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Knowledge And Preventive Practice Towards Covid-19 Infection Among Pregnant Women In Public Hospitals Addis Ababa, Ethiopia, 2022

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Abstract

Background

The novel coronavirus COVID-19 has created massive challenges to public health worldwide. Pregnant women are an immune-depressed status which makes pregnant women generally more vulnerable to COVID-19 infection and severe illness. The present preventive measure practices have gaps. Therefore, the current study aimed to present accurate and latest information regarding preventive measures for COVID-19 infection among pregnant women.

Methods and materials

Institution-based cross-sectional study design was conducted on 422 pregnant women in public hospitals in Addis Ababa using a pretested structured questionnaire. Face-to-face interview on pretested and structured questions was conducted to collect the data between January 12 and February 15, 2022. The collected data were entered into Epi data version 4.4.2.2 and exported to SPSS window version 25 for analysis. Descriptive statics and multivariable logistic regression were analyzed. Odds ratio with a 95% confidence interval and p-value ≤ 0.05 were declared statistical significance independent variables.

Result

A total of 418 pregnant women participated, and the response rate was 99.05%. About 417 (99.8%) pregnant women reported never hearing about COVID-19. Of those who heard about COVID-19, only 49% and 54.3% had good knowledge and had good practice towards COVID-19 infection respectively. Age (26-30yrs (AOR=0.46, 95%CI: 0.014,0.12), no education (AOR=0.23, 95%CI: 0.099-0.52), Primary school (AOR=0.199, 95%CI: 0.104-0.4) and Secondary school (AOR=0.282, 95%CI: 0.14-0.55), divorced (AOR=0.15, 95%CI: 0.065-0.34) and widowed (AOR=0.16, 95%CI: 0.024-1.03)) were factors that associated with

knowledge towards COVID-19 infection. Age (30-35yrs (AOR=0.334, 95%: 0.115-0.97) and ≥36yrs (AOR=0.28, 95%CI: 0.11-0.69)), no education (AOR=0.06, 95%CI: 0.019-0.18), being a civil servant (AOR= 0.28, 95%CI: 0.122-0.66), divorced (AOR=0.042, 95%CI: 0.01-0.18), having ≥4 family size (AOR=0.334, 95%CI: 0.169-0.66), no previous complication of pregnancy outcomes (AOR=0.019, 95% CI: 0.01-0.061), chronic health problem (AOR=14.66, 95%CI: 0.457-39.4) and two ANC visit (AOR=5.704, 95%CI: 2.41-13.5) were factors that associated with the practice towards COVID-19.

Conclusion

In this study area, only half of pregnant women had good knowledge and good practice about covid-19 infection prevention measures.

Introduction

Coronavirus disease (COVID-19) is an infectious disease caused by a virus, officially named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)(1). World Health Organization (WHO) declared the coronavirus 2019 (COVID–19) pandemic on 11 March 2020, after 11 days of being declared a public health emergency. COVID-19 has been reported as a continuing global epidemic since its first appearance in December 2019 in Wuhan City, China (1).

COVID-19 is right now a global health threat and public health emergency of worldwide concern. The infection has outreached nearly all over the world where the overall affirmed number of cases is more than 172 million and over 3 million deaths have been reported globally due to COVID-19 until Jun 8, 2021(2).

Africa is the final landmass to be hit by this pandemic; however, it is anticipated to be the most vulnerable continent and around 3,563 825 cases and 88274 deaths were reported until Jun 8, 2021(3). Ethiopia has become among the COVID-19-influenced nations as of March 13, 2020, the date on which one imported case was first identified. According to the WHO, the number of affirmed cases in Ethiopia reached 272 805 cases and 6,804 deaths as of the December 8, 2021 report. COVID-19 contains a devastating impact on social, financial, and political crises that will leave profound scars on casualties of the virus(4).

Pregnant women are particularly susceptible to respiratory pathogens because of their immune suppressive state and physiological adaptive change during pregnancy(5). Having poor preventive practices for infection among pregnant women might bring an obstructed impact on the supportive treatment at home for their family and, it increases the spread of the pandemic(4). Evidence shows that proper infection prevention and control (IPC) measures during outbreak management could change the course of the outbreak(6). Pregnant mothers are at risk of COVID-19 infection and they need counselling about control and prevention measurements(7).

