

Perception of COVID-19 Prevention Methods Efficacy and Intention to Use Among Patients with Chronic Disease in Dessie Town, Northeast Ethiopia: A Multicentered Cross-sectional Study

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Background: In Ethiopia, people infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) have been increasing dramatically. COVID-19 precaution measures are essential for highly susceptible groups. However, it was not known previously to what extent chronic disease patients were perceived to know about the efficacy of prevention measures. Hence, the aim of this study was to assess perception of patients with chronic disease toward the efficacy of COVID-19 preventive measures and their intention to carry out those measures.

Methods: A multicentered institutional-based cross-sectional study was conducted among 413 patients attended in selected hospitals of Dessie town from July 21 to August 5, 2020. Hospitals were selected using the lottery method and systematic random sampling was utilized to select study participants. An interviewer-administered structured questionnaire was used to collect the data and the tool had four dimensions which include sociodemographic, clinical profile and risk assessment, perceived efficacy of prevention measures, and patient's intention to carry out measures. In multivariable analysis, variables were declared statistically significant at a *p*-value of <0.05.

Results: In this study, the mean age of participants was 48.2 years (SD ±15.8 years) and 52.1% were females. In overall, 42.1% of participants had low perception on the efficacy of prevention measures and 28.3% had low intention to carry out measures. In this study, young adults (AOR=2.48; 95%CI: 1.42–4.31), male gender (AOR=2.75; 95%CI: 1.73–4.37), low literacy (AOR=3.42; 95%CI: 1.47–7.94) and face mask nonusers (AOR=1.64; 95%CI: 1.03–2.61) were significantly associated with low perceived efficacy of COVID-19 prevention methods.

Conclusion: In this study, a significant proportion of patients had low perception about the efficacy of COVID-19 prevention measures and nearly one-third of them had low intention to carry out prevention measures. Therefore, health education programs about efficacy of preventive measures should be provided by health professionals targeting high risk groups.

Keywords: perception, COVID-19, prevention methods, efficacy, intention, patients with chronic disease

Introduction

Coronavirus Disease 2019 (COVID-19) is caused by severe acute respiratory syndrome Coronavirus 2 (SARS-CoV-2) and it was declared a public health emergency of global concern on January 30, 2020.¹ The disease has spread globally and an estimated 349 million peoples are at risk of the severe form of COVID-19.²

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Received: 1 April 2021
Accepted: 25 May 2021
Published: 4 June 2021



Globally, as of May 14, 2021, more than 160 million confirmed cases and 3.3 million deaths have been reported to the World Health Organization (WHO) and the Americas, Europe and Southeast Asia were the most affected regions. However, South Africa, Nigeria, and Ethiopia were among the countries highly burdened by the COVID-19 pandemic in Africa.³ In Ethiopia, the first confirmed case was reported on March 13, 2020.⁴ Due to availability of limited testing sites in Ethiopia, people in the community infected with SARS-CoV-2 are expected to be high. As of May 14, 2021, over 264,000 confirmed cases and 4000 deaths have been reported.⁵

COVID-19 is a highly communicable disease transmitted to susceptible individuals by respiratory droplets and nasopharyngeal secretion.⁶ Peoples infected with SARS-CoV-2 have been diagnosed usually by taking nasopharyngeal swabs or oropharyngeal aspirates. These procedures are invasive and challenging both for health-care providers and patients. However, there is evidence which indicates that patients infected with SARS-CoV-2 can be detected from saliva.⁷ All individuals infected with SARS-CoV-2 may not show clinical manifestations of the disease.⁸ Fever, cough, fatigue and dyspnea were the common symptoms observed in people infected with SARS-CoV-2.⁹ However, the severe form of the disease: acute respiratory distress syndrome, organ dysfunction and death could occur in the elderly and patients who have chronic disease concomitantly.¹⁰

Cardiovascular, diabetic mellitus and chronic lung diseases were associated with COVID-19 illness and death.¹¹ In Ethiopia, the burden of cardiovascular diseases has increased over the last decades.¹² Ethiopia is also one of African countries with a high burden of TB and TB/HIV coinfection.¹³ This double burden of chronic diseases in the country may contribute for COVID-19 related morbidity and mortality unless prevention measures are routinely implemented.

Several vaccines have been used worldwide to prevent COVID-19 despite other prevention strategies.¹⁴ However, there was no effective and approved drug to cure the disease. Thus, patients have been treated symptomatically with supportive measures.¹⁵ However, the clinical setups and level of supportive measures employed varied across countries and it mainly depends on economic status.¹⁶ The African economy and health-care system was significantly affected by the COVID-19 pandemic.^{17,18} This pandemic showed that the capacity of the countries' health-care system has to be enhanced. Besides, health policies should be modified and emergency preparedness strategies have to be strengthened

to prevent and control public health emergencies.¹⁹ The COVID-19 public health crisis has also helped countries to revise their governance structures indirectly and to make some political reforms.²⁰

To reduce transmission of SARS-CoV-2, primary prevention strategies are feasible and the best options in resource-limited settings.²¹ Vaccination, maintaining physical distance, washing hands, staying home, and wearing face mask were the main measures recommended to prevent the disease worldwide.²² Globally, there are different commercially available antiviral solutions used to prevent SARS-CoV-2 infection during clinical practice in health-care settings, but many health-care providers had lack of awareness about the prevention benefit of those solutions.²³

