Compliance, Barriers, and Facilitators to Social Distancing Measures for Prevention of COVID-19 in Northwest Ethiopia, 2020

Workagegnehu Hailu (✉ workhailu@yahoo.com)

   University of Gondar, College of Medicine and Health Science, Department of Internal Medicine

Lemma Derseh

   University of Gondar, College of Medicine and Health Science, Department of Epidemiology and Biostatistics

Melkamu Tamir Hunegnaw

   University of Gondar, College of Medicine and Health Science, Department of Human Nutrition

Tsebaot Tesfaye

   University of Gondar, College of Medicine and Health Science, Department of Internal Medicine

Dessie Abebaw

   University of Gondar, College of Medicine and Health Science, Department of Epidemiology and Biostatistics

Abstract

Background: The Coronavirus disease (COVID-19) pandemic is the defining global health crisis of our time. To date there is no definitive treatment for COVID-19 and prevention remains the main strategy in tackling it. Social distancing has been proven to contain the epidemic and limit disease spread. The Ethiopian government has declared state of emergency and have taken several measures to impose social distancing measures. Given its strong culture and norms, the level of compliance to social distancing measures in Ethiopia is unknown. This study aims to determine the compliance, associated factors, barriers, and facilitators to social distancing measures for the prevention of COVID-19 in Northwest Ethiopia.

Methods: A telephone interview based cross-sectional survey triangulated by a qualitative study was conducted from April 20 to May 20, 2020. A total of 401 participants and 12 key informants included for the quantitative and qualitative study respectively. Information on socio-demography, knowledge about COVID-19, practice on preventive measures, particularly social distancing was collected. The barriers and facilitators of social distancing were elicited qualitatively using in-depth interviews. Data were entered and analyzed using Epi- data and Stata software, respectively. Frequencies and odds ratio are used to explain and analyze the results. P-values < 0.05 and confidence level of 95% were considered statistical significance and strength of association, respectively.

Results: Out of 401 study participants, 55.36 %(95% CI 50.43, 60.18) had poor compliance to social distancing measures. The mean age of the participants was 36.4 years with SD ±11.76. Majority of participants (63.84%) went to crowded places without putting face mask. Of the participants, 60.6% and 76.31% had good knowledge on COVID-19 transmission and prevention, respectively. Multivariate logistic regression analysis revealed only age (AOR= 1.02, 95%CI: 1.00−1.04) was significantly associated with social distancing measures.

Conclusion: The majority of the study participants have poor compliance with social distancing measures set by the government and health authorities. Compliance with social distancing measures was increased with increasing age. Continuous health education and enforcing of social distancing rules are recommended.

Background

Coronavirus disease 2019 (COVID-19) was first reported in Wuhan, the capital of Hubei province. The etiological agent of COVID-19 has been confirmed as a novel coronavirus, now known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (1). The symptoms are usually fever, cough, sore throat, breathlessness, fatigue, and malaise amongst others. The disease is mild in most (80%) of the

people. In the other 20% with risk factors like age, comorbidities, it may progress to pneumonia, acute respiratory distress syndrome (ARDS), and multi-organ dysfunction. Many people are asymptomatic (2–4). Diagnosis is made by reverse transcription-polymerase chain reaction (RT-PCR) based tests from specimens taken from Nasopharynx and or-pharynx (4). Treatment is essentially supportive and symptomatic. There are no effective antiviral treatments for COVID-19 to date. Recent studies showed that remdesivir could be helpful in severe COVID-19 (4–6). Infection is transmitted through large droplets generated during coughing and sneezing by symptomatic or asymptomatic patients. Infected droplets can spread 1–2 m and deposit on surfaces(7–9).

COVID-19 has rapidly spread all over the world (10). Ethiopia's, COVID-19 cases continue to increase exponentially with a rapid epidemic doubling time (11). As no specific therapeutics and vaccines are available for the disease, the epidemic of COVID-19 is posing a great threat to global public health (3).

Since there isn't a definitive treatment for COVID-19 at this point in time, prevention remains the main strategy in tackling this global threat.(2). Among the preventive strategies, social distancing is one of the effective methods and is currently being implemented in many countries.

The term 'social distancing' refers to the efforts that aim, through a variety of means, to decrease or interrupt transmission of COVID-19 in a population sub-group by minimizing physical contact between potentially infected individuals and healthy individuals, or between population groups with high rates of transmission and population groups with no or a low level of transmission (12,13). Measures to effect social distancing include staying at home and only going out if it is absolutely essential, maintaining 2 meters distance between oneself and others, avoiding physical greetings, closures of workplaces/schools, cancellations of mass gatherings, and quarantine/lock-down of affected areas(12,14–16). Avoiding handshaking, hugs and kisses, use tap and go instead of cash, travel at quiet times are also recommended (14–16).