Pregnant individuals are encouraged to take all available precautions to avoid exposure to COVID-19 and optimize health including. The first case of COVID-19 was reported in Ethiopia in March 2020 and as of December 6, 2021, Ethiopia reported 6804 deaths and 372, 334cases. In addition to the recommendations of WHO, Ethiopia implemented the '3 Ts' (i.e. test, treat and trace) approach and lockdowns in parts of the country to curb the spread of the virus. Since the beginning of COVID-19 preventive measures, the level of knowledge of these measures has not been reported in Ethiopia, particularly among pregnant women who are considered vulnerable(5). And so, to the best literature

search, few studies were conducted on the level of infection prevention practice of healthcare workers and other stakeholders to provide evidence-based information for pregnant mothers. Thus, this study aimed to assess the level of infection prevention practices and associated factors towards COVID-19 among pregnant mothers in four public hospitals in Addis Ababa, Ethiopia.

Methodology

Study area and period

The study was conducted in Addis Ababa, from February 15 to March 19. Addis Ababa is the capital city of Ethiopia. It has 11 sub-city and headquarters of Africa Union. The current metro population of Addis Ababa in 2022 is 5,228,000 which is located in the center of Ethiopia. There are around 16 public hospitals and 22 private hospitals in Addis Ababa. All hospitals provide comprehensive emergency obstetric care services in the city. Moreover, there are about 100 health centers that provide basic emergency obstetric care services in Addis Ababa.

Study Design

The institutional-based cross-sectional study was employed

Source Population

All pregnant women who were attending antenatal care (ANC) at public hospitals in Addis Ababa during the data collection period.

Study Population

Those pregnant women who were attending ANC at selected public hospitals during the data collection period were included in the study.

Inclusion criteria

All pregnant women who are on antenatal care follow-up in selected public hospitals were included in the study.

Exclusion criteria

Pregnant mothers who are seriously ill during data collection

Sample size determination

The sample size was determined by single population proportion with the following assumptions: Since this study was the first of its type in Addis Ababa P = 50% was taken, with a 5% margin of error, and 95% confidence interval and the final sample size was 422.

Sampling technique

The sampling procedure started by identifying public health hospitals in Addis Ababa and four public hospitals was randomly selected by lottery methods and included in the study, these include Abebech Gobena Maternal and child health memorial hospitals, St' Peter specialized hospital, Minliik II Hospital and Gandhi Memorial Hospital. The sample sizes for each school were allocated by using the proportional allocation formula.

Operational definitions

Good knowledge: Participants who scored greater than or equal to the mean score(8).

Poor knowledge: Participants who score less than the mean score(8).

Good practice: Participants who scored greater than or equal to the mean score(8).

Poor practice: Participants who scored less than the mean score(8).

Study variables

Dependent variable

- Knowledge towards Covid19
- Practices towards Covid19 prevention measure

Independent variable

Socio-demographic (age, marital status, occupational status, religion), obstetric and reproductive factors (parity, gravidity, history of ANC)

Data collection tool and procedure

An interviewer-administered based questionnaire on the practice and knowledge of coronavirus infection preventive measures was used for data collection among pregnant women during ANC follow-up. The questionnaires were developed following a review of the literature and world health organization recommendations on the measures to prevent human-to-human transmission of COVID-19 infection.

The questionnaire was adopted from different literature published in English and contextualized to local situations. The adopted questionnaire was translated into the locally spoken Amharic language and pre-tested at Tirunesh Beijing Hospital where different from the study area. The validity of the tool was evaluated by comparing the consistency between the original and re-translated versions of the tool. After the pretest, the order of questions was rearranged, and modified by replacing and adding more choices by consulting research experts. The questionnaires contain four parts: sociodemographic data, obstetric history data, and knowledge and practice questions. The questionnaires have a 15-item scale for knowledge assessment questions and a 10-item scale for practice questions. The scoring system of women's knowledge and practice was either 1 (for correct answer) or 0 (for incorrect answer). The maximum score for knowledge and the practice component of the question is 1 for each question whereas the minimum score is 0 for both knowledge and practice questions related to COVID-19 infections among pregnant mothers. Data were collected by four trained BSc midwives using an interviewer-administered structured questionnaire.

Data collectors

Data were collected by four trained BSc midwives using an interviewer-administered structured questionnaire.