Elderly populations are high risk groups for COVID-19 due to weakened immune status. Therefore, elderly populations are recommended to have awareness about the disease and they need to apply all the precautionary measures. A study among the elderly population in China indicated that females had a higher level of understanding about COVID-19 than males and awareness was the main determinant factor to develop protective behaviors.²⁴ Generally, a systematic review and meta-analysis report revealed that more than two-thirds of study participants in the general population had good knowledge and favorable attitude toward the pandemic.²⁵ In Ethiopia, the majority of the urban population have good knowledge about COVID-19.^{26,27} However, adhering to COVID-19 prevention methods was not satisfactory despite the increment of cases and death in the country. Fear and anxiety are common experiences during a public health crisis and in the era of the COVID-19 pandemic. These problems were exacerbated in communities who lacked knowledge about the pandemic and COVID-19-related rumors and fake news contributed to the spread of the disease.^{28,29}

Perception of people about the COVID-19 pandemic was the main determinant factor to the utilization of preventive behaviors.³⁰ In Ethiopia, COVID-19 cases have been increasing dramatically despite government mitigation activities. Though no studies were done in Ethiopia, low utilization of adopted mitigation measures and increment of cases in the country could be related to poor perception of people toward the disease and prevention methods. Due to high risk of morbidity and mortality, COVID-19 precaution measures are very essential for highly susceptible group of peoples. In Ethiopia, several studies have been conducted regarding people's knowledge about the COVID-19 pandemic and practices of adopted mitigation measures. However, it was

not known previously to what extent susceptible groups like chronic disease patients perceived about the efficacy of COVID-19 prevention measures.

Therefore, the aim of this study was to assess the perception of patients with chronic disease toward the efficacy of COVID-19 preventive measures and their intention to carry out measures. This paper has title page, abstract, introduction, material and methods, results, discussion, conclusion with recommendations. In addition, limitation of the study was included in the last paragraph of discussion part.

Materials and Methods

Study Design and Period

A multicentered institutional-based cross-sectional study was conducted among patients with chronic disease from July 21 to August 5, 2020.

Study Setting

This study was conducted among patients with chronic disease in selected hospitals of Dessie town, Northeast Ethiopia. Dessie town is located 400 km away from Addis Ababa (capital city of Ethiopia) and 488 km from Bahirdar (capital city of Amhara regional government). It is located at an altitude of 2470 meters above sea level and based on the 2007 national census, the town had a total population of 151,094, of which 78,203 were females.³¹ In the town, two government and three private hospitals are available that have been serving populations of Dessie town, surrounding zones and patients referred from Afar and Tigray regions. In addition, both COVID-19 quarantine and treatment centers are available in the town.

Population

Source population

All chronic disease patients who were admitted or attended chronic disease follow-up units in selected hospitals of Dessie town were the source population.

Study Population

All patients who were admitted or attended the selected hospitals of Dessie town during the data collection period were the study population.

Sample Size Determination

A single population proportion formula [$n=(Z a/2)^2 P(1-P)/d^2$] was used to estimate the sample size. Since no previous study was conducted in Ethiopia; we have used maximum sample size assumptions. Proportion of 50%,

95% confidence level ($Z=1.96$) and 5% margin of error. With this, the required sample size was 384. By adding 10% nonresponse rate, a total of 422 chronic disease patients were planned to be involved in the study.

Sampling Technique

From five hospitals in the town, one government hospital (Dessie Referral Hospital) and two private hospitals (Ethio General Hospital and Selam General Hospital) were selected using the lottery method. Then, the daily average chronic disease patients who attended those hospitals both at outpatient clinics and inpatient units were estimated. Finally, based on their patient load, the sample was allocated proportionally in the three hospitals (DRH=295, EGH=67, SGH=60). Finally, data was collected from eligible patients by using a systematic random sampling technique.

Data Collection Tool and Procedures

A pretested, on-site interviewer-administered structured questionnaire was used to collect the data. The tool has four sections. The first section consists of sociodemographic characteristics that includes; age, gender, educational status, marital status, residence, occupation, family size and household room number. The second section identifies the clinical profile of patients which include; type of chronic disease, duration of the disease, and presence of additional illness. In addition, patients' chart were also reviewed to correctly identify the type of chronic disease and the presence of additional comorbidities. In the third section, data on risk assessment of patients toward SARS-CoV-2 infection was evaluated. Moreover, patients were also observed whether or not they wore a face mask and had hand sanitizers at the time of data collection. All the three sections of the questionnaire were adapted by reviewing different literature.^{26,32–35} A standard and validated tool was used to assess the main outcome variables:³⁶ 1. Perception of patients towards the efficacy of COVID-19 prevention measures; 2. Intention of patients to carry out disease prevention measures ([Supplementary Material](#)). We carried out a reliability test for questions assessing perceived efficacy and intention to carry out measures in the pretest survey and it was found to have a Cronbach alpha coefficient of 0.713. A total of 12 questions were used and each question had five-scale responses (1=certainly not, 2=probably not, 3=perhaps not—perhaps yes, 4=probably yes and 5=most certainly). For the purpose of analysis; those who responded

certainly not, probably not and perhaps not—perhaps yes were coded by zero and those who responded probably yes and most certainly was coded one. Then, mean value was calculated and we used mean to classify both the patients' level of perception towards the efficacy of COVID-19 prevention methods and intention to carry out those prevention methods.³⁷ In addition, the main hindering factors not to carry out COVID-19 preventive measure were also assessed for those who responded certainly not and probably not.

