

(RESEARCH ARTICLE)

Knowledge, attitude and practice towards COVID-19 and associated factors among pregnant women at Debarq Town Northwest Ethiopia: An institutional-based cross-sectional study

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Abstract

Introduction: Pregnant women are at high risk for coronavirus because of their physiologic and immunologic changes. Hence, preventive measures are essential as they prevent higher mortality. However, there is a paucity of evidence on the knowledge, attitude, and practice of the prevention of coronavirus in the study area. Thus, this study assesses knowledge, attitude, practice, and associated factor towards coronavirus prevention among pregnant women is crucial.

Methods: An institution-based cross-sectional study was employed among 549 pregnant women from June 1 to 30, 2021. A multi-stage sampling technique was used to select the study participants. Data were collected using an interviewer-administered structured questionnaire. The software Epi-data version 4.6 and SPSS version 23 were used for data entry and analysis, respectively. Binary logistic regressions (bivariable and multivariable) were performed to identify statistically significant variables. Adjusted odds ratio with a 95% CI was used to declare statistically significant variables on the basis of a p-value < 0.05 in the multivariable logistic regression model.

Results: Of the overall sample required (N = 549), 538 pregnant women with 98.0% response rate. The prevalence of good knowledge was 67.3% (95% CI: 63.0, 71.0), a desirable attitude was 43.0% (95% CI: 42.6%, 50.6%), and good practice was 51.6% (95% CI: 47.0, 55.9%) towards coronavirus prevention. Urban residents (AOR: 2.12, 95%, CI: 1.40, 3.20), unemployed husbands (AOR: 0.39, 95%, CI: 0.25, 0.62) and less than 3000 Ethiopian birr family income (AOR: 0.53, 95%, CI: 0.32, 0.85) were found to be statistically significant with knowledge of coronavirus, where as participants' age (32-38 years) (AOR:2.24, 95%, CI:1.02, 4.26), participants' education(AOR:2.33, 95%CI:1.19, 4.55), husbands' education (AOR:2.88(95% CI:1.35,4.54),and husband's occupation (AOR: 1.94, 95%, CI: 1.24, 3.03) were also significantly associated with the practice of coronavirus prevention.

Conclusions: The findings have indicated that the prevalence of the study participants who had good knowledge, attitudes, and practices towards prevention of coronavirus were low compared to developing countries. Hence, healthcare providers should provide health education to pregnant mothers during antenatal care visits and disseminate leaflets regarding the COVID-19 preventive measures.

Keywords: COVID-19; Attitude; Knowledge; Practice; Pregnant women: Debarq

1. Introduction

The Coronavirus Disease 2019 (COVID-19) is a viral pandemic that was reported for the first time in Wuhan, China, and spread all over the world between December 2019 and early 2021[1]. Then, the World Health Organization (WHO)

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declared this novel COVID-19 as a pandemic disease on March 11, 2020, and a public health emergency of international concern that posed a high risk to countries with vulnerable health care systems [2]. The COVID-19 pandemic has become a major concern for global health and registered as the largest outbreak of novel coronavirus (2019-nCoV) or the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) since it rapidly spread from the Wuhan city province of China to the rest of the world[1]. In Ethiopia, the COVID-19 pandemic was officially recognized on March 13, 2020, after the Japanese arrived Addis Ababa, the capital city of Ethiopia from their Burkina Faso trip and tested positive for the novel COVID-19 [3].

The WHO has designed various mechanisms to combat the spread of COVID-19 outbreaks in public health aspects [4-6]. However, there is a scarcity of attention to knowing about COVID-19 complications in pregnant women and pregnant women with limited acceptance of COVID-19 vaccines [7-9]. Pregnant women are more susceptible to developing severe cases or severe pneumonia morbidity with COVID-19 infection when compared with the general population due to physiological, adaptive, and immunological changes during pregnancy[10]. Pregnant women had pre-existing medical co-morbidities such as diabetes, bacterial and viral co-infections, preeclampsia, and severe obstetric complications which all worsens the outcome of COVID-19 infections [11, 12]. In obstetric cases, pregnant women infected with COVID-19 had a higher risk of having a stillbirth, fetal distress, fetal tachycardia, low birth weight, neonatal asphyxia, and stillbirth [13-15]. According to current case-fatality reports from February 26, 2020, until June 18, 2020, Brazil reported 124 maternal deaths[10].

Various studies noticed that socio-demographic factors like age, residence, educational status, and social support, level of awareness about COVID-19, husband's educational and occupational status, number of alive children, having ANC follow-up in the current pregnancy, and knowledge of COVID-19 were some of the predictors of KAP among pregnant women to prevent COVID-19[16-20].