Data processing and analysis

The collected data was tallied manually and entered into the Epi-data manager and exported to SPSS version 25 for statistical software. An exploratory analysis was carried out to determine the nature of data such as normality, the presence of outliers, and missing values. Before data analysis, we had got that the data was normally distributed based on the Shapiro-Wilks test. Then, the data were described using relative frequency and per cent for categorical variables. Continuous variables were also expressed by mean and standard deviation. Frequency and percentage were to describe the socio-demographic, reproductive and obstetric characteristics, knowledge and practice of the participants. The final report was expressed by tables and graphs. Finally, only those independent variables that maintain their association with outcome variables in multivariable logistic regressions (p-value <0.05) were used to

construct the final models. The odds ratio with its p-value and confidence interval were reported in each logistic regression analysis. For measuring the strength of the association between the outcome and independent variables, Crude Odd Ratio (COR) and Adjusted Odd Ratio (AOR) along with a 95% Confidence interval (CI) were calculated.

Data quality control

The questionnaires were prepared in English and translated to Amharic languages and re-translated to English. The tools were pre-tested before the actual data collection among 20 pregnant women at Tirunesh Beijing Hospital, which was not included in the final study analysis. The training was given to 4 BSc midwifery data collectors and 1 supervisor for one-day duration. The data collection process was supervised by principal investigators and trained supervisors. The filled questionnaires were randomly checked for completeness and consistency.

Ethical considerations

Ethical clearance was obtained from the Kotebe Metropolitan University institutional research ethics board with the reference number **አጦ5/38/12/6083**. A formal letter from the research ethics board was submitted to the Addis Ababa health office and concerned bodies to obtain their cooperation. Then a letter of permission and support was written to each respective public hospital. Study subjects were informed about the study's purpose. At the time of data collection, written consent is taken from the participants to confirm whether they are willing to participate. Those unwilling to participate were allowed to do so. The confidentiality of responses was also ensured throughout the research process. The study was performed by the ethical standards of the Helsinki Declaration.

Results

Socio-demographic characteristics of respondents

A total of 418 study subjects take part in this study making the response rate 99.05%. In this study, the maximum age of the participant was 44 and the minimum age was 20 with a mean and standard deviation of 29.89±5.438. The majority (48.3%) of the participant's age group was 26-30 years followed by greater than or equal to 35 years which accounted for 20.6%. Most of the participant's educational status was completed primary school which accounted for 32%. From the study subjects about half of the participants were Orthodox in religion 51.2% and most of them have occupational status as a housewife (41.1%) (Table1).

Obstetric Characteristics related variables

In this study the majority (67.0%) of the subjects were multigravida and the rest 33.0 % were Primigravida. In more than three-quarters (80.6%) of the women the current pregnancy was wanted. Eighty-one (19.4%) of the study participants had previous pregnancy-related complications and sixty-two (14.8%) of the participants had current pregnancy-related complications. Ninety-Six (22.9%) of the study participants had a history of chronic disease (Table 2).

Knowledge related variables

About 417 (99.8%) pregnant women reported never hearing about COVID-19. Of those 195 who had ever heard about COVID-19 315(%) heard from mass media (TV 49.2%, Internet 31.75%, and Radio 19.04%), 120(24.5%) heard from a health care provider and 25(11.8%) heard from friends was the source of information. Around 49% of the respondents have good knowledge towards Covid-19 (Figure 1) (Table 3).

Table 1. Distribution of Socio-demographic characteristics of respondents in relation to knowledge towards COVID-19 among pregnant mothers ANC follow up at public hospitals in Addis Ababa, Ethiopia, 2022.

Variables	Category	Frequency	Percent
Age	20-25yrs	74	17.7%
	26-30yrs	202	48.3%
	30-35yrs	57	13.6%
	≥ 36yrs	85	20.6%
Religion	Orthodox	214	51.2%
	Muslim	108	25.8%
	Protestant	87	20.8%
	Others	9	2.2%
Marital status	Married	348	83.3%
	Divorced	55	13.2%
	Widowed	7	1.7%
	others	8	1.9%
Educational level	Illiterate	66	15.8%
	Primary school	137	32.8%
	Secondary school	105	25.1%
	College diploma and above	110	26.3%
Occupation	House wife	172	41.1%
	Civil servant	151	36.2
	Private business	95	22.7%
Family size	≤4	211	50.5%
	> 4	207	49.5%

Table 2. Obstetrics Characteristics of Pregnant Women Attending Antenatal Care in public hospitals, Addis Ababa, Ethiopia 2020 (N=418).