Data Quality Control

Data quality was insured by undertaking the following measures. The questionnaire was first translated from English to Amharic (local language of the study area) and then translated back to English to check its consistency by public health and nursing professionals. Four data collectors were trained regarding objective of the study, ethical issues, and how to collect the data by protecting themselves from COVID-19. They were also trained how to apply personal protective equipment and gloves, face mask and sanitizer were provided for all data collectors.

Three supervisors managed the data collection process and the principal investigator did daily supervision. In addition, the questionnaire was pretested by taking 10% of the total sample size in Bati general hospital to evaluate face validity, clarity of language and to ensure that patients understood the questions. Furthermore, internal validity (reliability) of the scales to assess the outcome variables were calculated in the pretest survey and found to have a Cronbach alpha coefficient of 0.713.

Operational Definitions

Chronic disease patients: In this study, it was to mean patients who had one of the following diseases: diabetes mellitus, hypertension, chronic heart disease, chronic kidney disease, HIV/AIDS, asthma, chronic obstructive pulmonary disease, tuberculosis, cancer, and nerve disease).

Perception about the efficacy of COVID-19 prevention methods: patients who scored the mean value of four and above were considered to have high perception toward the efficacy of COVID-19 prevention methods. Whereas, those who scored below the mean were considered to have low perception.^{37,38}

Intention to carry out COVID-19 prevention methods: Patients who scored the mean value of four and above were considered to have high intention to carry out COVID-19 prevention methods and those who scored

below the mean were considered to have low intention.^{37,38}

Data Processing and Analysis

Data was coded and entered using EpiData version 3.1 statistical software and then exported to SPSS (statistical package software for social science) version 20.0 for further statistical analysis. Appropriate descriptive statistics were used to analyze the data and mean, standard deviation, frequency, percentage and tables were utilized to summarize the data.

Bivariable and multivariable logistic regression analyses were tested to identify factors associated with the outcome variables. In bivariable analysis, variables which had a *p*-value of less than 0.2 were entered into multivariable analysis model. In multivariable analysis, variables were declared statistically significant at *p*-value of <0.05. Moreover, strength of association between factors and the dependent variables were determined using adjusted odds ratio (AOR) with 95% confidence level.

Results

Sociodemographic Characteristics of Study Participants

A total of 413 chronic disease patients participated in the study with a response rate of 97.8%. The mean age of participants was 48.2 years (SD ±15.8 years) and 52.1% of them were females. Majority of participants (64.9%) were urban dwellers and 69.5% of patients were married. Of all participants, 46.2% did not attend formal education and 38.5% were housewives. The mean family size and house room number of participants was 4.4 (SD ±1.7) and 3.0 (SD ±1.4), respectively (Table 1).

Clinical Characteristics, Risk Assessment and Health Seeking Behavior of Study Participants

Of study participants, 94 (22.8%) and 86 (20.8%) patients were hypertensive and diabetic patients, respectively. The patient's mean duration of illness was 3.7 years (SD ±5.6 year) and 10.2% of patients have been living with their disease for more than 10 years. The majority of study participants (84.7%) had no additional comorbidities. Regarding risk assessment to the current pandemic, no one had contact history with known confirmed COVID-19 cases. However, 9.9% of participants had reported respiratory symptoms and 3.9% of patients had travel history to other areas in the last two weeks. At the time of data collection, 63.2% and 26.6% of participants utilized face masks and hand sanitizer, respectively.

Table 1 Sociodemographic Characteristics of Chronic Disease Patients in Dessie Town, Northeast Ethiopia, 2020 (n=413)

Variables	Frequency	Percent
Gender		
Male	198	47.9
Female	215	52.1
Age (years)		
18–34	139	33.7
35–54	128	31.0
≥55	146	35.3
Marital status		
Single	86	20.8
Married	287	69.5
Widowed	25	6.1
Divorced	15	3.6
Residence		
Rural	145	35.1
Urban	268	64.9
Educational level		
No formal education	191	46.2
Primary school	91	22.0
Secondary school	87	21.1
College and above	44	10.7
Occupation		
Housewives	159	38.5
Employed	85	20.6
Students	61	14.8
Farmer	60	14.5
Unemployed	27	5.1
Merchant	21	6.5
Household room (in number)		
One	83	20.1
Two	98	23.7
≥Three	232	56.2
Household family size (in number)		
1–3	167	40.4
≥4	246	59.6

Furthermore, 47% of participants were members of community-based health insurance and 19.6% of clients would have no social support if they were isolated or quarantined due to COVID-19 (Table 2).

Perception of Patients Towards the Efficacy of COVID-19 Prevention Methods

In this study, 37.5% of participants perceived that applying face masks “probably” helps to prevent COVID-19 and

44.8% perceived that hand washing with soap and water “probably” helps to prevent the disease. Whereas, 21.3% and 20.6% of respondents perceived that maintaining of physical distancing and wearing face masks may “probably not” help to prevent COVID-19, respectively. In overall, 174 (42.1%) (95%CI: 37.3–46.5) participants had low perception toward the efficacy of COVID-19 prevention measures (Table 3).

Patients’ Intention to Carry Out COVID-19 Prevention Methods and Barriers

In this study, 85.7% of participants had an intention to carry out hand washing and 81.9% to wear face masks in general. In addition, 74.6% of participants had an intention to maintain their physical distance so as to prevent the disease. On contrary, 45% of respondents in general had no intention to staying home and 12.1% patients had no intention to quarantine themselves if suspected of SARS-CoV-2. In overall, 117 (28.3%) (95%CI: 24.1–32.7) participants had low intention to carry out the recommended COVID-19 prevention measures (Table 4).