Even though there are strong initiatives and recognition of the public health importance of COVID-19 by the Ethiopian government (screening, quarantine, and treatment centers), there is a challenge of community awareness and practices to stop the nationwide spread of the virus. However, there is a paucity of evidence on the knowledge, attitude, and practice of prevention of COVID-19 in the study setting. Therefore, this study is aimed at investigating knowledge, attitudes, and practice towards COVID-19 prevention and their associated factors among pregnant women in *Debank* town, Northwest Ethiopia. Knowledge, attitude, and practice towards the disease of pregnant women play an integral role in determining a society's readiness to accept pregnant women's health measures since pregnant women need special attention and design to prevent bad obstetrics outcomes due to coronavirus infections.

2. Material and methods

2.1. Study setting

The study was conducted in Debank town, Amhara Regional State in Northwest Ethiopia. The town is 828 kilometers far from Addis Ababa, the capital of Ethiopia, and about 260 kilometers from Bahir Dar city, the capital of Amhara regional state. The town has three Kebeles (the smallest administrative units in Ethiopia) and a total population of 25,350. The town has 1 hospital, 2 health centers, 2 medium clinics, 4 primary clinics, 6 pharmacies, and 2 health posts for providing maternal and child health services. Most maternal health services, like antenatal care, labor delivery, postnatal and vaccination services are provided free of charge as exempted services. According to the zonal health office, among all women residing in the town, 20.96% (17,968) of them were of reproductive age, and 1330 women were pregnant during the study period. All public health facilities were included in the study.

2.2. Study design and period

The institutional-based cross-sectional study design was conducted from June 1-30, 2021 at public health facilities

2.3. Participants

The source population were all pregnant women who were attending Antenatal care (ANC) at public health facilities residing in Debank town, while the study population included all the randomly selected pregnant women that attended ANC during the data collection period.

2.4. Eligibility criteria

All selected pregnant women who attended antenatal care and lived in the town for a minimum of six months during the data collection period were included. Mothers who were unable to respond or who were seriously ill or unable to hear were excluded from the study.

2.5. Study variables and measurements

The outcome variables of this study were the knowledge, practice, and attitude towards coronavirus prevention, while others, like socio-demographic factors, and obstetric-related factors were the explanatory variables. Pregnant women's knowledge and practice of COVID-19 outbreak prevention were assessed using 14 related questions (Cronbach's alpha 0.73), and a three-point scale was used for the analysis of responses (Yes, No, and don't know). Then computed to show yes responses to be correct and no and don't know responses to be incorrect. Accordingly, the mean of the responses was computed. Participants who scored the mean and above on the knowledge questions about coronavirus prevention were labeled as having good knowledge of coronavirus preventions[20].

Participants who scored the mean and above of the knowledge questions about coronavirus preventions were labeled as having good knowledge in coronavirus prevention. Respondents were asked to respond to the nine attitudinal questions about coronavirus prevention, each containing a 5- point Likert scale (1-strongly agree, 2-agree, 3- neutral or not applicable, while 4-disagree, and 5-strongly disagree). A response answering (strongly agree and agree) was carried out as a one and not applicable, disagree and strongly disagree responses indicated zero. The responses were dichotomized as desirable and not desirable attitudes, and then composited. In addition, study participants who scored at or above the mean on attitude questions were deemed to have a desirable attitude[21].

2.6. Sample size determination

The sample size(n) was determined using the formula for a single population proportion taking an estimate of 75.4% of knowledgeable women 43.6% had good practice to prevent coronavirus and 31.8% had a satisfactory attitude from previous research conducted in Wollega Zones, Ethiopia[22], we had taken the prevalence of satisfactory attitude to 31.8% to increase simple size. Where the following assumptions were made: The standard normal table has a critical point of $Z_{\alpha/2} = 1.96$, where α = level of significance, n = sample size, d = 5% margin of error, 10% non-response rate, and a design effect of 1.5, =549.

2.7. Sampling techniques

A multi-stage sampling technique was used to recruit the study participants. In the first stage, Debank town zone was selected from three Central Gondar Administration zones by lottery method. In a second stage, a systematic random sampling technique was used to select pregnant women from ANC attendant rooms with a proportional allocation to the size of each health facility. The sampling interval K^{th} value was determined by dividing the total number of pregnant women in each facility by the sample size allocated for each health facility.