Social distancing showed a significant impact in limiting the spread in China (9). Quarantine, social distancing, and isolation of infected populations can contain the epidemic (17). An early implementation of social distancing measures helped to rapidly control the outbreak in South Korea (18). Modeling study has predicted that if social distancing measures were implemented one week, two weeks, or three weeks earlier in China, cases would have been reduced by 66%, 86%, and 95%, respectively (19).

Ethiopia's covid-19 confirmed cases are increasing and showing a rise in the community transmission rates. . In response to the first reports of confirmed COVID-19 cases in Ethiopia, the government put different measures in place to slow the pandemic. Hand washing and social distancing are being advocated by different authorities. School closure, partial workplace non-attendance, and stay at home order, and ban on social gathering have been declared. Although several developed nations around the world are currently implementing social distancing measures which are thought to significantly contribute in decreasing or slowing the disease spread, implementation of these guidelines and regulations might be difficult in the context of Ethiopia owing to the different customs, cultural values, education and socioeconomic status as compared to the rest of the world.

Given the strong social norms and values existing in the country, the practice and acceptance of this advice among society are unknown. Understanding the level of the practice of social distancing and its associated factors using reliable methods is highly important to design intervention strategies and policies that are helpful to combat the epidemic. This study aimed to determine the level of practice of social distancing, its associated factors, and barriers and facilitators in implementing the practice in Gondar, Northwest Ethiopia.

Methods

Study design

A cross-sectional study design was conducted using a telephone interview. It employed a mixed approach of both quantitative and qualitative techniques; the quantitative study assessing the level of practice of social distancing measures and its associated factors was triangulated with a qualitative approach that explored the barriers and facilitators of practicing social distancing.

Study setting and period

The study was conducted from April 20-May 20, 2020 in Gondar (North, Central, and West zones), Northwest Ethiopia. Gondar city, the capital of the Central Gondar zone is located 750kms north of Addis Ababa in the Amhara Region. As most parts of the country, agriculture is the mainstay of economy of the people in the study area, and the economy could best be described as a subsistence peasant economy. Over 75% of adults living in the study area have access to mobile phones. Gondar University comprehensive specialized hospital is a tertiary level hospital in Gondar town serving as the only referral hospital for more than 5 million populations in the catchment area.

Population, sample size, and sampling procedure

The study population included all individuals who own mobile phone and a subscription from ethio-telecom of Gondar branch and were residing in Central, North, and West Gondar zones during the study period. Individuals who own mobile phones and a subscription from Gondar ethio-telecom branch but currently living outside the study area during the study period were excluded from the study.

In determining the sample size for the quantitative component, because we couldn't come across with a study done on COVID-19 in the country at the time of initiation of this study, we assumed the proportion of 50% to get the maximum sample size for the first objective; assuming 5% confidence level, the sample size was 385. Furthermore, assuming a 10% non-response rate, the total sample size was 425. Because we couldn't get inputs to determine the sample size for the second objective, we assumed that the same sample size will be sufficient to answer the research question associated with it. Regarding the qualitative

study, the actual sample size was determined when saturation point was reached or there were redundancies of ideas and no new idea was emerging.

Sample participants for the quantitative study were selected using the telephone number that eligible individuals had. Ethiopia uses a 12 digit format, of these digits, the first six digits subscribed by ethio-telecom of Gondar branch are the same, i.e. 251918. Therefore, the sampling was performed based on the varying the last six digits using simple random sampling technique on computer generated random numbers. For the qualitative method, individuals whom we assumed are most informative about the communities and had active social involvement such as religious leaders, community leaders, health extension workers, taxi drivers and law enforcing bodies were selected and an in-depth interview, mainly on the barriers and facilitators of social distancing was conducted.

Variables and operational definition

The outcome variable of interest was compliance with social distancing. The independent variables were socio-demographic variables including age, sex, and marital status, and occupation, perception about social distancing, knowledge about prevention and transmission means of COVID-19.