In this study, we have also assessed the main reason why participants had no willingness (for those who responded “certainly not” and “probably not”) to carry out the recommended COVID-19 prevention measures. Thus, takes too much effort was the main reason identified by participants for not willing to wear face masks (38.6%), not wash hands with soap and water (43.7%) and not to use alcohol-based hand sanitizers (67.8%). In addition, 33.8% of participants described that they will not maintain physical distancing because they had doubt whether it helps to prevent the disease or not. Moreover, about 24.8% of participants responded that they will not stay home to prevent COVID-19 because of other peoples in their environment would not carry out this measure (Table 5).

Factors Associated with Low Perception of Patients Towards the Efficacy of COVID-19 Prevention Methods

First, all variables were tested in bivariable analysis. In bivariable analysis; age, sex, residence, educational level, presence of additional comorbidity, presence of respiratory symptoms, social support, wearing a face mask and sanitizer utilization had a *p*-value of <0.2 and were entered into multivariable logistic regression analysis. In multivariable analysis; young adults (AOR=2.48; 95%CI: 1.42–4.31), male gender (AOR=2.75; 95%CI: 1.73–4.37), low literacy

Table 2 Clinical Characteristics, Risk Assessment and Health Seeking Behavior of Chronic Disease Patients in Dessie Town, Northeast Ethiopia, 2020 (n=413)

Variables	Category	Frequency	Percent
Type of chronic disease	Hypertension	94	22.8
	Diabetes mellitus	86	20.8
	Heart disease	76	18.4
	Multiple illnesses ^a	63	15.3
	Kidney disease	35	8.5
	Respiratory disease	30	7.3
	HIV/AIDS	22	5.3
	Others ^b	7	1.7
Duration of chronic disease (year)	<5	307	74.3
	5–10	64	15.5
	>10	42	10.2
Presence of additional Comorbidity	Yes	63	15.3
	No	350	84.7
Member of community based health insurance	Yes	194	47.0
	No	219	53.0
Travel history to other areas in the last two weeks	Yes	16	3.9
	No	397	96.1
Presence of respiratory symptoms in the last two weeks?	Yes	41	9.9
	No	372	90.1
Wear face mask	Yes	261	63.2
	No	152	36.8
Had hand sanitizers	Yes	110	26.6
	No	303	73.4
Had social support if you are isolated/quarantined due to COVID-19	Yes	332	80.4
	No	81	19.6

Notes: ^aHad more than one chronic disease. ^bNerve disease, cancer.

(AOR=3.42; 95%CI: 1.47–7.94) and face mask nonusers (AOR=1.64; 95%CI: 1.03–2.61) were significantly associated with low perception of patients towards the efficacy of COVID-19 prevention methods (Table 6).

Factors Associated with Low Intention of Patients to Carry Out COVID-19 Prevention Methods

Age, sex, residence, educational level, duration of living with chronic disease, presence of additional comorbidity, presence of respiratory symptoms, face mask and sanitizer users had a *p*-value of <0.2 in bivariable analysis and were entered into multivariable logistic regression analysis model. In multivariable analysis; male gender (AOR=2.06; 95%CI: 1.28–3.31), rural residents (AOR=1.89; 95%CI: 1.16–3.07) and patients with longer

duration of illness (AOR=2.19; 95%CI: 1.19–4.01), (AOR= 2.40; 95%CI: 1.15–4.98) were significantly associated with low intention of patients to carry out COVID-19 prevention methods (Table 7).

Discussion

The people in sub-Saharan Africa have adequate knowledge about COVID-19, but there is a significant gap in their perception toward COVID-19 and utilization of prevention measures.³⁹ In Ethiopia, people infected with SARS-CoV-2 have been increasing significantly despite government mitigation measures.⁴⁰ As of May 14, 2021, over 264,000 confirmed cases and 4000 deaths have been reported.⁵ In the era of COVID-19 pandemic, every individual is susceptible to SARS-CoV-2 and it brings significant morbidity and mortality.

Table 3 Perception of Patients Toward the Efficacy of COVID-19 Prevention Methods Among Chronic Disease Patients in Dessie Town, Northeast Ethiopia, 2020 (n=413)

Questions	Frequency (%)					Mean	SD
	Level 1	Level 2	Level 3	Level 4	Level 5		
1. Do you think that applying face masks helps to prevent COVID-19?	48 (11.6)	85 (20.6)	39 (9.4)	155 (37.5)	86 (20.8)	3.35	1.326
2. Do you think that physical distancing and avoiding over-crowding helps to prevent COVID-19?	26 (6.3)	88 (21.3)	47 (11.4)	160 (38.7)	92 (22.3)	3.49	1.226
3. Do you think that hands washing with soap and water help to prevent COVID-19?	14 (3.4)	30 (7.3)	80 (19.4)	185 (44.8)	104 (25.2)	3.81	1.004
4. Do you think that use of hand sanitizers helps to prevent COVID-19?	16 (3.9)	34 (8.2)	32 (7.7)	186 (45.0)	145 (35.1)	3.99	1.053
5. Do you think that staying home helps to prevent COVID-19?	13 (3.1)	14 (3.4)	12 (2.9)	224 (54.2)	150 (36.3)	4.17	0.885
6. Do you think that self-quarantine of suspected peoples helps to prevent COVID-19?	4 (1.0)	13 (3.1)	5 (1.2)	216 (52.3)	175 (42.2)	4.32	0.740
Overall perception on efficacy of COVID-19 prevention methods	Category			Frequency (%)			
	High			239 (57.9%)			
	Low			174 (42.1%)			

Note: Level 1=certainly not, level 2=probably not, level 3=perhaps not—perhaps yes, level 4=probably yes, level 5=most certainly.