2.8. Data and collection

The questionnaire was prepared after intensively reviewing previous studies conducted to assess KAP on COVID 19 preventive measures [20, 23, 24]. It has three parts (socio-demographic, obstetric, and knowledge, attitude, and practice of prevention of COVID-19 disease). It was first prepared in English, then translated to Amharic, and again translated back to English by language experts. Data were collected using face-to-face interview with pre-tested questionnaires. Three health extension workers as data collector and one MSc holder clinical midwifery as a supervisor were recruited for the data collection process. Both the data collectors and the supervisor strictly followed the COVID 19 preventive measures during data collection such as wearing face masks and keeping 2 meters physical distancing.

2.9. Data quality management

The reliability of the questionnaire was checked by conducting a pretest among pregnant women in Koladiba primary hospital by taking 30 participants, which was 5% of the total sample size. One-day training was given for the data collectors before the actual data collection. The training covered the aim of the study, procedure, inclusion and exclusion criteria, data collection techniques, contents and details of the questionnaire, the art of interviewing and clarification. Moreover, during data collection, the supervisor checked how the data collection process was going on. At the end of data collection, the principal investigator also checked the completeness of questionnaire. Multicollinearity was also checked to see the linear correlation between the independent variables by using a standard error and variance inflation factor. Variables with a standard error of greater than > 2 and a variance inflation factor (VIF) of one to ten were checked by the multivariable analysis. The Hosmer-Lemeshow goodness of fit test was used to check for model fitness by looking

at the cut-point P-value > 0.05. The continuous variables, such as age were tested using the normal curve with a histogram.

2.10. Data processing and analysis

Data entry was performed using the statistical program Epi-Data version 4.6 and then exported into SPSS version 23 for analysis. Descriptive statistics were carried out and presented with narration, figure, and tabulation. Binary logistic regression (bivariable and multivariable) was performed to identify statistically significant variables. In the bivariable logistic regression, p-value < 0.25 was considered as a cut of point to identify candidate variables for multivariable logistic regression. An adjusted odds ratio with a 95% confidence interval was used to declare statistically significant variables on the basis of a p-value <0.05 in the multivariable binary logistic regression model. A Hosmer and Lemeshow goodness of fit test was performed and the decision was made at P>0.05.

3. Results

3.1. Socio-demographic characteristics

Of the overall sample required (N = 549), 538 pregnant women with a 98.0% response rate were used in this analysis. Almost three-fourths (72.5%) of the study participants were urban dwellers. The mean age of the respondents was 29.7 ±5.8SD) years). More than half (317(58.9%) of the study participants were orthodox Christians. Almost all (486(90.3%) of the study participants were married. Regarding participants' educational status, 316(43.1%) of the study participants could not have a formal education, while 88 (16.4%) could have a diploma and above the level of educational status (Table 1).

Table 1 Socio-demographic characteristic of pregnant women in Debark town, Northwest Ethiopia, 2021(n=538)

Variables	Category	Frequency	Percent (%)
Ages	18-24	108	20.1
	25-231	234	43.5
	32-38	152	28.3
	≥39	44	8.2
Residence	Urban	390	72.5
	Rural	148	27.5
Marital status	Married	486	90.3
	Divorced	34	6.3
	Windowed	18	3.3
Religion	Orthodox	317	58.9
	Muslim	185	34.4
	Others *	36	6.7
Mother's educational status	No formal education	316	58.7
	Primary school	76	14.1
	Secondary school	58	10.8
	Diploma and above	88	16.4
Husband's educational status	Non-formal education	182	33.8
	Primary school	158	29.4
	Secondary school	184	15.6
	Diploma and above	114	21.2
Mother's occupation	Housewife	364	64.7
	Employed	87	16.2
	Private business	87	16.2

Husband's occupation	Unemployed	147	27.3
	Employed	141	26.2
	Merchant	250	46.5
Family income in EBR	<3000	365	67.8
	≥3000	173	32.2

Note: Others *= protestant, catholic

3.2. Obstetric and Health Care Service Characteristics

Three-hundred and twenty-eight (61.0%) of the study participants were multigravida, and 342 (63.6%) were multiparous. Concerning the condition of pregnancy, almost all 487(90.5%) of their current pregnancies were wanted and supported. In relation to the antenatal care follow-up, 300 (55.8%) of the study participants had ≥3 times ANC follow-up in their current pregnancies, while, 238 (44.2%) had ≥4 times ANC follow-up in their current pregnancies. In the case of related pregnancy adverse outcomes, 174 (32.3%) of the study participants had a history of pregnancy-related complications. Among these, abortion, 73 (42.4%), preterm delivery was 34 (19.8%), premature rupture of membrane 58 (33.7%), and pregnancy-induced hypertension was 9 (4.1%).