Compliance with social distancing was considered good if an individual either stayed at home or if one has to go out, he/she went to non-crowded area. Poor compliance was defined as leaving one's house which was almost always without mask and going to crowded places. Perception towards social distancing was the composite variables of five items (worshiping from home, calling for condolence, lockdown, stay at home, and do not go the market). Perception towards social distancing was good when the sum of the score of these variables which ranges from zero to five was three and above. Knowledge about transmission of COVID-19 was measured with 5 items (close contact with infected person, handshaking, exposure to aerosol droplets, contaminated surfaces, touching face with unclean hands). And, a respondent was considered as having good knowledge if it scored 3 and above. Similarly prevention strategies of COVID-19 were measured with 6 items(hand hygiene, keeping 2-meters distance, avoid touching face, stay at home, avoid public gatherings and put face mask). A respondent was grouped as knowledgeable if he/she scored 3 and above.

Data collection tool and procedure

Direct phone calls were made to the randomly selected phone numbers during working hours. Data collectors were trained health care professionals. After giving greetings, a brief introduction on the purpose of the telephone survey was given to the participant followed by question whether they are residing in the study area for at least six months preceding the date of interview. Those who responded positively, were asked for verbal consent to participate in the study. Data were then collected by reading a structured questionnaire to them. The questionnaire used in this study was developed for this study (see additional file 1) Information on socio-demography, knowledge about COVID-19, practice on preventive

measures, particularly social distancing were asked and the response was filled on the questionnaire. To ensure the quality of data collected, supervisors redialed to 5% of the randomly selected respondents and rechecked the filled questionnaire. For the qualitative interview, data were collected by face to face in-depth interviews by taking all precautions and keeping social distancing measures. Subsequent communications were audio-recorded as a source document for this study. To capture the qualitative data, a semi-structured questionnaire was used.

Statistical analysis

Data were entered into Epi - data version 3.1 and were exported to Stata version 14 for statistical analysis. Then data cleaning was performed before conducting descriptive analysis such as tables, graphs, and charts. To examine the association between independent variables and the level of social distancing, binary logistic regression was performed. To screen independent variables for multiple logistic regressions, we used a p-value of 0.2 as a cutoff point. P-values of less than 0.05 and a confidence level of 95% by two-sided test were considered to indicate statistical significance.

For the qualitative study, the in-depth interviews which were recorded during the data collection were transcribed and translated into English language. Then thematic content analysis was conducted to identify the barriers and facilitators of social distancing among residents. Finally, thorough analyses were conducted on the associated factors, barriers, and facilitators of social distancing to get its potential adaptation strategies of the practice to the context of the study setting.

Results

Socio-demographic characteristics

A total of 425 study subjects were approached and 401 of them responded with the response rate of 94.35%. The mean age of the participants was 36.4 years with SD ±11.76. The majority 285 (71.07%) and 352 (87.78%) were male in sex and urban in residency, respectively. About 40% of the participants had a diploma and above, of whom only 9.94% studied in health-related fields (Table 1).

Table1. Socio- demography characteristics of participants compliance with social distancing measures and associated factors to prevent COVID-19 in Northwest Ethiopia, 2020 (n=401)

Characteristics	Frequency (n)	Percent (%)
Sex		
Male	285	71.07
Female	116	28.93
Residence		
Urban	352	87.78
Rural	49	12.22
Educational status		
Illiterate	33	8.23
Elementary	89	22.19
Secondary	80	19.95
Preparatory	38	9.48
Diploma and above	161	40.15
Field of study (n=161)		
Health-related	16	9.94
Other than health	145	90.06
Occupation		
Government	104	25.94
Private	70	17.46
Merchant	81	20.20
Farmer	46	11.47
Others*	100	24.94
Elders above 50 in a family		
Yes	153	38.15
No	248	61.85

*Housewife, daily laborer, religious leader and operator

Source of information, knowledge and perception about transmission and prevention of COVID-19

Of the total participants, 386 (96.26%) are informed/know about COVID-19 before the time of data collection period and the main source of information was television. At the time of data collection, about 10% of the participants thought coronavirus was not yet reported in Ethiopia.