Table 4 Patients' Intention to Carry Out COVID-19 Prevention Methods Among Chronic Disease Patients in Dessie Town, Northeast Ethiopia, 2020 (n=413)

Questions	Frequency (%)					Mean	SD
	Level 1	Level 2	Level 3	Level 4	Level 5		
1. Will you apply face masks, if this is advised?	10 (2.4)	47 (11.4)	18 (4.4)	239 (57.9)	99 (24.0)	3.90	0.974
2. Will you maintain physical distancing and avoid overcrowding, if this is advised?	19 (4.6)	61 (14.8)	25 (6.1)	222 (53.8)	86 (20.8)	3.71	1.093
3. Will you wash your hands with soap and water, if this is advised?	15 (3.6)	33 (8.0)	11 (2.7)	237 (57.4)	117 (28.3)	3.99	0.979
4. Will you use hand sanitizers, if this is advised?	43 (10.4)	69 (16.7)	60 (14.5)	172 (41.6)	69 (16.8)	3.38	1.237
5. Will you staying home? If this is advised?	35 (8.5)	86 (20.8)	65 (15.7)	205 (49.6)	22 (5.3)	3.23	1.099
6. Will you quarantine yourself, if you are suspected and advised to do it?	13 (3.1)	26 (6.3)	11 (2.7)	287 (69.5)	76 (18.4)	3.94	0.862
Overall intention of patients to carry out COVID-19 prevention methods	Category			Frequency (%)			
	High			296 (71.7%)			
	Low			117 (28.3%)			

Note: Level 1=certainly not, level 2=probably not, level 3=perhaps not—perhaps yes, level 4=probably yes, level 5=most certainly.

Table 5 Main Hindering Factors Not to Willing to Carry Out COVID-19 Preventive Measure Among Chronic Disease Patients in Dessie Town, Northeast Ethiopia, 2020 (n=413)

Questions	Main Reasons, Frequency (%)					
	1	2	3	4	5	6
1. Why you are not willing to use face masks?	6 (10.5)	22 (38.6)	4 (7.0)	13 (22.8)	9 (15.8)	3 (5.3)
2. Why you are not willing to maintain physical distancing and avoid overcrowding?	11 (13.7)	7 (8.7)	19 (23.8)	27 (33.8)	16 (20.0)	0
3. Why you are not willing to wash your hands with soap and water?	8 (16.7)	21 (43.7)	5 (10.4)	14 (29.2)	0	0
4. Why you are not willing to use hand sanitizers?	0	76 (67.8)	13 (11.6)	6 (5.4)	17 (15.2)	0
5. Why you are not willing to stay home?	15 (12.4)	21 (17.4)	27 (22.3)	23 (19.0)	30 (24.8)	5 (4.1)
6. Why you are not willing to quarantine yourself if you are suspected?	13 (33.4)	0	7 (17.9)	14 (35.8)	0	5 (12.9)

Note: 1=COVID-19 is not serious, 2=takes too much effort (time, resource), 3=I do not think I am at risk of contracting COVID-19, 4=I doubt whether the measures help, 5=people in my environment will also not carry out the measure, 6=others.

Individuals' perceived susceptibility to SARS-CoV-2 and fear were the main predictors for the utilization and engaging in COVID-19 preventive behaviors.^{30,33,41} A lot of factors might be contributed to the distribution of the disease in Ethiopia. In our context, though not studied, one of the main reasons could be related to wrong perception of people toward the disease and the recommended prevention measures. Studies revealed that severity of COVID-19 was observed in patients who had chronic disease concomitantly.^{10,42} Patients with chronic diseases are the groups most vulnerable to COVID-19 and they should carry out all the recommended protective measures. Many patients with chronic disease and older aged adults feel that they belong to high risk groups.^{43,44} The more people perceive that the recommended COVID-19 prevention measures are effective, the more they will carry out those measures. However, in our study, 42.1% (95%CI: 37.3–46.5) of participants had low perception about the efficacy of COVID-19 prevention measures. Specifically, more than half of participants perceived that wearing a face mask (58.3%) and washing hands with soap and water (61%) helps to prevent COVID-19. This was nearly similar with studies reported in Egypt,⁴⁵ India,⁴⁶ and Australia,⁴⁷ where more than half of respondents perceived that face masks and hand washing were an effective COVID-19 prevention measures. In the present study, staying at home (90.5%) and self-quarantine (94.5%) were the main prevention measures perceived to be effective in preventing the COVID-19 pandemic than the other precautionary behaviors. However, it contradicted a study

in Korea which reported that hand hygiene and wearing face masks were perceived as more effective measures.³⁴ Similarly, a study in Iran indicated that avoidance of attending overcrowded places and hand washing with soap and water were the predominant preventive behaviors.⁴⁸ Moreover, hand washing with soap and water are routinely practiced in religious institutions to prevent the current pandemic.⁴⁹

In chronic disease patients, health literacy is one of the main determinant factors for execution of COVID-19 preventive behaviors.⁵⁰ Our study revealed that patients with low literacy were more likely to have low perception about the efficacy of COVID-19 prevention methods compared to more educated patients. This might be due to educated people having more knowledge about the disease and the recommended prevention strategies. Severe clinical disease of COVID-19 and death have been reported mainly in the elderly and patients who had chronic disease concomitantly.^{10,42} In our study, independent association was observed between young adults and low perceived efficacy of COVID-19 prevention methods. Furthermore, male gender and face mask nonusers were significantly associated with low perceived efficacy of recommended prevention methods.