Variables	Category	Frequency	Percentage
Gravidity	Primigravida	138	33.0%
	Multigravida	280	67.0%
Parity	Nulliparous	138	33.0%
	Primipara	202	48.3%
	Multipara	78	18.7%
Condition of pregnancy	Wanted	337	80.6%
	Unwanted	68	16.3%
	Mistimed	13	3.1%
Previous complication of pregnancy outcomes	Yes	81	19.4%
	No	337	80.6%
Chronic health problem	Yes	96	22.9%
	No	322	77.1%
Types of chronic disease	DM	37	8.9%
	Hypertension	42	10.0%
	Cardiac disease	11	2.6%
	Others	6	1.4%
No of ANC visit	One	64	15.3%
	Two	162	38.8%
	Three	94	22.5%
	Four	98	23.4%
Current pregnancy complication	Yes	62	14.8%
	No	356	85.2%

Table 3. Distribution of questions to assess the knowledge towards COVID-19 among ANC follow up pregnant mothers in public hospitals of Addis Ababa, Ethiopia, 2022 (n=418).

Variables on knowledge questions	Response N (%)	
	Yes	No
Have ever heard about COVID-19	**417(99.8)**	**1(0.2)**
COVID-19 is viral disease	82(19.6)	336(80.4)
Respiratory droplets and close contact are the main transmission route of the infection	376(90.0)	42(10.0)
Incubation period of COVID-19 is 2–14 days	298(71.3)	120(28.7)
All peoples are generally susceptible for COVID-19 Infection	328(78.5)	90(21.5)
Fever is a symptom of COVID-19	365(87.3)	53(12.7)
Dry cough is a symptom of COVID-19	383(91.6)	35(8.4)
Headache is a symptom of COVID-19	357(85.4)	61(14.6)
Runny nose is a symptom of COVID-19	346(82.8)	72(17.2)
Sore throat is a symptom of COVID-19	384(91.9)	34(8.1)
Difficulty of breathing is a symptom of COVID-19	367(87.8)	51(12.2)
Stay at home and wearing face mask can prevent transmission of COVID-19	312(74.6)	106(25.4)
People with co-existing disease and smokers had poor prognostic outcomes if they are infected with COVID-19.	116(27.8)	302(72.2)
Person with COVID-19 can transmit the virus to others without development of signs and symptoms	264(63.2)	154(36.8)
Pregnant women are at high risk than others if infected with COVID −19	274(65.6)	144(34.4)

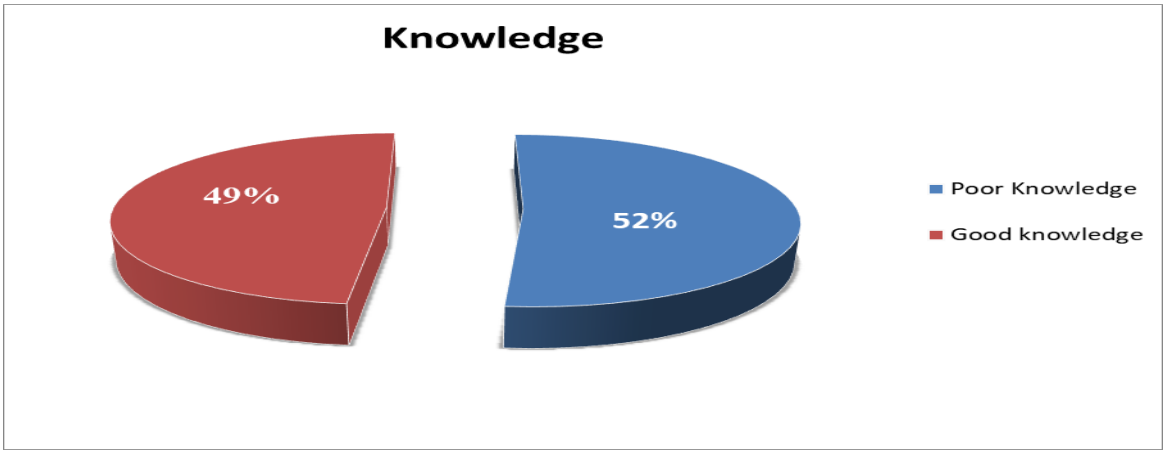

Figure 1. Knowledge towards Covid-19 infection among pregnant women in public hospitals, Addis Ababa, Ethiopia, 2022.

Preventive practice levels of COVID-19 infection

The pregnant women's responses regarding preventive practice against COVID-19 infection was wearing a face mask regularly (89.1%), frequent hand washing and using sanitizers (87.1%), wearing a face mask when having flu-like symptoms (86.1%), avoiding hand contact having cough (73.9%) and keeping physical distancing (73.7%). The women participating in this study responding show that 54.8% of them were Reporting COVID-19 symptoms to health facilities but the remaining 45.2% did not report to the facility (Table 4).