Of all participants, 243 (60.6%) and 306 (76.31%) had good knowledge about COVID-19 transmission and prevention, respectively (**Table 2**) and (**Table 3**)

Table 2: Source of information and knowledge about transmission and prevention towards COVID-19 in Northwest Ethiopia, 2020 (n=401)

Variables	Frequency (n)	Percent (%)
Heard before COVID-19		
No	15	3.74
Yes	386	96.26
Heard from radio		
No	253	63.09
Yes	148	36.91
From television		
No	64	15.96
Yes	337	84.04
From school		
No	396	98.75
Yes	5	1.25
From a religious place		
No	387	96.51
Yes	14	3.49
Others*		
No	187	46.63
Yes	214	53.37
Is corona ever reported in Ethiopia		
Yes	360	89.78
No	41	10.22
Knowledge about COVID-19 transmission		
Poor	158	39.40
Good	243	60.60
Knowledge about COVID-19 prevention		
Poor	95	23.69
Good	306	76.31
Perception of social distancing		
Poor	139	34.66
Good	262	65.34

*Family, friend, Face book, telegram, YouTube, poster, ethio- teleom health workers, other people, health office, kebele leader, health extension workers, mobile call

Table 3. Knowledge about COVID -19 transmission and prevention methods and perception towards social distancing measures to prevent COVID-19 in Northwest Ethiopia, 2020(n=401)

Variables	Frequency (n)	Percent (%)
1. Common means of transmission of Coronavirus		
1.1 Close contact with an infected person		
Yes	212	52.87
No	189	47.13
1.2 Handshaking		
Yes	368	91.77
No	33	8.23
1.3 Exposure to droplets(sneezing, coughing)		
Yes	285	71.07
No	116	28.93
1.4 Touching contaminated objects/surfaces		
Yes	157	39.15
No	244	60.85
1.5 Touching eyes, mouth and nose with unclean hands		
Yes	80	19.95
No	321	80.05
2. Main prevention methods for Coronavirus		
2.1 Regular hand hygiene		
Yes	365	87.78
No	49	12.22
2.2 keeping 2- meter distance		
Yes	336	83.79
No	65	16.21
2.3 Avoid touching face with unclean hands		
Yes	78	19.45
No	323	80.55
2.4 Stay at home		
Yes	123	30.67
No	278	69.33
2.5 Avoid public gatherings		
Yes	219	54.61
No	182	45.39
2.6 Putting face mask		
Yes	146	36.41
No	255	63.59
3 Perception towards social distancing measures		
3.1 Worshipping from home instead going to church/mosque		
Yes	257	64.09
No	144	35.91
3.2 Calling to people on phone than attending funerals, weddings etc.		
Yes	293	73.07
No	108	26.03
3.3 Not going to the market		
Yes	204	50.87

No	197	49.13
3.4 Staying at home strictly		
Yes	299	74.56
No	102	25.44
3.5 Total restriction of peoples movement (lockdown)		
Yes	145	36.16
No	256	63.84

Compliance to social distancing measures activities related to social distancing

Out of 401 participants included in the quantitative study, 55.36 % (95 % CI 50.43, 60.18), have poor compliance with social distancing measures. From the total participants, almost 89% leave their house and of which 38% think it was for an absolutely essential reason. Participants went to different crowded places without face mask including churches (58.48%), open market places (58.04%), funerals (25.89%), mosque (1.79%), and wedding (1.79%). Only 59.22% were able to keep 2 −meters distance between oneself and others but almost 93 % of the study participants reported the practice of regular hand washing. (**Table 4**).

Table 4: Activities related to social distancing measures to prevent COVID-19 in Northwest Ethiopia, 2020

Variables	Frequency (n)	Percent (%)
Get out of home		
No	43	10.72
Yes	358	89.28
Essential reason(grocery, medical care) (n=358)		
No	222	62.01
Yes	136	37.99
Go to crowded place without facemask (n=358)		
No	134	36.16
Yes	224	63.84
Church(n=224)		
No	93	41.42
Yes	131	58.48
Mosque (n=224)		
No	220	98.21
Yes	4	1.79
Open Market (n=224)		
No	94	41.96
Yes	130	58.04
Funerals(n=224)		
No	166	74.11
Yes	58	25.89
Weddings		
No	220	98.21
Yes	4	1.79
Type of transport(n=358)		
On foot		
No	48	13.41
Yes	310	86.59
Public transport		
No	300	83.80
Yes	58	16.20
Private/Bajaj		
No	258	72.07
Yes	100	27.93
Physical contact during greeting		
No	314	78.30
Yes	87	21.70
Regular hand washing		
No	29	7.23
Maintain 2 meters distance		
No	146	40.78
Yes	212	59.22

Factors associated with non – compliance to social distancing measures for prevention of COVID-19

On the multivariate analysis, only age was found to have statistically significant association with compliance to social distancing measures (**Table 5**)

Table 5: Factors associated with compliance with social distancing measures to prevent COVID-19 in Northwest Ethiopia, 2020