A systematic review and meta-analysis report revealed that COVID-19-related knowledge was found high in the general population, but practice of preventive measures needs to be promoted.²⁵ Risk perception to COVID-19 was one of the main determinant factor for the adoption and utilization of COVID-19 prevention measures.⁵¹

Table 6 Factors Associated with Low Perceived Efficacy of COVID-19 Prevention Methods Among Chronic Disease Patients in Dessie Town, Northeast Ethiopia, 2020 (n=413)

Characteristics	Perceived Efficacy of COVID-19 Prevention Methods		COR (95%CI)	AOR (95%CI)
	Low	High		
Age (years)				
18–34	72 (51.8)	67 (48.2)	1.88 (1.17–3.02)*	2.48 (1.42–4.31)*
35–54	49 (38.3)	79 (61.7)	1.08 (0.66–1.77)	1.28 (0.71–2.31)
≥55	53 (36.3)	93 (63.7)		
Sex				
Male	101 (51.0)	97 (49.0)	2.02 (1.36–3.01)*	2.75 (1.73–4.37)*
Female	73 (34.0)	142 (66.0)		
Residence				
Urban	98 (36.6)	170 (63.4)		
Rural	76 (52.2)	69 (47.6)	1.91 (1.26–2.87)*	1.38 (0.85–2.24)
Educational status				
No formal education	96 (50.3)	95 (49.7)	2.69 (1.31–5.54)*	3.42 (1.47–7.94)*
Primary school	38 (41.8)	53 (58.2)	1.91 (0.87–4.18)	1.64 (0.67–4.03)
Secondary school	28 (32.2)	59 (67.8)	1.26 (0.56–2.82)	1.21 (0.49–2.98)
College and above	12 (27.3)	32 (72.7)		
Marital status				
Single	32 (37.2)	54 (62.8)		
Married	121 (42.2)	166 (57.8)	1.23 (0.74–2.02)	
Divorced	7 (46.7)	8 (53.3)	1.47 (0.48–4.45)	–
Widowed	14 (56.0)	11 (44.0)	2.14 (0.87–5.29)	
Type of chronic disease				
Diabetes mellitus	33 (38.4)	53 (61.6)	0.83 (0.17–3.94)	
Hypertension	38 (40.4)	56 (59.6)	0.90 (0.19–4.27)	
Kidney disease	14 (40.0)	21 (60.0)	0.88 (0.17–4.59)	
Heart disease	30 (39.5)	46 (60.5)	0.87 (0.18–4.16)	–
Respiratory disease	19 (63.3)	11 (36.7)	2.30 (0.43–12.2)	
HIV/AIDS	10 (45.5)	12 (54.7)	1.11 (0.20–6.18)	
Multiple illness	27 (42.9)	36 (57.1)	1.00 (0.21–4.84)	
Others	3 (42.9)	4 (57.1)		
Family size				
1–3	64 (38.3)	103 (61.7)	0.76 (0.51–1.14)	–
≥4	110 (44.7)	136 (55.3)		
House room number				
1	37 (44.6)	46 (55.4)		
2	40 (40.8)	58 (59.2)	0.85 (0.47–1.54)	–
≥3	97 (41.8)	135 (58.2)	0.89 (0.53–1.48)	
Duration of chronic disease (in year)				
<5	121 (39.4)	186 (60.6)		
5–10	31 (48.4)	33 (51.6)	1.44 (0.84–2.48)	–
>10	22 (52.4)	20 (47.6)	1.69 (0.88–3.23)	
Presence of other comorbidity				
Yes	21 (33.3)	42 (66.7)		
No	153 (43.7)	197 (56.3)	1.55 (0.88–2.73)	1.88 (0.94–3.74)

(Continued)

Table 6 (Continued).

Characteristics	Perceived Efficacy of COVID-19 Prevention Methods		COR (95%CI)	AOR (95%CI)
	Low	High		
Respiratory symptoms in the last two weeks				
Yes	13 (31.7)	28 (68.3)	I	I
No	161 (43.3)	211 (56.7)	1.64 (0.82–3.27)	1.57 (0.69–3.58)
Wear face mask				
Yes	92 (35.2)	169 (64.8)	I	I
No	82 (53.9)	70 (46.1)	2.15 (1.43–3.23)*	1.64 (1.03–2.61)*
Hand sanitizers				
Yes	37 (33.6)	73 (66.4)	I	I
No	137 (45.2)	166 (54.8)	1.62 (1.03–2.56)*	1.53 (0.89–2.64)
Social support				
Yes	145 (43.7)	187 (56.3)	1.39 (0.84–2.30)	1.65 (0.91–2.98)
No	29 (35.8)	52 (64.2)	I	I
Travel history in the last two weeks				
Yes	4 (25.0)	12 (75.0)	I	I
No	170 (47.3)	227 (52.7)	2.24 (0.71–7.08)	–
Member of community health insurance				
Yes	87 (44.8)	107 (55.2)	1.23 (0.83–1.82)	–
No	87 (39.7)	132 (60.3)	I	I

Notes: *Significantly associated at p -value of <0.05 . I, Reference. Blank spaces (–) indicated that the variables were not entered in multivariable analysis model as the variables had a p -value of ≥ 0.2 in bivariable analysis.