3.3. Knowledge of pregnant women towards COVID-19 preventive measures

Three hundred and sixty-three (67.3%) of the study participants had good knowledge of the precautionary measures against COVID-19 infections. According to the findings of this study, almost all participants (440 or 81.1%) have heard about the COVID-19 pandemic. Among these, the main sources of main information were 188 (34.9%) from social media, 163 (30.3%) from news media (television and radio) and 89 (16.5%) from health workers.

The majority (441, or 82.0%) of study participants knew the cause of COVID-19 and 360 (66.9%) of study participants could maintain at least a two-meter distance to prevent COVID-19 infections. The current study demonstrated that 267 (49.6%) of study participants knew the mode of transmission. From this, nearly two-thirds (58.2%) of study participants could appreciate the COVID-19 mother-to-child mode of transmission.

According to the knowledge of the vaccine, only one hundred and fifty-six (29.0%) participants were willing to take the vaccine for the purpose of preventing COVID-19 infections, while most (382, or 71.0%) of the participants did not volunteer for different reasons. Among this, because I used other home-based-made traditional methods of COVID-19 prevention, 112 (20.8%), the vaccine might affect my fetuses, 102 (19.0%), the vaccine might not be effective, 79 (14.7%), and fear of side effects, 62 (11.5%), and the vaccine might turn into COVID-19, 27 (5.0%). Furthermore, more than half (53.5%) of them didn't know the main risks of the group (old age and having chronic disease) for coronavirus morbidity and mortality (Table 2).

Table 2 Knowledge of pregnant women towards coronavirus prevention in Debark town, Northwest Ethiopia, 2021(n=538)

Variables	Category	Frequency	Percent (%)
Heard about COVID-19	Yes	440	81.8
	No	98	18.2
source of information	News (Television, Radio)	163	30.3
	Social media	188	34.9
	Health workers	89	16.5
Cause of COVID-19	Viral	97	18.0
	bacterial	110	20.4
	fungal	163	30.3
	man -made	84	15.6
	I don't knew	84	15.6
Mode of transmission of COVID-19	Air droplet	187	34.8
	Contact with infected surface	84	15.6
	Blood contact	52	9.7

	Sexual transmission	39	7.2
	Don't know	176	32.7
Very body is at risk COVID-19	Yes	339	63.0
	No	106	19.7
	I don't know	33	17.3
Mother to child transmission	Yes	224	41.6
	No	206	38.3
	I don't know	107	19.9
Mode of mother to child transmission (n=224)	Trans-placental	24	10.7
	Droplets from infected mother after birth	80	35.7
	Breast milk	120	53.6
COVID-19 is prevented	Yes	382	71.0
	No	99	18.4
	I don't know	57	10.6
COVID-19 is treated	Yes	391	72.7
	No	94	17.5
	I don't know	53	9.9
Avoiding touching eyes and nose prevents COVID-19	Yes	328	61.0
	No	104	19.7
	I don't know	106	19.3
COVID19 is lead to death	Yes	300	64.0
	No	139	27.6
	I don't know	99	18.4
Groups of people are at risk of death	Children	269	50.0
	Young adults	87	16.2
	Middle age	169	30.3
	Old age	19	3.5
Physical distance	Not talking or greeting people	261	48.5
	Not hugging/ embracing	99	18.4
	Maintaining 2m distance away from people	178	33.1
Knowledge of COVID-19 symptoms	Knowledge of 3 or more correct symptoms	269	50.0
	Knowledge of less than 3 correct symptoms	89	16.5
	Don't know	180	33.5
Willingness to take COVID-19 vaccine	Yes	156	29.0
	No	382	71.0

3.4. Attitude of pregnant women towards coronavirus prevention

According to this study, the study participants' mean desirable attitude toward COVID-19 prevention was 251 (46.7%) with a 95% CI (42.6-50.6). The finding of this study indicates that 75.1% of study participants have heard about COVID-19 preventive measures. Among the studied pregnant women, 354 (65.8%) believed that we could prevent the COVID-19 outbreaks by taking different protective measures. In this study also, 55.2% of pregnant women believed that they

didn't have a high risk of developing complications compared to non-pregnant women. More than half (297/538, 55.2%) of study participants also believed that the pandemic was not a real disease but rather a political issue. However, almost all 440 (81.8%) of them want to test for COVID-19 infections to know their status. Only two hundred and ninety-seven (52.2%) of study participants would have taken action if they had been infected with COVID-19. And three-hundred and sixty-four (67.7%) of the study participants believed they could protect their families from the coronavirus. Further, 453 (84.2%) of participants feared losing their families in the case of COVID-19. Attitude questionnaires refer to (Table 3).