Variables	Compliance		COR (95% CI)	AOR (95% CI)
	Good	Poor		
Age			1.01(0.99,1.03)	**1.02 (1.00,1.04)***
Sex				
Male	119 (41.75)	166(58.25)	1	1
Female	60 (51.72)	56(48.28)	0.67(0.43,1.03)	0.70 (0.44,1.13)
Educational status				
Illiterate	17(51.52)	16(48.48)	1	1
Elementary	42(47.19)	47(52.81)	1.19 (0.53,2.64)	1.35 (0.57,3.19)
Secondary	38(47.50)	42(52.50)	1.17 (0.52,2.64)	1.39 (0.54,3.53)
Preparatory	20(52.63)	18(47.37)	0.95(0.38,2.43)	0.94 (0.34,2.62)
Diploma and above	62(38.51)	99(61.49)	1.69(0.79,3.60)	2.08(0.81,5.39)
Occupation				
Government	43 (41.35)	61(58.65)	1	1
Private	28 (40.00)	42(60.00)	1.06 (0.57,1.96)	1.35 (0.69,2.64)
Merchant	38(46.91)	43(53.09)	0.79 (0.44,1.43)	0.99 (0.48,2.08)
Farmer	24(52.17)	22(47.83)	0.64 (0.32,1.29)	0.79 (0.33,1.91)
Others*	46(46.00)	54(54.00)	0.83(0.47,1.44)	1.29 (0.65,2.59)
Elders >50 in a family				
Yes	62 (40.52)	91(59.48)		1
No	117 (47.18)	131 (52.82)	0.76 (0.51,1.15)	0.76 (0.49,1.17)
Knowledge of COVID-19 transmission				
Poor	74 (46.84)	84 (53.16)	1	1
Good	105 (43.21)	138 (56.79)	1.16 (0.77,1.73)	1.19 (0.77,1.84)
Knowledge of COVID-19 prevention				
Poor	44(46.32)	51(53.68)	1	1
Good	135(44.12)	171(55.88)	1.09 (0.69,1.73)	0.97(0.59,1.59)
Perception on social distancing				
Poor	57 (41.01)	82 (58.99)	1	1
Good	122 (46.56)	140 (53.44)	0.79 (0.52,1.21)	0.71(0.45,1.12)

*Statistically significant at p value of less than 0.05

Summary of the Qualitative Findings

A total of 12 participants were selected purposefully from religious leaders, community health workers, traffic police, drivers, and community leaders that were invited in the qualitative interviews. Three main themes were identified from the content analysis of qualitative research. These were (i) the existing facilitators or opportunities for social distancing, (ii) barriers or challenges of social distancing in the community, and (iii) recommendations to adapt social distancing in the context of Ethiopia. Direct quotes from transcripts were provided to illustrate these themes.

Table 6. Characteristics of key informant interview participants from Gondar town 2020, Gondar, Ethiopia (n=12)

Participant code	Sex	Age in year	Occupation
P1	Female	27	Community health workers
P2	Female	27	Community health workers
P3	male	31	Traffic police
P4	male	36	Traffic police
P5	male	28	Bajaj driver
P6	male	50	Religious leader(priest)
P7	male	40	Religious preacher(Christian)
P	male	50	Community leader
P10	male	50	People from the community
P11	male	56	Muslim religious follower
P12	male	45	Muslim religious follower

The existing Opportunities for practicing social distancing

There have been many opportunities to practice social distancing at the community level. Most participants agreed on several opportunities such as, the fact that the epidemic started elsewhere so it gives us a chance to learn from others, the disease was imported late and has given us time for preparation, the norms and rules of the religions are in-line with that of social distancing principles, top religious leaders were in support of health professionals and the government recommendations from the outset. A 50 years old priest explained some of the opportunities that can support COVID-19 protection practice said,

"Even though the disease has no medicine and all the believers believe that we can be cured and protected by only God, the norms and rules of the church are in-line with that of social distancing principles (for example, individuals should stand far apart from each other so that one cannot disturb the other while praying). Social events such as weddings and christening are not against the rules to prevent COVID-19 by themselves. Additionally, the top authority of the church (Sinodose) informed fellow

Christians on media (television, and official letters) that followers can pray from home until the pandemic is controlled".

Similarly, community health workers and traffic police agreed that there are conditions that can facilitate social distancing practice. They mentioned the presence of well-organized volunteer workers at the community to enact social distancing measures, the trustworthiness of community health workers by the community, top Christian and Muslim religious leaders have good understanding and awareness about the prevention of the disease.