Table 4. Distribution of questions to assess the preventive practice towards COVID-19 infection among ANC follow up pregnant mothers in public hospitals of Addis Ababa, Ethiopia, 2022 (n=418).

Variables on practice questions	**Response**	
	Yes	**No**
Wash your hands or sanitize your hands	364(87.1)	54(12.9)
Regularly use facemask	373(89.2)	45(10.8)
Use facemask when you have flu-like symptoms	360(86.1)	58(13.9)
Use non-conventional remedies (Honey, garlic, ginger and lemon) when you have flu-like symptoms	345(82.5)	73(17.5)
Have you worn a face mask when leaving your home	330(78.9)	88(21.1)
Avoid close contact with people having cough	309(73.9)	109(26.1)
Avoid unnecessary close contact and practice social distancing and keep at least 1-m distance	244(58.4)	174(41.6)
Stay at home /work from home	269(65.4)	149(35.6)
Report COVID-19 symptom to health facility	229(54.8)	189(45.2)
Avoid going to social gathering (holiday, special celebration)	221(52.9)	197(47.1)

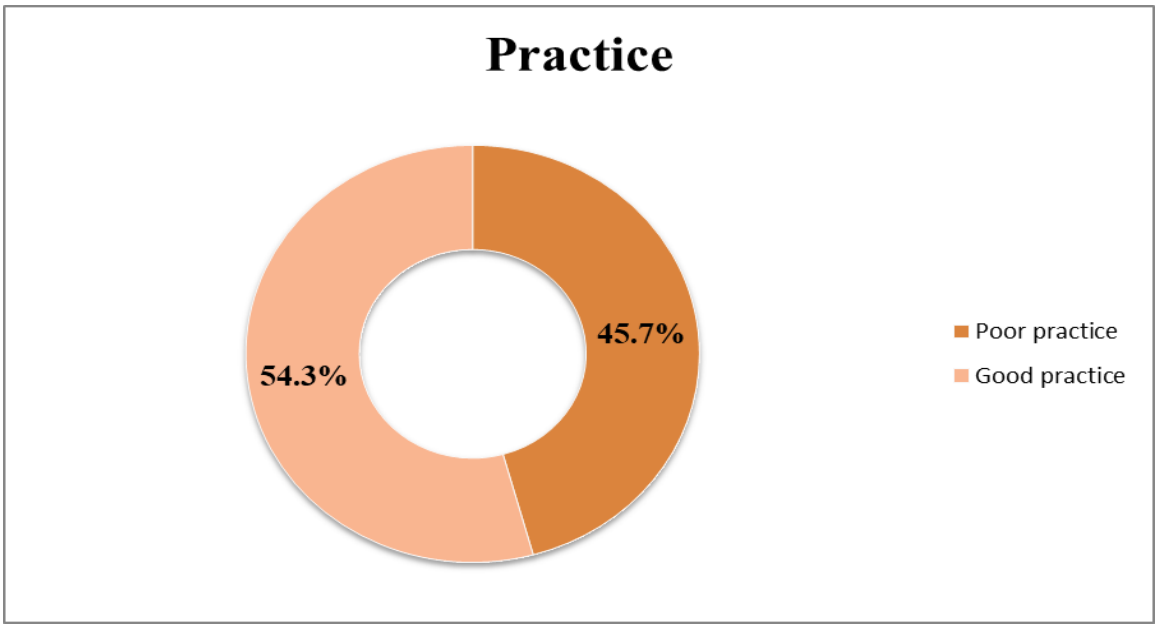

Figure 2. Practice towards Covid-19 among pregnant women in public hospitals, Addis Ababa, Ethiopia, 2022.

The prevalence of poor practice was found to be 45.7% whereas 54.3% had good practice towards preventive practice against COVID-19 infection. Hence, just 54.3% of study participants practiced COVID-19 infection prevention measures under scientific recommendation (Figure 2).

Factors associated with knowledge towards covid-19 infection

In bivariate logistic analysis age, education, occupation, marriage, gravidity, parity, condition of pregnancy, previous complication of pregnancy outcomes, and number of ANC visits were significantly associated with knowledge towards covid-19 infection with a p-value of < 0.2. In multivariable logistic regression 26-30yrs (AOR=0.46, 95%CI: 0.014,0.12), 30-35yrs (AOR=0.093, 95%CI: 0.037-0.24),≥36yrs (AOR=0.482, 95%CI: 0.234-0.99), no education (AOR=0.23, 95%CI: 0.099-0.52), Primary school (AOR=0.199, 95%CI: 0.104-0.4), Secondary school (AOR=0.282, 95%CI: 0.14-0.55), divorced (AOR=0.15, 95%CI: 0.065-0.34) and widowed (AOR=0.16, 95%CI: 0.024-1.03) were statistically significant (Table 5).