Table 3 Attitude of pregnant women towards coronavirus prevention in Debark town, Northwest, Ethiopia, 2021 (n = 538)

Serial No	Questions
1	Do you agree to protect yourself?
2	Do you believe the source of information is important?
3	Can you protect your children from Coronavirus?
4	Do you agree COVID-19 is real?
5	Are you willing to take COVID-19 test?
6	Can you take action if you are sick with COVID-19 infection?
7	Are you willing to take COVID-19 vaccine?
8	Do you think a pregnant woman is at higher risk of complication from COVID-19 Compared with non-pregnant?
9	Do you fear that you may lose your life/family member by COVID-19?

Attitude: Desirable 251(46.7%), mean of attitude (37.03 ± 13.6 SD)

3.5. Practice of pregnant women on preventing coronavirus infections

This study revealed that the prevalence of good practice towards COVID-19 outbreak preventive measures was (538/277 (51.1%) of the study participants (Figure 1).

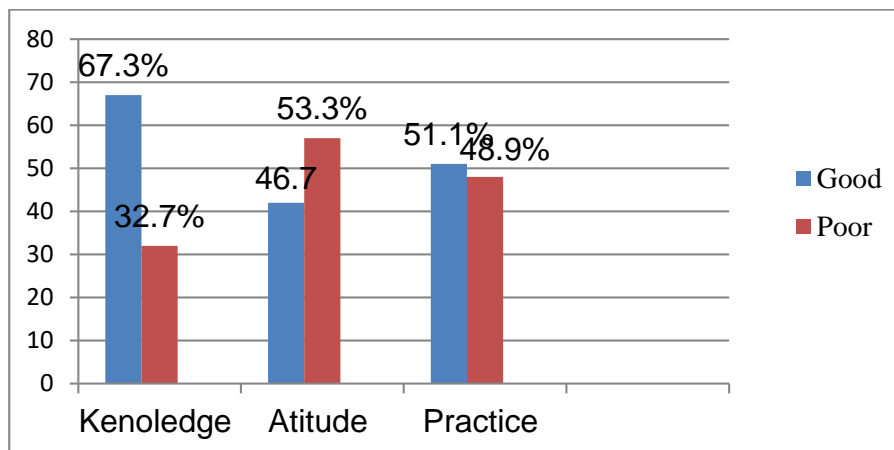


Figure 1 KAP of pregnant women towards COVID-19 outbreaks prevention at Debark Town Northwest Ethiopia, 2021(n=538)

The participants' responses regarding the practice of COVID-19 preventive measures were: covering the mouth with a flexed elbow while coughing or sneezing (91.8%), frequent hand washing (90.6%), and avoiding touching the eyes and nose to prevent COVID-19 infection (61.0%). Wearing face masks (88.2%), avoiding handshaking with other people (87.7%) when leaving their homes to prevent COVID-19 infection and keeping a physical distance of at least two meters (73.7%) is explained in (Table 4).

Table 4 Distribution of studied pregnant women according to their practice towards Coronavirus infection prevention in *Debank* town, Northwest Ethiopia, 2021(n = 538)

Variables	Category	Frequency	Percent (%)
Do you wear face mask?	Yes	349	64.9
	No	189	35.1
How often do you wear face mask outside the home?(N=349)	All the time	197	54.7
	Most times	65	18.6
	Few hours daily	94	26.6
What type of face mask is worn?	N95 mask	121	20.0
	Surgical mask	67	12.5
	Fabric mask	149	30.2
	Piece of cloth	12	2.2
Is N95 mask changed daily?	Yes	122	22.5
	No	128	42.4
Is fabric/cloth mask washed daily?	Yes	119	22.0
	No	231	42.9
Covering mouth with elbow while sneezing?	Yes	202	37.5
	No	336	62.5
Do you shake hands?	Yes	254	47.2
	No	284	52.8
Maintain physical distance	Yes	366	68.0
	No	172	32.0
How often is physical distance observed?	All the time	197	36.6
	Most times	65	12.1
	Few times	104	20.3
Hands wash with soap/use sanitizer	Yes	244	37.5
	No	294	62.5
Time of washed hands with soap and sanitizer	All the time	110	23.1
	Most times	50	6.0
	Few times	84	8.4
Use ant- infection hand sanitizers	Yes	235	43.7
	No	303	56.3
Use antibacterial hand sanitizers	All the time	92	15.1
	Most times	35	7.4
	Few times	108	20.1