The decision made by the government to decrease passenger numbers by 50% in public transport and penalty measures for drivers violating this recommendation are some of the opportunities explained by the participants.

A 27 years old female community health worker with two years of working experience described how top religious leaders are working with them as follows.

"…..at one of the Orthodox Church, many people were attending together in holy water. We informed them to avoid gathering by explaining the effect and transmission of COVID-19. But they had assumed we were interfering with their belief. Later the religious leaders and local authorities were informed and the holy water service was temporarily closed "

Another female community health worker aged 27, also explains the impact of volunteer workers and their acceptance by the community to improve the application of social distancing as follows:

"…since we are always working with them, they usually accept what we recommend to implement COVID-19 protection measures. In addition to the existing volunteer workers in the community, we organized volunteer groups with 10 members per village, and then selected one representative from each group. We easily communicate with the representative to transfer new information or we can take the information from those leaders on the challenges they face."

Barriers or challenges of social distancing in the community

Participants clearly describe that even though there are some opportunities to implement social distancing measures, there are many challenges that prohibit them from applying social distancing measures. Most commonly agreed upon points explained by the participants were: the inconsistent decision by the government, considering the media as the treachery of orthodox religion, assuming COVID-19 is brought upon us by the devil that can only be cured by God. Social customs like attending funerals in large groups, consoling families of the deceased by hugging, giving a pat in the shoulder and holding hands. Absence of penalty measures on those not abiding by the rules of social distancing measures set by the government.

A Community health worker with 2 years working experience explains how the people of the community do not accept the orders to not attend church mass and religious gatherings and why they still become

ignorant about the disease as follow:

"During a home to home visit for observation and awareness creation on COVID-19, the villagers welcomed us and accept our health education. Because they know about us and the religion we follow and that we are one of them. While others give health education through media, they are suspicious and some even may consider them as an evil spirit. They say, no one can prohibit us from going to our church. That is why the people of the community are always attending mass services at the churches crowded together. After the pandemic was reported in the country, everybody was strict to stay at home or maintain a 2 meter distance, and there were hand washing facilities at crowded places. Gradually these good practices have become less consistent".

On top of this, the participant raised different challenges to perform social distancing measures for COVID-19 prevention. Inconsistent measures by law enforcing bodies like tight control at the house of worships while ignoring other crowded places like open markets. Few religious leaders teach against social distancing measures and there is inconsistency in the implementations of social distancing measures among different religious institutions. The absence of a strong monitoring system in crowded places like the house of worships, markets, transport stations, funerals, and weddings are mentioned among the challenges.

A 50-year-old man from the community describe the observed challenges that exist at the community level, among religious leaders, and at a government levels as follows:

"The Christian followers' belief that Gondar is the country of 44 covenants and that the virus cannot attack the people of the community. When I put face mask and gloves, there were people who teased and made fun of me calling me "corona". I observed that in mourning people were out walking without keeping their distance. People are not giving much attention to the disease, they are walking in groups and not protecting themselves. On top of this, the government is not acting uniformly in enforcing the law (there is more strict control in house of worships while it is lenient in other places such as markets, public transportations etc). Few religious leaders teach against the rule to prevent covid-19, affirming that they should continue their cultural and religious practice and only rely on faith of God, and leave everything else being told aside "

A 50 year old pries added "There are extra or unnecessary practices beyond the church recommendations such as dancing during christening and hugging or holding hands while mourning a deceased one which can increase the disease transmission.

These are unnecessary extra practices that are not part of the religious ceremony in the church, and thus, need to be avoided in the era of covid-19".

Suggestions to adopt social distancing to the context of Ethiopia

Even though there are many challenges in practicing social distancing measures for COVID-19 prevention, there were many solutions raised by the key informants. Continuous Health education and increasing

awareness of the community about COVID-19 preventive measures, informing that social distancing principles are in harmony (not against) with religious rules, law enforcement by the government, the involvement of religious leaders working together at the ground level, limiting the number individuals attending funerals are some of the solutions repeatedly raised by the participants.

A 50 year old man from the community described a few of the solutions that must be considered for better implementation of social distancing measures as follow:

"Religious preachers are more influential than external body. The decision of our top religious authority (sinodos) is not being implemented. They don't follow what is going on. It is good to work on preachers. Therefore, the religious media could work to teach their followers using influential preachers and religious leaders. So, that people can stay at home, avoid going out to crowded area and greetings without physical contact. People change their behavior gradually through continuous education. Total closure of the church and prohibiting followers not to go church is not a good solution".