Peoples' perceived severity has a stronger effect than perceived susceptibility in the engagement of protective behaviors against the COVID-19 pandemic.⁵² In this study, 28.3% (95%CI: 24.1–32.7) of participants had low intention to carry out COVID-19 prevention measures. In Ethiopia, at the beginning of the pandemic, people in urban areas mainly utilized the adopted prevention methods.^{53,54} However, after three to four months of the outbreak, peoples' engagement in COVID-19 prevention measures and health seeking behaviors have decreased extensively. Consequently, the number of COVID-19 cases and related deaths has increased dramatically. In our study, 63.2% of participants were wear a face mask to prevent SARS-CoV-2, which was similar to a study reported in South Korea³⁴ but lower than a study reported in Pakistan.⁵⁵ However, about 81.9% of participants had an intention to wear face mask in the present study, which was higher than in a study reported from Egypt (35%).⁴⁵ In Ethiopia, numerous factors could contribute to the reduction of COVID-19 prevention measures and behaviors. Those factors may be related with lack of

awareness, negligence, perception, resource limitation, or a combination of those factors.⁵⁴

The findings of this study have many public health and clinical implications. In this study, a significant proportion of patients with chronic disease had low perception about the efficacy of COVID-19 prevention measures and low intention to carry out the adopted prevention measures. These problems in high risk groups cause health professionals to provide continuous awareness creation and educational campaign programs about COVID-19 risk of acquisition and effectiveness of prevention methods. In addition, clinicians should consider prolonging appointment of patients in health-care facilities to reduce the risk of COVID-19 pandemic.

In this study, we have also assessed the main reasons why participants had no willingness to carry out the recommended prevention measures and behaviors. As a result, "takes too much effort" was the main reason identified by participants for not being willing to wear face masks and not to maintain hand hygiene, which may be associated with lack of resources. In our study, 33.8%

Table 7 Factors Associated with Low Intention to Carry Out COVID-19 Prevention Methods Among Chronic Disease Patients in Dessie Town, Northeast Ethiopia, 2020 (n=413)

Characteristics	Intention to Carry Out COVID-19 Prevention Methods		COR (95%CI)	AOR (95%CI)
	Low	High		
Age (years)				
18–34	44 (31.7)	95 (68.3)	1.41 (0.84–2.37)	1.55 (0.88–2.75)
35–54	37 (28.9)	91 (71.1)	1.24 (0.72–2.12)	1.68 (0.93–3.02)
≥55	36 (27.4)	110 (75.3)		
Sex				
Male	69 (34.8)	129 (65.2)	1.86 (1.20–2.87)*	2.06 (1.28–3.31)*
Female	48 (22.3)	167 (77.7)		
Residence				
Urban	61 (22.8)	207 (77.2)		
Rural	56 (38.6)	89 (61.4)	2.13 (1.37–3.31)*	1.89 (1.16–3.07)*
Marital status				
Single	21 (24.4)	65 (75.6)		
Married	84 (29.3)	203 (70.7)	1.28 (0.73–2.23)	
Divorced	5 (33.3)	10 (66.7)	1.54 (0.47–5.04)	-
Widowed	7 (28.0)	18 (72.0)	1.20 (0.44–3.27)	
Educational status				
No formal education	57 (29.8)	134 (70.2)	1.91 (0.83–4.37)	2.45 (0.97–6.18)
Primary school	28 (30.8)	63 (69.2)	2.00 (0.82–4.85)	2.12 (0.81–5.56)
Secondary school	24 (27.6)	63 (72.4)	1.71 (0.69–4.21)	2.10 (0.79–5.58)
College and above	8 (18.2)	36 (81.8)		
Type of disease				
Diabetes mellitus	23 (26.7)	63 (73.3)		
Hypertension	27 (28.7)	67 (71.3)	1.10 (0.57–2.12)	
Kidney disease	6 (17.1)	29 (82.9)	0.56 (0.21–1.54)	
Heart disease	23 (30.3)	53 (69.7)	1.18 (0.60–2.35)	
Respiratory disease	14 (46.7)	16 (53.3)	2.39 (0.01–5.67)	-
HIV/AIDS	8 (36.4)	14 (63.6)	1.56 (0.58–4.21)	
Multiple illness	13 (20.6)	50 (79.4)	0.71 (0.32–1.54)	
Others	3 (42.9)	4 (57.1)	2.05 (0.42–9.88)	
Family size				
1–3	42 (25.1)	125 (74.9)		-
≥4	75 (30.5)	171 (69.5)	0.76 (0.49–1.19)	
House room				
1	27 (32.5)	56 (67.5)	1.23 (0.72–2.13)	
2	25 (25.5)	73 (74.5)	0.88 (0.51–1.50)	-
≥3	65 (28.0)	167 (72.0)		
Presence of other comorbidity				
Yes	11 (17.5)	52 (82.5)		
No	106 (30.3)	244 (69.7)	2.05 (1.03–4.09)*	1.86 (0.85–4.05)
Wear face mask				
Yes	63 (24.1)	198 (75.9)		
No	54 (33.5)	98 (64.5)	1.73 (1.12–2.68)*	1.38 (0.86–2.23)

(Continued)

Table 7 (Continued).