3.6. Factors of good knowledge towards prevention of coronavirus infections

In a binary logistic regression analysis, age, level of education, occupation, residence, husband's education, husband's occupation, family income, and adverse pregnancy outcome were all significantly associated with having good knowledge of COVID-19. Through multivariable logistic regression analysis, after adjusting for other third co-variables by using the backward likelihood stepwise method, being an urban resident, husbands' occupation, and family income were found to be statistically significant with knowledge of COVID-19. Participants whose residents were found to be living in urban areas were nearly five times more likely to have sound knowledge about coronavirus infections (AOR: 2.13; 95% CI: 1.40, 3.20) as compared to participants whose residents were living in rural areas. Unemployed husbands' occupational status was 69% less likely to have good knowledge of coronavirus (AOR: 0.39; 95% CI: 0.25, 0.62). Once more, study participants who had sound COVID-19 prevention knowledge had 47% fewer chances of having lower odds of practicing the preventive measures against COVID-19 (AOR: 0.53; 95% CI: 0.32, 0.85) when compared to their counterparts (Table 5).

Table 5 Bivariable and multivariable analysis of factors affecting pregnant women's knowledge to prevent against coronavirus in *Debank* town, Northwest Ethiopia, 2021(n = 538)

Variables	Knowledge		COR (95% CI)	AOR(95% CI)
	Good	Poor		
Age				
18-24	78	30	1.49(0.71-3.13)	1.12(0.48-2.61)
25-231	151	83	1.04(0.53-2.03)	0.92(0.43-1.96)
32-38	93	59	0.90(0.45-1.81)	0.78(0.35-1.71)
≥39	28	16	1	1
Residence				
Urban	274	116	2.24(1.52-3.30)	2.12(1.40-3.20)*
Rural	76	72	1	1
Mother's education				
Non formal education	188	136	0.29(0.17-0.53)	0.89(0.36-2.24)
Primary school	53	23	0.51(0.25-1.06)	1.38(0.48-3.90)
Secondary school	45	13	0.76(0.34-1.8)	1.60(0.54-4.76)
Diploma & above	72	16	1	1
Husband's education				
No formal education	93	86	0.28(0.17-0.49)	0.50(0.24-1.03)
Primary school	100	58	0.44(0.25-0.77)	0.63(0.30-1.29)
Secondary school	63	21	0.76(0.39-1.49)	0.75(0.33-1.71)
Diploma & above	91	23	1	1
Mother's occupation				
Housewife	217	147	0.66(0.40-1.10)	0.85(0.50-1.46)
Employed	73	14	2.35(1.30-4.87)	1.66(0.58-4.74)
Private business	60	27	1	1
Husband's occupation				
Unemployed	64	83	0.31(0.20-0.48)	0.39(0.25-0.62)*
Employed	108	33	1.32(0.82-2.13)	0.96(0.57-1.61)
Merchant	178	72	1	1
Family income				
<3000	212	153	0.35(0.23-0.54)	0.53(0.32-0.85)*
≥3000	138	35	1	1
Pregnancy adverse outcome				
Yes	124	50	1.52(1.03-2.24)	1.28(0.83-1.96)
No	126	138	1	1

3.7. Factors Associated with Practice to Prevent COVID-19

The result of binary logistic regression analysis showed that age, level of education, occupation, residence, husband education, husband occupation, marital status, family income, and current pregnancy status were significantly associated with a good practice of COVID-19. In multivariable binary logistic regression analysis, age group, educational status, husband education, and husband occupation were statistically significant with respect to participants' level of practice to prevent COVID-19 infection.

Participants whose age group was found to be between 32 and 38 years old were nearly 2.5 times more likely to have sound knowledge of COVID-19 (AOR: 2.24; 95% CI: 1.02, 4.27) as compared to participants whose age was greater than or equal to 39 years.

Pregnant women who had completed secondary school had 2.33 times the odds of having adequate knowledge of COVID-19 (AOR: 2.33; 95% CI: 1.19, 4.55) compared to those who had not completed formal education. Similarly, their husbands who had attended diploma and above education were nearly three times more likely to have an adequate level of knowledge to prevent COVID-19 (AOR: 2.88; 95% CI: 1.35, 4.54) as compared to those who had not attended formal education. Furthermore, husbands who are civil servants had almost two times the odds of having an adequate level of knowledge about COVID-19 prevention (AOR: 1.94; 95% CI: 1.24, 3.03) than those who are unemployed (Table 6).