A 40 year old man from the religious member suggest additional solutions as follow:

"……Without complete restriction of religious followers from the church, limit the number of attendants on mass prayers like "kidassie". Similar measures must be taken to other crowded places like market to be consistent with all social distancing practice. However, avoiding social life is impossible. It is very difficult to deal with grief alone but limiting the number of individuals attending funeral is a good option. At the same time, during moments of happiness, it is better to avoid dancing and celebrating together. By keeping our physical distance we can emotionally get connected in our happiness and sadness".

Discussion

To the best of our knowledge, this is the first study in Ethiopia to assess compliance with social distancing measures for the prevention of COVID-19. A total of 401 participants were included in the quantitative survey and more than half of which have poor compliance with social distancing guidelines. Almost nine out of ten participants have went out of their home during the past three days and of which only about one-third thought it was for an absolutely essential reason such grocery, medical care and work.

Social distancing is currently the single most effective method to slow the spread of COVID-19. It minimizes physical contact between individuals to reduce infection spread and burden on the health system. However, the amount of social distancing needed to curb the COVID-19 epidemic remains unclear. A study in the US using a mathematical model revealed that one-time interventions will be insufficient to maintain COVID-19 prevalence within the critical care capacity(20). This is also supported by our qualitative findings that continuous health education by media and religious leaders could increase public awareness and practice of social distancing.

Counties like China and South Korea have implemented strict social distancing measures and controlled the spread of COVID-19(9,16,18). In Ethiopia, despite the increasing number of COVID-19 cases and mortality from the disease, the majority of participants have poor compliance with social distancing guidelines. A study from the US found 87.5% knew social distancing guidelines, 62.5% intended to follow, and 46.2% currently followed all guidelines(21). In our study, poor compliance with social distancing was higher than that of the US study (63.84% vs 53.8%). This study also found that 60% and 76% had good knowledge of means of transmission and prevention for COVID-19. This difference in non-compliance and knowledge could be due to the difference in the population's socio-economic characteristics.

In the current study, only age as a continuous variable was associated with social distancing practice but from prior studies, male sex and income were associated with social distancing measures(21). All other respondent characteristics, including, education, gender, religion, perception, knowledge were not significant predictors of social distancing uptake.

Voluntary plus mandated quarantine, banning mass gatherings, closure of educational institutions or places of work where the infection has been identified, and isolation of households, towns, or cities have been advocated to mitigate the pandemic(17). Mandatory quarantine for all individuals entering Ethiopia for 14 days, school closure, isolation of cases, and contact tracing being implemented. Despite the banning of social gatherings by the government, 63.8% of participants in this study reported that they have been to crowded places. This finding was highly supported by our qualitative findings that majority of people living in the community support going to place of worships, religious gatherings, and attending mass services.

Common crowded places identified in the study include the house of worships (such as churches, mosques), open markets, funerals, and wedding ceremonies.

Close to 60% of participants have been to the house of worship within the last one week prior to the interview. Ethiopians have deep routed cultures and customs that have been practiced for centuries. There are strong social ties and attachments with frequent physical interactions that have been developed for centuries as a beneficial means of integrity, which are now considered to be risk factors for COVID-19 transmission. Religion plays a significant role in Ethiopian populations. Religious practices and rituals in the country include praying together in mass gatherings and religious holidays. (22). The Ethiopian government has strongly advised to avoid mass service and gathering on religious holidays. There are some lessons learned from other countries like China that have extended the Chinese Lunar New Year holiday and believed to have helped in controlling the epidemic in China(23).

Ethiopia has now confirmed cases of community transmission of COVID-19 in different regions of the country. It is, therefore, high time for strengthening and scaling up of low cost enhanced hygiene and social distancing measures. An epidemic simulation model study in Singapore found that implementing the combined intervention of quarantining infected individuals and their family members, workplace distancing, and school closure once community transmission has been detected could substantially reduce the number of COVID-19 cases(24). Social distancing is particularly useful now in Ethiopia where

community transmission is believed to have occurred, but where the linkages between cases is unclear, and where restrictions placed only on persons known to have been exposed is considered insufficient to prevent further transmission. In our qualitative finding volunteer community workers are trying to implement social distancing measures by creating groups with 10 members per each village. Such informal organizations can help strengthen the practice of social distancing in the community.

