All information collected from patients was kept confidential and names of patients were not included. Accordingly, the national research guideline of Ethiopia;https://www.ccghr.ca/wp-content/uploads/2013/11/national-research-ethics-review-guidline, since the data were collected on patient interview data were stored anonymous and kept any secret.

Consent for Publication

There is no consent of publication for this research.

Availability of Data and Materials

All the data set for this research is in the hand of the main author in reasonable request will send.

Competing Interests

The author declared that there is no competing interest.

Funding

The Benishangule gumuz health bureau has supported by finance for data collection wage and printing cost but has no role in this research.

Authors' Contributions

FK has drafted original research, manipulate, write, and organized the collected data BK and TK= worked manuscript writing and software analysis.

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