

Factors influencing knowledge, attitude and practice of COVID-19 preventive measures among pregnant women attending antenatal care in Adiarkay District, Northwest Ethiopia

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ABSTRACT

Introduction

Coronavirus Disease 2019 (COVID-19) is a newly emerged respiratory disease caused by a novel coronavirus, Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-Cov2). The first case was identified in Wuhan, China and spread to other parts of the world within a short period. According to the Worldometer datatracker, 105,926,858 cases and 2,309,328 deaths had been reported globally by November 2021. The aim of this study was to determine factors influencing knowledge, attitudes and practice of COVID-19 preventive measures among pregnant women attending antenatal care in Adiarkay District health facilities, Ethiopia in 2021.

Methods

A facility-based cross-sectional study design was conducted during March and April 2021. A total of 458 pregnant women participated in this study.

Results

Participants who had completed primary education were more than three times more likely to observe good practice of COVID-19 preventative measures (AOR: 3.29; 95% CI: 1.8-6.02) compared with those who had no formal education. Pregnant women who knew that a virus is the causative agent of COVID-19 were more than three times more likely to observe good practice (AOR: 3.5; 95% CI: 1.86-6.61) than women who didn't know the causative agent of COVID-19. Participants who believed that COVID-19 can be prevented were more than four times more likely to practice preventive measures (AOR 3.66; 95 = 2.14-6.25) than women who don't think that COVID-19 can be prevented. Participants who feared COVID-19 infection were four times more likely to follow good practice (AOR: 3.98; 95% CI: 1.15-13.84) than other participants.

Conclusion

This study showed that participants who were better educated had better knowledge of COVID-19, were more likely to believe it can be prevented, and were more likely to observe good practice of preventative measures. This suggests that improving education around COVID-19 is likely to improve behaviour that will help to prevent its spread.

Keywords: COVID-19, Preventive measures, Pregnancy, Practice, Antenatal care, Ethiopia

GJMEDPH 2021; Vol. 10, issue 4 | OPEN ACCESS

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Conflict of Interest—none | Funding—none

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INTRODUCTION

Coronavirus Disease 2019 (COVID-19) is a newly emerged respiratory disease caused by a novel coronavirus, Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-Cov-2). The first case was identified in Wuhan, China in late 2019, and the disease spread to other parts of the world within a short period. The disease is highly infectious. Its clinical symptoms include fever, dry cough, fatigue, myalgia, and dyspnea.¹ Studies to identify the modes of transmission have found that human-to-human transmissions occurs primarily through respiratory droplets and direct contact with living or nonliving bodies colonized by the virus.² One study carried out in China³ showed that residents had a high level of awareness of the main symptoms (dry cough, fever, tiredness and loss of taste or smell), transmission routes, use of masks, hand washing and treatment information for COVID-19, but displayed lower levels of awareness of the less common symptoms, such as sore throat, headache, aches and red eyes, and of more serious symptoms such as difficulty breathing or shortness of breath, loss of speech or mobility, or confusion and chest pain.

Infectious diseases are a serious issue in pregnancy, with the potential to affect maternal and fetal outcomes. Prenatal respiratory infections may also result in stillbirth, spontaneous abortion and pre-term delivery. Pregnant women are at particular risk of severe symptoms of COVID-19. Immunological and physiological changes during pregnancy impact immune tolerance and put pregnant women at higher risk of serious disease or death from COVID-19 infection compared with the general population.^{4,5} For comparable coronavirus infections, such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS), the risk of death in women infected during pregnancy is also higher than in non-pregnant women.⁶

Pregnant women are more susceptible to developing severe cases of COVID-19^{6,7} and of being admitted to hospitals and intensive care units. Higher age, presence of comorbidities and high body mass index are intersecting risk factors for pregnant women developing severe COVID-19.⁷

Marital status (unmarried); low formal educational status or answering "cannot read and write" to questions regarding literacy; rural residency; monthly income of less than the local mean; and poor knowledge of COVID-19 have been found to be significantly associated with poor practice of COVID-19 preventative measures in previous studies.⁸