Factors associated with preventive practice levels of covid-19 infection

In bivariate logistic analysis age, education, occupation, marriage, family size, previous complication of pregnancy outcomes, chronic health problems and number of ANC visits were significantly associated with preventive practice levels of covid-19 infection with a p-value of < 0.2. In multivariable logistic regression 30-35yrs (AOR=0.334, 95%: 0.115-0.97),≥36yrs (AOR=0.28, 95%CI: 0.11-0.69), no education (AOR=0.06, 95%CI: 0.019-0.18), occupation (Civil servant) (AOR= 0.28, 95%CI: 0.122-0.66), marital status (divorced) (AOR=0.042, 95%CI: 0.01-0.18), family size (AOR=0.334, 95%CI: 0.169-0.66), previous complication of pregnancy outcomes (AOR=0.019, 95%CI: 0.01-0.061), chronic health problem (AOR=14.66, 95%CI: 0.457-39.4) and number of ANC visit (two) (AOR=5.704, 95%CI: 2.41-13.5) were statistically significant (Table 6).

Discussion

In this study, the proportion of pregnant women who had good knowledge towards COVID-19 prevention measures was 49% (95% CI 45%-54%). This finding is consistent with the study done in Debre Tabor Town(8). But this finding is lower than studies conducted in Northern Ghana, (10) Wollega zones (11). And it is higher than the study conducted in South Africa (12) This difference is probably associated with variations in socio-demographic characteristics and study setting.

The preventive practice in the present study indicated that 54.3% (95% CI 49.3%-59.3%) of them were practicing well towards preventive measures for COVID-19. It is higher than the study conducted in Debre Tabor showed that 47.6% of participants have good practices towards COVID-19(8). This may be due to a variation of individual beliefs on preventive measures among pregnant mothers. But it is lower than the study conducted in Iran where 98.92% of study participants had good practice towards COVID-19. This might be due to our study participants having a high rate of not being educated compared with Iranian(13) and probably associated with variations in socio-demographic characteristics, study setting

Participants whose age group was 26-30yrs, 30-35yrs and > 36yrs are 54, 90.7, and 51.8 times less likely to have good knowledge about COVID-19 when compared to participants whose ages were 20-25yrs. This is consistent However, a study done in Debre Tabor revealed that participants whose age group was found between 15 and 24 years were nearly five times more likely to have a sound knowledge about COVID-19 as compared to participants whose ages were greater than or equal to 35 years(8). However,

Table 5. Factors associated with knowledge towards Covid-19 infection in bivariate and multivariate analysis among pregnant women in public hospitals, Addis Ababa, Ethiopia, 2022.

Variable	Knowledge (N=418)		COR (95% C.I.)	AOR (95% C.I.)	P-value
	Good	Poor			
Age					
20-25yrs	44	30	1	1	
26-30yrs	116	86	0.92(0.535-1.58)	0.460(0.237-0.89)	0.022*
30-35yrs	10	47	0.145(0.064-0.33)	0.093(0.037-0.24)	0.000*
≥ 36yrs	43	42	0.698(0.372-1.31)	0.482(0.234-0.99)	0.047*
Education					
No education	23	43	0.149(0.076-0.29)	0.23(0.099-0.52)	0.000*
Primary school	64	73	0.245(0.139-0.43)	0.199(0.104-0.4)	0.000*
Secondary school	40	65	0.172(0.094-0.31)	0.282(0.14-0.55)	0.000*
College diploma and above	86	24	1	1	
Marital status					
Married	198	150	1	1	
Divorced	11	44	0.189(0.095-0.38)	0.15(0.065-0.34)	0.000*
Widowed	2	5	0.303(0.058-1.58)	0.16(0.024-1.03)	0.000*
others	2	6	0.253(0.05-1.27)	0.33(0.061-1.73)	0.054
Gravidity					
Primiparous	55	83	1	1	0.839
Multiparous	158	122	0.512(0.338-0.78)	0.92(0.414-2.04)	
Condition of pregnancy					
Wanted	183	154	1	1	
Unwanted	22	46	0.402(0.23-0.699)	0.812(0.36-1.85)	0.619
Mistimed	8	5	1.346(0.432-4.2)	3.398(0.85-13.6)	0.084
Previous complication of pregnancy outcomes					
Yes	35	46	1	1	
No	178	159	1.47(0.902-2.399)	0.704(0.33-1.49)	0.358
No of ANC visit					
One	23	41	0.539(0.282-1.03)	0.94(0.348-2.52)	0.894
Two	87	75	1.114(0.674-1.84)	1.51(0.748-3.05)	0.251
Three	53	41	1.241(0.703-2.19)	0.954(0.452-2.014)	0.901
Four	50	48	1	1	

*significantly associated with P-value <0.05, COR=Crude odd ratio

Table 6. Factors associated with practice towards Covid-19 infection in bivariate and multivariate analysis among pregnant women in public hospitals, Addis Ababa, Ethiopia, 2022.