Table 6 Bivariable and multivariable analysis of factors affecting pregnant women’s practice to prevent against COVID-19 infection in *Debank* Town, Northwest Ethiopia, 2021(n = 538)

Variables	Practice		COR (95% CI)	AOR(95% CI)
	Good	poor		
Ages				
18-24	57	51	1.78(0.87-3.63)	1.68(0.78-3.59)
25-231	118	116	1.62 (0.84-3.22)	1.60(0.80-3.19)
32-38	85	67	2.02(1.02-4.00)	2.24(1.02-4.27)*
≥39	17	27	1	1
Residence				
Urban	190	200	0.67(0.46-0.98)	0.72(0.48-1.06)
Rural	87	61	1	1
Marital status				
Married	245	241	0.39(0.14-1.12)	0.45(0.15-1.30)
divorce	19	15	0.49(0.14-1.67)	0.50(0.14-1.81)
windowed	13	5	1	1
Mother’s education				
Non-formal education	166	146	1	1
Primary school	49	31	2.09(1.24-3.52)	1.05(0.62-1.79)
Secondary school	24	34	0.67(1.38-1.18)	2.33(1.19-4.55)*
Diploma and above	38	50	0.72(0.45-1.16)	0.91(0.45-1.83)
Husband’s education				
No formal education	82	101	1	1
Primary school	81	72	1.39(0.90-2.13)	1.54(0.98-2.43)
Secondary school	45	39	1.42(0.85-2.87)	1.66(0.95-3.90)
Diploma and above	69	49	1.74(1.09-2.77)	2.88(1.35-4.54)*
Mother’s occupation				
Housewife	194	170	0.97(0.61-1.55)	0.85(0.50-1.46)
Employed	36	51	0.60(0.33-1.10)	1.66(0.58-4.74)
Private business	47	40	1	1
Husband’s occupation				
Unemployed	95	52	1	1
Civil servant	55	86	1.41(0.93-2.14)	1.94(1.24-3.03)
worked at private sector	127	123	0.57(0.38-0.87)	0.51(0.30-0.82)*
Family income		365		
<3000	200	165	1.51(1.05-2.18)	1.12(0.72-1.75)

≥3000	77	96	1	
Pregnancy status				
Wanted	32	19	1.66(0.92-3.02)	1.55(0.84-2.82)
Unwanted	245	242	1	1

NB: The Hosmer and Lemeshow model fitness test p-value was 0.821, VIF was 1.06-2.58, Standard err >2.1, 1 = Reference category,* = statistically significant at p<0.001

4. Discussion

Presently, COVID-19 has spread rapidly throughout different countries and has become a major global health concern. Presently, COVID-19 has spread rapidly throughout different countries and has become a major global health concern. Pregnant women and those who have had a negative pregnancy outcome should be especially cautious. Thus, assessed Knowledge and attitude of and their factors were necessary to prevent and control the pandemic disease of COVID-19 perversion measures.

According to this study, the level of good knowledge was (67.3%) (95% CI: 63.0, 71.0%). This finding is lower than that of the studies done in Nigeria (81.4%)[25], Iran (90)[24] and Tanzania (84.4%) [26]. This discrepancy might be due to differences in socio-demographic characteristics, study setting, study participants, and healthcare systems of the countries involved in creating awareness regarding the infection. However, it was significantly higher than the findings from community-based cross-sectional studies conducted in other parts of Ethiopia; Guraghe Zone Hospitals (54.8%)[27], and Debre Tabor Northwest Ethiopia (46.8%)[20]. This difference might be due to the time of the studies conducted in which information delivery and awareness creation programs about the pandemic are ongoing and improving from time to time. For this reason, practices were expected to be low at the beginning of the pandemic. The other reason might be that this result in enough access to updated information related to COVID-19, differences in assessment tools used for knowledge and time of data collection.

The level of desirable attitude for the prevention of COVID-19 in Ethiopia was 43.0% with (95%, CI: 42.6%, 50.6%), which was higher than the studies conducted in South Africa (30.0%)[28] and in Nigeria (20.2%)[25], but much lower than the studies conducted in Iran (57%)[24] and China (59.5%)[29]. The possible explanation might be due to the differences in the level of education of the respondents; more than two-thirds (58.7%) had not completed college and above, while only 59.4% of our study respondents had completed college and above[29]. This disparity might be attributed to variation in study participants since our participants were only pregnant women, while the participants in China were healthcare professionals who were on the front line of the infection.