Ethiopia has taken a number of prevention and control measures to stop the spread of COVID-19, including encouraging face-mask wearing; encouraging people to try to stay at home where practical; encouraging people to keeping physical distance; and increasing the number of handwashing basins at the national level.⁹ Practicing preventive measures for COVID-19 infection and associated factors is necessary for public health and helps to predict the outcomes of planned behaviour modification programmes. There are many advantages to changing behaviour around personal hygiene and infection control, especially with regard to pregnant women through improving the routine practice of infection prevention within the general population, irrespective of COVID-19. Several studies have been carried out to assess the practice of COVID-19 preventive measures and associated factors among pregnant women in Ethiopia, undertaken in different locations¹⁰⁻¹⁴ but this is the first study to focus on pregnant women attending antenatal care in Adiarkay District, Northwest Ethiopia.

Adiarkay district is 360km from Bahir Dar, the capital city of Amhara National Regional State, Northwest Ethiopia. According to the most recent Adiarkay District Health Office report, in 2012, the total population of Adiarkay District administration was estimated to be 120,430, of which approximately 4060 were estimated to be pregnant women at any one time. The district has four health centres, 18 health posts (small-scale scale health clinics often with only one member of staff and basic supplies), two primary level private clinics and one medium level private clinic in the district that provides preventive, curative and diagnostic services to people living in Adiarkay District and its surroundings. Antenatal care attendant coverage in the region is estimated at 98%. Under the District Health Office, health facilities implement

infection prevention strategies to tackle COVID-19 transmission and support a range of activities including health education, screening, and quarantine and isolation services.

METHODS AND MATERIALS

A facility-based cross-sectional study was conducted at Adiarkay District health facilities during March and to April 2021. The study population was pregnant women who attended antenatal follow-up care at these health facilities during the data collection period. Pregnant women who were seriously ill, who had mental illness or were unable to understand and unable to respond to interviews were excluded. Ethics approval was granted by the Institutional Review Board (IRB) of Bahir Dar University College of Medicine and Health Science, Ethiopia, before the start of the study. A permission letter was given by health facility heads and finally patient consent was taken from individual study participants.

Practice of COVID-19 preventative measures was captured through eight practice-related questions. Pregnant women who scored above or equal to the mean value were deemed to have 'good' practice and those who scored below the mean were considered to have 'poor' practice of COVID-19 preventive measures. The score is therefore relative within the study group and is not based on externally determined absolute measures of 'good' or 'poor practice'. Knowledge was determined by the level of information, awareness and understanding pregnant women displayed regarding the practice of preventive measures for COVID-19 infection. Attitude was determined by recording pregnant women's thinking and feelings about the practice of COVID-19 preventive measures including: use of a face-mask (a protective mask covering the mouth and nose for prevention of COVID-19 infection); isolation when infected (separation from others to preventing exposure); and maintaining 2m physical distance between people to avoid close contact. The sample size was determined by using a single population proportion formula, based on the proportion of pregnant women (76%) who were recorded to practice COVID-19 prevention measures in a previous study carried out in Ethiopia¹⁰.

A systematic random sampling technique was applied to pick the study participants from antenatal clinics. Based on the Adiarkay District Health Office report, on average 759 pregnant women attend ANC clinics each month at four health centers. When we compute Kth ($k=N/n$ where N =number of source population and n =number of study population $759/458=1.7\sim 2$) the Kth interval is 2. Of the first two pregnant mothers, one mother was randomly selected by lottery method. Then, we selected and interviewed every second woman attending ANC at the health facilities until the required sample size was reached.