Variable	Practice(N=418)		COR (95% C.I.)	AOR (95% C.I.)	P-value
	Good	Poor			
Age					
20-25yrs	38	36	1	1	0.000
26-30yrs	73	129	1.865(1.088-3.197)	1.326(0.616-2.86)	0.471
30-35yrs	34	23	0.714(0.355-1.436)	0.334(0.115-0.97)	0.045*
≥ 36yrs	46	39	0.895(0.479-1.671)	0.28(0.110-0.69)	0.007*
Education					
No education	46	20	0.337(0.176-0.642)	0.06(0.019-0.18)	0.000*
Primary school	41	96	1.813(1.072-3.065)	1.234(0.53-2.88)	0.627
Secondary school	56	49	0.677(0.396-1.16)	0.85(0.373-1.93)	0.695
College diploma and above	48	62	1	1	0.000
Occupation					
House wife	64	108	1.23(0.734-2.05)	1.81(0.69-4.71)	0.225
Civil servant	87	64	0.54(0.32-0.9)	0.28(0.122-0.66)	0.004*
Private business	40	55	1	1	0.000
Marital status					
Married	144	204	1	1	0.000
Divorced	45	10	0.16(0.08-0.32)	0.042(0.01-0.18)	0.000*
Widowed	0	7	114033518(0.00)	3398139(0.000)	0.999
others	2	6	2.12(0.42-10.64)	0.59(0.099-3.45)	0.554
Family Size					
≤ 4	115	96	0.484(0.327-0.716)	0.334(0.169-0.66)	0.002*
> 4	76	131	1	1	0.000
Parity					
Nulliparous	80	58	0.96(0.546-1.69)	1.04(0.386-2.804)	2.813
Primiparous	101	101	0.696(0.41-1.18)	0.54(0.208-1.4)	1.391
Multiparous	46	32	1	1	0.000
Previous complication of pregnancy outcomes					
Yes	24	57	1	1	0.000
No	167	170	0.43(0.25-0.723)	0.019(0.01-0.061)	0.000*
Chronic health problem					
Yes	41	35	1	1	0.000
No	150	192	1.499(0.91-2.47)	14.66(0.457-39.4)	0.000*

No of ANC visit					
One	38	26	1.178(0.618-2.25)	1.105(0.34-3.56)	0.867
Two	44	118	4.62(2.699-7.903)	5.704(2.41-13.5)	0.000*
Three	47	47	1.722(0.968-3.07)	0.87(0.37-2.061)	0.753
Four	62	36	1	1	0.000
Knowledge					
Good knowledge	104	101	1	1	0.000
Poor knowledge	123	90	1.327(0.902-1.95)	0.941(0.529-1.67)	0.835

*significantly associated with P-value <0.05, COR=Crude odd ratio

studies done in low-resource Africans, aged older than 40 years are 81% less likely to have inadequate knowledge compared to those < 30 years (14). This could be due to the younger population being closer to social media, so they will have more information.

In this study, education is significantly associated with knowledge about COVID-19. Pregnant mothers with no education, in primary school and secondary school are 77%, 80.7%, and 71.8% less likely to have good knowledge about COVID-19 when compared to participants whose education level is college and above. Another study also revealed that those with no formal education were 6.3 times more likely to have inadequate knowledge than those with a tertiary education level (14). This could be due to those who are college and above are closer to updated information and they have a greater ability to interpret information that has been transmitted.

The finding of these studies revealed that marital status is significantly associated with knowledge about COVID-19. Pregnant mothers who are divorced, widowed and other (single) are 85%, 84%, and 66% less likely to have good knowledge about COVID-19 when compared to participants who are married. But this was not significant in the studies done in Debre Tabor town and Wollega zone (8)(11). This indicates that being married will improve the likely hood of sharing and interpreting information.