This study showed that only 23.4% of study participants accepted the use of the COVID-19 vaccine. This finding is higher than that of the studies in China (91.3%)[30] and South Africa (81.6%)[31]. This might be due to the difference might be in access to health care services, awareness of the prevention mechanisms of COVID-19, and study population differences. On the other hand, public health measures are new and it may take time to adapt to new Ethiopian norms. Based on our study findings, the level of good practice to prevent COVID-19 was 51.6%, with (95% CI: 47.0%, 55.9%) of the pregnant women. This finding was significantly higher than the finding reported from a study in Wollega Zones, Ethiopia (43.6%) [22]. The possible explanation for this difference is that the sample size was larger than that of the study participants. However, the current study was similar to a community-based cross-sectional study in Debre Tabor Town, Northwest Ethiopia (47.6%) [20]. This discrepancy could be attributed to the study differences in methodology and study time since this study was done after practicing precautionary measures against COVID-19.

Regarding the factors, the current study revealed that urban residents had an increased level of knowledge of COVID-19 than rural residents. This is similar to a study done in China[29]. This might be due to the fact that the main ways of accessing information in urban areas of Ethiopia are through the news (television and radio) and health care workers. When health information is delivered timely and resourcefully, the tendency to use such information is increased. Participants who were unemployed had a poor knowledge index. This finding was supported by a study conducted in Egypt [32]. A possible explanation might be that unemployed participants may have lower education attainment, which might have less influence on their knowledge levels than merchant occupations. These also employed participants might have information from different individuals, which positively affects the awareness regarding the outbreaks. Participants who had less than 3000.0 Ethiopian birr earned were less knowledgeable about preventing COVID-19 infections than their counterparts. This might be the reason it's less affordable to buy some preventive measures like soap, alcohol-based hand sanitizer, and face masks that are used to prevent the spread of COVID-19 infections from person to person.

The result of this study revealed that being in the age category of 32–38 years had an increased good level of practice towards COVID-19 prevention than being older than or equal to 39 years. This finding is not consistent with a study done in Wollega Zones, Ethiopia[22]. This might be due to a middle-aged population group being more likely to maintain a new lifestyle. This study reported that the odds of having a good practice of COVID-19 prevention were higher among participants who had attended secondary school than those who had non-formal education status. This finding is supported by a study in Debre Tabor[20]. This might be due to more educated participants having a better understanding of control measures and preventive strategies related to COVID-19, and the capacity to practice recommendations to protect COVID-19 will rise. In addition, those who could read and write had an opportunity to get information through reading. Lastly, the study found that civil servant husbands' occupations had better knowledge of COVID-19 and was found to be associated with the good practice of precautionary measures against COVID-19. The findings were consistent with those of a similar study conducted among pregnant women in South Africa[33].

Limitations of this study

Our study has several limitations. Firstly, it may not explain the level of knowledge, attitude, and practice at the community level, and the current study was conducted in a single period during the COVID-19 outbreaks. Secondly, a random selection from the general population was not available. Thirdly, all participants were recruited from maternal hospitals, which may introduce selection bias.

5. Conclusions

Our findings have indicated that the prevalence of good knowledge, desirable attitudes, and good practice among pregnant women were still low. For urban residents, husbands' occupation and family income were significantly associated with having good knowledge, and age group, educational status, husband's education, and husband's occupation were also significantly associated with having good practice. Healthcare providers should provide health education to pregnant mothers during antenatal care visits and disseminate leaflets regarding the COVID-19 preventive measures. Besides, during the starts of antenatal care, healthcare workers should provide preventive measures towards COVID-19 prevention and increase awareness to control the pandemic in the study area. It is also recommended that mixed-method research, program evaluations, and longitudinal research efforts be undertaken to explore and address the effect of COVID-19 on pregnancy and pregnancy outcomes.

List of abbreviations

ANC: Antenatal Care, COVID-19: Coronavirus disease-19, AOR: Adjusted Odds Ratio; CI: Confidence Interval; COR: Crude Odds Ratio; SARS: Severe Acute Respiratory Syndrome, SPSS: Statistical Package for Social Sciences, TV: Television; WHO: World Health Organization.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare that they have no conflicts of interest in this work.

Authors' contributions

AMZ participated in designing the study, performed the data collection and statistical analysis, and was the lead author of the paper GMB participated in data analysis and revised subsequent drafts of the paper. All the authors read and approved the final manuscript

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Ethical approval and consent to participate

The research was conducted after an ethical approval letter was given from the research and ethical committee department of nursing, at Real Dream university of College (Ref DN/04/2013). In addition, after explaining the importance of the study, permission letters were taken from each of the head of health facility, and informed consent was obtained from each study participant. Names or specific addresses of the study participants were coded and kept anonymous, and confidentiality was assured. Their rights to refuse to participate, to refuse to answer any or all questions, and to leave the interview at any time were respected. Patients and/or the public were not involved in the design, conduct, reporting, or dissemination plans of this research.

Availability statement

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

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