Data were collected by face-to-face interviews using a structured and pre-tested questionnaire. The questionnaire was first prepared in English language then translated to the local language, Amharic, for simplicity and back to English for consistency by two different language experts fluent in English and Amharic. The questionnaire was adapted from WHO COVID-19 guidelines and literature from other parts of the world and modified to the local context¹⁰. The questionnaire had five parts: socio-demographic information, obstetric information and items related to knowledge, attitude and practice related to COVID-19 and its prevention. The questionnaire was pre-tested on sample of 5% of the number of total participants at Debarq Town health facility, which has similar sociodemographic characteristics to Adiarkay District. During the pre-test, the questionnaire was assessed for clarity, accuracy and comprehensiveness, readability and the optimal time required to complete the interview. Modifications and corrections, including wording, logical sequence and skip patterns, were made immediately based on the results. Data were collected by four health professionals and supervised by two trained health professionals. Data collectors and supervisors were trained for two days on the aim of the study, method of data collection, contents of the questionnaire, how to keep patient confidentiality, responders' rights and how to take informed consent, before they started the data collection. The completeness and consistency of the collected data were cross-checked, cleaned and compiled daily by supervisors and principal investigators. The overall activity was supervised by the principal investigator of the study.

The data were cleaned, coded, and entered in EpiData version 3.2 software and exported to IBM SPSS version 25.0 for analysis. Descriptive analysis was carried out and the results were presented as frequency tables and figures. Bivariable logistic regression analysis was carried out to assess the association between the dependent variable and each independent variable.

The sociodemographic variables and practice of preventive measures against COVID-19 were then included in the bivariable analysis. Independent variables with p -value <0.25 were considered in the final model. The model fitness was also checked using Hosmer-Lemeshow model fitness test with p -value <0.1 . Finally, multivariable logistic regression analysis was carried out to control potential confounders and to identify factors associated with the practice of COVID-19 preventive measures. A p -value <0.05 was considered statistically significant.

Sample size calculations

$$n = \frac{(P)(1-p)(Z\alpha/2)^2}{d^2}$$

Assumptions:

n = the number of pregnant women participating in the study

$z = 1.96$

$p = 76\%$ proportion of the population of pregnant women who did practice infection prevention for COVID-19 in Guraghe Zone, a comparable region of Ethiopia.

d = the margin of error, taken as 4%

% non-respondent rate

$n = (1.96)^2(0.76)(0.24) / (0.04)^2 = 437$

Total sample size = 458

RESULTS

A total of 458 pregnant women participated in this study, with 100% of those approached giving consent to be included. The mean age of the participants was 28.4 (SD \pm 5.6) years; of these, 158 (35%) were aged 25–29 years. The study participants were predominantly from the Amhara ethnic group (447, 98%) and Orthodox Christians (409, 89%). The majority of the participants (446, 97%) were married and more than

three-quarters (353, 77%) were housewives. Just under half (248, 48%) of the participants had no formal education; 118 (26%) had completed primary education and 50 (11%) had educational status equating to college or above (see Table 1).

Of the study participants, 358 (78%) and 285 (62%) were multigravida and multipara respectively; 185 (40%) women had greater than or equal to three living children. Most (441, 96%) of the current pregnancies were wanted and planned. The pregnant women were attending ANC for their current pregnancy: 145 (32%) had attended three or more times, while 313 (68%) had attended 1–2 times. Eleven (2%) participants had chronic health problems (see Table 2).

All 458 pregnant women were asked knowledge-related questions about their practice of COVID-19 preventive measures. The majority of the participants (440, 96%) had heard about COVID-19 infection. For just over half (260, 57%) of participants, the main source of information about COVID-19 was health workers. The majority (395, 86%) knew the main route of transmission to be respiratory droplets and close contact; 262 (57%) knew that the recommended period for isolation after known exposure or infection is 14 days; 346 (75%) knew that everyone is susceptible to infection; 427 (93%) knew the importance of wearing masks to prevent infection; 417 (91%) knew the importance of maintaining 2 metres physical distance and 428 (93%) knew the importance of hand washing with water and soap for 20 seconds to prevent COVID-19 infection (See Table 3).