The finding of these studies revealed that women aged 30-35 years and ≥ 36yrs 66.6% and 72% less likely to engage in good COVID-19 preventive practices respectively than those aged 20-25yrs. This finding was consistent with a study done in Guraghe, those aged 20–24, 25–29 and 30–34 were 1.22, 1.32 and 2.57 times more likely to practice COVID-19 preventive measures(9). Young age women are more likely to engage in good COVID-19 preventive practices (10,11,14). This may be due to a younger population being more likely to adopt a new lifestyle (11).

In this study, those who are divorced are 95.8% less likely to have good COVID-19 preventive practices than those who are married. However, another study revealed that married pregnant women are 2.99 times more likely to have poor COVID-19 preventive practices(14). Another study revealed that those who are single are more likely to engage in unsafe practices (15). This indicates that being married will improve the likely hood of sharing and interpreting information.

This study identified that educational status is significantly associated with good COVID-19 preventive practices. When compared to those who attend a college diploma and above, those who are not educated are 94% less likely to engage in good COVID-19 preventive practices. In another study, pregnant women with at least a primary education were also associated with good COVID-19 preventive practices (10,14).

The possible reason is illiterate women are not more exposed to health information, especially regarding COVID-19 and are therefore less likely to take positive measures to protect themselves against the disease.

According to these studies, occupation status is significantly associated with good COVID-19 preventive practices. Those who are civil servants are 72% less likely to engage in good COVID-19 preventive practices than those who engage in private business. A study done in Iran revealed that having health-care-related occupations was significantly associated with lower practice(15). According to the study done in Nigeria, occupations requiring physical contact (like farmer, artisan and trading) were the factors associated with poor practice of preventive measures(14). These might be due to the flexibility of their work in which those who have private business have the freedom to stop at any time they went and isolate themselves but civil servants are dependent on others so making their own decision regarding the preventive practices could be difficult.

This study identified that family size is significantly associated with COVID-19 preventive practice. Pregnant women who have a family size >4 are 66.6% less likely to have good COVID-19 preventive practices than those who have a family size $\leq$4. Once more, women having less than or equal to three children had a good level of practice. The possible explanation might be due as the number of children increases the family size may become crowded which makes it difficult to maintain the recommended distance(8). Besides, an increased number of children may negatively affect the economy of the family thus less affordable some preventive measures like soap, alcohol-based hand sanitizers, and face masks that are used to prevent the spread of COVID-19 from person to person(8). This might be due to; the crowdedness of the family size will make them focus on daily necessary things/accommodation instead of concerning about their health.

The previous complication of pregnancy outcomes is significantly associated with COVID-19 preventive practices. Pregnant women who don't have any complications no their previous pregnancy outcomes were 98.1 times less likely to engage in good COVID-19 preventive practices compared to those who have previous complications of pregnancy outcomes. But this was not significant in the study done in Debre Tabor town(8). Because it might be due to not knowing/experiencing the physical, mental and socioeconomic burden of pregnancy complications they will be careless on the COVID-19 preventive practice as well.

In this study, women who do not have a chronic disease were 14.6 times more likely to engage in good COVID-19 preventive practices compared to those who have a chronic disease. But another study revealed that women who had a chronic disease were more likely to engage in good COVID-19 preventive practices compared to those who have no chronic disease (9,10). It could be due to a loss of hope due to the effect of the disease on those who have chronic disease that they don't engage in good preventive practice.

Those pregnant women who have ANC visits two times are 5.704 times more likely to engage in good COVID-19 preventive practices compared to those who have ANC visits four times. It could be due to an increased rate of 2 times ANC visits. But a significant association was not seen between the number of ANC visits according to the study done in Northern Ghana(10).

Conclusion and recommendation

In this study area, only half of pregnant women had good knowledge and good practice about covid-19 infection. Age, education level and marital status were the factors associated with knowledge of pregnant

women towards covid-19 infection. Age, education level, occupation marital status, family size, previous complications of pregnancy outcomes, chronic disease, and number of ANC visits were the factors associated with Covid-19 preventive practices.

Based on the findings of the study, the following recommendations are forwarded

Promote health education dissemination programs regarding the COVID-19 pandemic.

Integrate health education with ANC follow-up care about COVID-19.

Recommended that another research is needed to be undertaken to explore and address the impact of COVID-19 on pregnancy and pregnancy outcomes.

Abbreviations

ANC stands for antenatal care: AOR stands for adjacent odd ratio and SPSS stands for Statistical Package for Social Science

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Conflicts of interest

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

Availability of data and materials

All the datasets for this study are available from the principal investigator and corresponding author upon request.

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