Characteristics	Intention to Carry Out COVID-19 Prevention Methods		COR (95%CI)	AOR (95%CI)
	Low	High		
Travel history				
Yes	4 (25.0)	12 (75.0)	1.19 (0.37–3.78)	-
No	113 (28.5)	284 (71.5)	I	
Duration of illness (in year)				
<5	76 (24.8)	231 (75.2)	I	I
5–10	25 (39.1)	39 (60.9)	1.94 (1.10–3.42)*	2.19 (1.19–4.01)*
>10	16 (38.1)	26 (61.9)	1.87 (0.95–3.67)	2.40 (1.15–4.98)*
Respiratory symptoms in the last two weeks				
Yes	6 (14.6)	35 (85.4)	I	I
No	111 (29.8)	261 (70.2)	2.48 (1.01–6.06)*	2.53 (0.94–6.74)
Use hand sanitizers				
Yes	21(19.1)	89(80.9)	I	I
No	96(31.7)	207(68.3)	1.96(1.15–3.35)*	1.67(0.93–3.02)
Member of community health insurance				
Yes	58 (29.9)	136 (70.1)	I	
No	59 (26.9)	160 (73.1)	1.15 (0.75–1.77)	-
Social support				
Yes	93 (28.0)	239 (27.0)	I	
No	24 (29.6)	57 (70.4)	0.92 (0.54–1.57)	-

Notes: *Significantly associated at p -value of <0.05 . I, Reference. Blank spaces (-) indicated that the variables were not entered in multivariable analysis model as the variables had a p -value of ≥ 0.2 in bivariable analysis.

of participants described that they will not maintain physical distancing because they had doubt whether it helps to prevent the disease or not. This contradicted a study from Iran which reported that 39.7% of participants always maintained physical distancing.⁵⁶ In addition, 24.8% of participants will not stay home because of other people in their environment will not carry out this measure.

In this study, male patients had low intention to carry out COVID-19 prevention methods compared to females. It was supported by study findings in Chicago⁵⁷ and Hong Kong³² that female patients were maintaining social distancing more than males. Despite disease severity in advanced age and in chronic disease patients,^{10,42} multivariable analysis of this study revealed an independent association between longer duration of living with chronic disease and low intention to carry out disease prevention measures. In addition, patients from rural areas were less likely to carry out COVID-19 prevention measures than urban residents which was in line with a study reported from China.⁵⁸ This could be related to lack of accessible information and awareness about the disease in rural residents.

Our study has the following limitations that readers need to know. The first limitation of this study could be related to the nature of the cross-sectional study design used which does not permit causal relationships and there could be social desirability and recall bias. Second, this study was done in selected hospitals of Dessie town therefore our finding may not be generalized to the overall population of the town. Third, factors related to health-care setting and economical status of patients was not assessed, which could have impact on adoption and utilization of COVID-19 prevention methods. In addition, due to limited research, we compared our finding with other studies conducted in different populations and methodologies used in the discussion part of the paper.

Conclusions

In this study, a significant proportion of chronic disease patients (42%) had low perception about the efficacy of COVID-19 prevention measures and nearly one-third of participants (28.3%) had low intention to carry out the adopted prevention measures. Our study revealed that

young adults, male gender, patients with low literacy, and face mask nonusers were significantly associated with low perceived efficacy of COVID-19 prevention methods.

However, male gender, rural residents and patients with longer duration of chronic disease were significantly associated with low intention to carry out the recommended prevention measures. Therefore, health education programs about COVID-19 and efficacy of prevention measures have to be provided by health professionals targeting high risk group of peoples in setting of health-care facilities and through mass media. Health institutions and other governmental organizations should prepare, distribute and post leaflets that will show how to use COVID-19 preventive measures and its usefulness particularly for vulnerable groups of individuals. Nongovernmental organizations are required to supply the commonly used SARS-CoV-2 prevention materials like face masks, soap and hand sanitizers to high risk groups who need it but cannot afford themselves. Furthermore, health-care providers, psychologists, community and religious leaders should work together to alleviate COVID-19-related morbidity and mortality as the disease is still the major public health problem in Ethiopia. In addition, we recommend other researchers to study the perception of chronic disease patients towards COVID-19 and its prevention methods after being vaccinated by using other study designs and including other variables which were not addressed in our study.

Abbreviations

AOR, adjusted odds ratio; CI, confidence interval; COR, crude odds ratio; COVID-19, novel coronavirus disease 2019; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2; TB, tuberculosis; WHO, World Health Organization; SD, standard deviation.

Data Sharing Statement

The data set used and analyzed during this study are available from the corresponding author on reasonable request.

Ethical Approval and Consent to Participate

Ethical clearance was obtained from the Ethical Review Committee of Wollo University (Protocol no: WU/324/T-01/2020). Communications with administrators of selected hospitals were held through formal letter. Study participants were informed that participation was on a voluntary basis and they can leave the study at any

time if they are not comfortable about the questionnaire. We got verbal consent from each participant, which was approved by the Ethical Review Committee of Wollo University and that this study was conducted in accordance with the Declaration of Helsinki. Confidentiality was preserved for all data collected.

Acknowledgments

We would like to thank Wollo University for the ethical approval and funding this project. We also forward our thanks to study participants for their valuable information and to supervisor and data collectors for their commitment.

Author Contributions

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; agreed to submit to the current journal; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

Funding

We did not receive funding from any organization, but Wollo University has covered data enumeration expense.

Disclosure

The authors report no conflicts of interest in this work

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