In response to attitude-related questions regarding the practice of COVID-19 preventive measures, 282 (62%) of respondents believed themselves to be susceptible to COVID-19 infection and 427 (93%) were afraid of the outcome if they or their family members became infected.

The majority of participants (387, 85%) would accept isolation in a health facility if they were infected with COVID-19. Most (419, 92%) participants thought that handwashing can prevent COVID-19 spread, and 315 (69%) participants did believe that it is possible to prevent COVID-19 (see Table 4).

Table 1 Sociodemographic characteristics of pregnant women in the study population (n=458)

Variables	Frequency	Percent (%)
Age		
15-19	31	7
20-24	83	18
25-29	158	35
30-34	116	25
>=35	70	15
Total	458	100.0
Ethnicity		
Amhara	447	98
Tigre	11	2
Total	458	100.0
Residence		
Urban	162	35
Rural	296	65
Total	458	100.0
Religion		
Orthodox Christian	409	89
Muslim	49	11
Total	458	100.0
Family size		
<5	323	70.5
>=5	135	29.5
Total	458	100.0
Educational status		
No formal education	248	54
Primary	118	26
Secondary	42	9
College and above	50	11
Total	458	100.0
Occupation		
Housewife	353	77
Civil servant	53	12
Merchant	25	6
Farmer	6	1
Private business	9	2
Others	12	2
Total	458	100
Marital status		
Married	446	97.5
Widowed	3	.5
Divorced	2	.5
Single	7	1.5
Total	458	100
Monthly family income (Ethiopian Birr, ETB)		
<1500	72	16
1500-3000	315	69
>3000	71	15
Total	458	100

Table 2 Obstetrics and disease characteristics of study participants (n=458)

Variables	Frequency	Percent (%)
Gravida		
Primigravida	100	22
Multigravida	358	78
Total	458	100
Parity		
Nulliparous	103	23
Primiparous	70	15
Multipara	285	62
Total	458	100
No of alive children		
<=3	229	50
>3	126	28
Antenatal care visits		
One	146	32
Two	167	37
Three	111	24
Four	34	7
Total	458	100
Condition of pregnancy		
Wanted	441	96
Unwanted	8	2
Untimed	9	2
Total	458	100
History of asthma		
Yes	2	0.5
No	456	99.5
Total	458	100
History of chronic disease		
Yes	11	2
Hypertension	5	1
Congested heart failure	1	-
Kidney condition	1	-
HIV	4	1
No	447	98
Total	458	100

At least one preventative measure was practiced by 376 (82%) of participants and only 82 (18%) did not practice any. The most common was washing hands with water and soap 372 (81.2%) and covering the mouth and nose during coughing or sneezing (344, 75%) (see Table 5). Binary logistic regression analysis showed that age, residence, educational status, occupation, gravida, receiving information about COVID-19, the source of the information about COVID-19, and knowing the importance of masks wearing were significantly associated with those participants who practiced a good (above average) level of preventative measures. In multivariable logistic regression analysis, educational status, participants who knew a virus is the causative agent of COVID-19 and those who think COVID-19 can be prevented were statistically significant more likely to practice

COVID-19 preventative measures. Participants who had completed primary education were more than three times more likely to have a good level of practice (AOR: 3.29; 95% CI: 1.8-6.02) compared to those who had no formal education. Pregnant women who knew a virus is the causative agent of COVID-19 were more than three times more likely to observe good practice (AOR: 3.5; 95% CI: 1.86-6.61) than those who didn't. Participants who thought that COVID-19 spread can be prevented were more than four times more likely to observe good practice (AOR 3.66; 95 = 2.14-6.25) compared with less optimistic women. Participants who feared the impact of COVID-19 infection on themselves and their families were four times more likely to observe good practice of preventative measures (AOR: 3.98; 95% CI: 1.15-13.84) than those who were not afraid (See Table 6).