There were temporary attempts of small area lockdowns or community-wide containment in Amhara, Tigray, and Oromia regions when the first cases were reported in the respective regions but this was not maintained despite the increasing number of COVID- 19 cases. This is also supported by our qualitative findings in which regional governments took strong measures for the first 15 days starting from the occurrence of the first case. Subsequently, as restrictions become loosen the people in the community also became reluctant to practice social distancing and other preventive measures. Enforcement of community-wide containment measures is far more complex given the larger number of persons involved and ethically more challenging with individual human rights weighing against the public health imperative(25).

Community-wide quarantine and major movement restrictions might be considered in Ethiopia if the pandemic poses a challenge to the health system and the economy. Although the scientific basis for these interventions might be robust, ethical considerations are multi-faceted. Special attention should be given to protections for vulnerable groups, such as homeless, incarcerated, older, or disabled individuals, migrants, and people who are reliant on ongoing medical treatment(26). There is some evidence that people in low-income settings are not willing to make the economic sacrifices that come with social distancing as the immediate risk of financial losses and hunger are valued over the risk of COVID-19 (27). Social distancing in African set up could be disruptive and difficult impacting economic, social, and cultural activity. However, careful community engagement can mitigate these effects (28). This is also ratified by the current qualitative findings in which many of the people do not stay at home because their lives are from hand to mouth.

The mean age of the participants was 36 years and 38% reported that there are individuals with age above 50 years living in the same house with them. Even though the mean age of the study population is young, they can still infect the elders cohabiting with them and this might result in increased COVID-19 related fatalities. More than 95% of participants have known about COVID- 19 and Medias like television are the main source of information but 3.7% reported that they have never heard about the disease. Further health education and awareness creation should be continued until everyone is well aware of this pandemic.

One of the social distancing measures is to keep 2 meters distance from others. As the diseases is transmitted by respiratory droplets, it requires a certain proximity of people for transmission. Hence, social distancing of persons will significantly reduce transmission. From participants that went out of their home, 40.78% said they couldn't keep a distance of 2 meters from others regularly. Institutions that provide public services in Ethiopia are inadequate, such that crowding is common in hotels, cafes,

restaurants, public transportation, market places, hospitals, and other social institutions. So many people may find it difficult to maintain physical/social distancing and hence may facilitate the spread of COVID-19 (22). A study in Cape Town demonstrated that implementing effective social distancing measures like keeping 2 meters distance between individuals will be challenging in informal settlements due to their density(29). This is also one challenging fact in most cities of Ethiopia owing to the presence of such crowded informal settlements and slum houses.

Handshaking, hugs, and kisses are among the not to do recommendation in social distancing guidelines(14–16). There is a significant change of practice towards avoiding these forms of physical greetings but 21.7% of participants still greet with physical contact. Ethiopians are known for their warm greetings including handshakes and kisses on the cheeks which are currently advised against with regards to COVID-19(30).

Limitation of the Study

The majority of the participants in this study are urban dwellers. This might be due to better access to mobile phones compared to rural counterparts. Therefore this study might under-represent the rural community. As this is a mobile survey, participants' response was considered as their actual practice. However, there could be gaps between self-reported judgments and actual behavior.

Conclusion

The majority of study participants have poor compliance to social distancing measures set by the government and health authorities.

Risky practice among study participants includes going to crowded places without putting face mask, leaving their house for non-essential purposes, not keeping 2 meters distance between oneself and others, and physical greetings.

Continuous health education and enforcing of social distancing rules are recommended.

Abbreviations

COVID: Coronavirus disease; SARS-CoV-2: severe acute respiratory syndrome coronavirus 2; ARDS: acute respiratory distress syndrome; RT-PCR: reverse transcription-polymerase chain reaction; US: United States; IRB: Institutional Review Board.

Declarations

Ethics approval and consent to participate

The study was approved by the Institutional Review Board (IRB) of the University of Gondar. Participants who met the inclusion criteria and gave informed verbal consent via telephone calls were included in the study. As it is a telephone based interview, non - intervention study, it was decided as appropriate to request the verbal consent of each of participant via telephone, and the ethics committee approved this. To maintain the client's privacy, data were collected anonymously and were kept confidential.

Consent for publication

Not applicable

Availability of data and materials

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

Competing interests

The authors declare that they have no competing interests in this work.

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Authors' Contributions
WH, LD, MT, TT, and DA involved in the conception and design of the study. LD, DA, and MT analyzed the data. WH and TT prepared the draft manuscript. WH, LD, DA, MT, and MT revised and prepared the final version of the manuscript. All authors critically revised the content of the manuscript and read and approved the final version and agree to be accountable for all aspects of the work.

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Supplementary Files

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