Table 3 Knowledge of COVID-19 and measures to prevent infection spread amongst the study population

Questions	Response	Frequency	Percent (%)
Have you ever heard about COVID-19 infection?	Yes	440	96
	No	18	4
Source of information	Mass media	137	30
	Health worker	260	57
	Social media	1	-
	Community	42	10
Causative agent for COVID-19 infectious disease	Virus	189	41
	Don't know	269	59
Main transmission route of COVID-19	Respiratory droplets and close contact*	395	86
	Water	2	0.5
	Food	3	0.5
	Don't know	58	13
Incubation period of COVID-19	1-14 days*	138	30
	3-7 days	9	2
	More than 14 days	49	11
	Don't know	262	57
Who is susceptible to COVID-19	Elderly and children only	26	6
	Everyone*	346	75.5
	Young adults only	3	0.5
	People with pre-existing disease only	29	6
	Pregnant women only	28	6
	Don't know	26	6
The clinical manifestations of COVID-19	Fever*	9	2
	Dry cough*	192	42
	Headache	7	1.5
	Sore throat	169	37
	Runny nose	11	2.5
	Difficulty breathing*	50	11
	Don't know	20	4
What will you do when you have the above symptoms?	Stay at home	187	41
	Wear face mask	60	13
	Inform your healthcare provider	197	43
	Other	7	1.5
	Didn't know	7	1.5
	Yes*	112	24
Can a person with COVID-19 can transmit the virus to others without developing signs and symptoms?	No	26	6
	Don't know	320	70
	Yes*	427	93
Did the respondent know that wearing masks when moving outside of the home is important in preventing the spread of COVID-19?	No	4	1
	Don't know	27	6
	Yes*	417	91
Did the respondent know that maintaining 2-metre physical distance is important in preventing the spread of COVID-19?	No	12	3
	Don't know	29	6
	Yes*	428	93
Aware that washing hands with soap and water for at least 20 seconds/use of an alcohol-based hand sanitizer is important to prevent the spread?	No	5	1
	Don't know	25	6
	Yes*	381	83
Aware that isolation and treatment of people who are infected with COVID-19 are effective ways to reduce the spread of the virus?	No	29	4
	Don't know	63	13
	Yes*	366	78
Aware that isolation people who have contact with someone infected with the COVID-19 virus should immediately isolate in an appropriate place?	No	29	6
	Don't know	63	14
	Yes*	366	78

*Indicates correct answer

Table 4 Attitudes to COVID-19 Infection amongst the study population (*indicates correct answer)

Questions	Response	Frequency	Percent (%)
Do you think you are susceptible to COVID-19?	Yes*	282	62
	No	179	38
Do you feel anxious or fearful that you or any family members have contracted COVID -19?	Yes*	417	91
	No	41	9
If you are infected with COVID-19 would you accept isolation in a health facility?	Yes*	387	85
	No	71	15
Do you think that handwashing with soap and water can prevent COVID-19 spread?	Yes*	419	92
	No	39	8
Do you think people recovering from (COVID-19) should be transferred to another healthcare facility?	Yes*	198	43
	No	260	57
Do you think we can prevent and control COVID-19 infection?	Yes*	315	69
	No	143	31

Table 5 Practices of COVID-19 preventive measures amongst the study population

Questions	Response	Frequency	Percent (%)
Have practiced COVID-19 infection prevention methods	Yes	376	82
	No	82	18
Washed hands with soap and water or rubbing with alcohol-based sanitizers frequently	Yes	372	81
	No	86	19
Avoid touching eyes, nose and mouth with unwashed hands	Yes	124	27
	No	334	73
Cover mouth and nose during coughing/sneezing	Yes	344	75
	No	114	25
Wear face mask in whenever outside the house	Yes	102	23
	No	352	77
Disposed of used masks in an appropriate place	Yes	64	63
	No	38	37
Practice social distancing by staying at home or indoors	Yes	345	75
	No	113	25
Maintain at least 2-metre physical distance from others when staying indoors is not practical	Yes	225	56
	No	203	44

Table 6 Factors associated with practices of COVID-19 preventive measures within the target population

Variables	Category	Practice		COR (95%CI)	AOR (95%CI)	p value
		Good	Poor			
Educational status	No formal	84	164	-	-	-
	Primary	85	33	5.029 (3.11-8.13)	3.29 (1.80-6.02)	0.001*
	Secondary	30	12	4.88 (2.378-10.02)	1.76 (0.7.4.37)	0.224
	College/above	42	8	10.25 (4.603-22.82)	3.046 (1.12-8.27)	0.029*
Know the causative agent of COVID-19?	Virus	146	95			
	Don't know	43	174	6.22 (4.078-9.485)	3.5 (1.86-6.61)	.001*
Can COVID-19 be prevented?	Yes	206	109		3.66	
	No	35	108	0.17 (0.11-0.26)	(2.14-6.25)	.001*
Do women fear the impact of COVID-19	Yes	234	183		3.98	
	No	7	0	0.16 (0.7-0.37)	(1.15-13.84)	0.029*



DISCUSSION

This study investigated the practice of COVID-19 preventive measures and considered the associated factors of this practice among pregnant women attending antenatal care in Adiarkay District health facilities, Ethiopia. The result of this study showed that good practice of preventive measures of COVID-19 was practiced by 53% of the study population (95% CI= 48.3-55.7) but as 'good practice' within the study was defined as scores that fell above or below the average for the group, this score is subjective to this study. Previous studies have recorded levels of good practice in India¹⁵ at 83.8%, in Iraq at 85.5%¹⁶, Bangladesh at 55.1%¹⁷ and in Egypt at 55.2%.⁶ Previous studies on Ethiopian practices have recorded that in Addis Ababa high risk groups displayed 49% good practice¹⁸ as did 40.7% of Dire Dawa residents¹⁹ and 76.2% of pregnant women in Guraghe hospital.²⁰ A study carried out in a low resource setting in Nigeria recorded only 30.3% of practice considered to be good.^{21,22} All these studies used different methodologies and defined 'good' in different ways, however. Differences might also be due to different sociocultural characteristics or to the time when the studies were conducted, which may be susceptible to different information delivery and different periods in the creation of pandemic awareness programmes.

Our study finding that participants who have completed primary education are more than three times more likely to have good practice of preventive measures (AOR: 3.29; 95% CI: 1.8-6.02) compared to those who had no formal education is supported by a study carried out in Egypt.²³ Pregnant women who knew the virus is the causative agent of COVID-19 were more than three times more likely to have good practice of preventive measures of COVID-19 (AOR: 3.5; 95% CI: 1.86-6.61) compared to women who didn't know the causative agent. This suggests that

pregnant women in Ethiopia will benefit from awareness campaigns and further results suggest that these are best delivered through mass media and via healthcare workers. This information could be prepared by leaflet, house-to-house visits by healthcare workers and via village microphones. COVID-19 information must be part of guidelines developed by antenatal services. The numbers of pregnant women who routinely wear face masks outside of the home was relatively low in our study (23%), so this is a particular area where more targeted information may be needed.

CONCLUSION

This study showed that education status, personal concerns over COVID-19 infection, knowledge that the virus is the causative agent of COVID-19, and participants who think that COVID-19 can be prevented were more likely to observe good practice of COVID-19 preventive measures. Health facilities must provide role model behaviour in practices such as handwashing; wearing masks and encouraging patients to wear a mask; and spacing seats in waiting and treatment areas 2 metres apart. This is particularly important as healthcare workers are a key source of information. Healthcare providers should not only provide health education but also normalize the practice of COVID-19 preventive measures within their communities. We recognize that this may be dependent on the respective officials providing necessary supplies as well as monitoring and evaluating COVID-19 preventive measures.

We would like to acknowledge Bahir Dar University, College of Medicine and Health Sciences, School of Public Health, Department of Health System Management for giving us the chance to develop this thesis by permitting time for the study.

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