

Pregnant Women's Knowledge and Practice in Preventing Coronavirus Disease and its Associated Factors in the Dire Dawa Administration, Ethiopia

Aminu Mohammed^{1*} and Ahmedin Aliyi²

¹Department of Midwifery, Dire Dawa University, Ethiopia

²School of Nursing and Midwifery, Haramaya University, Ethiopia

*Corresponding Author

Aminu Mohammed, Department of Midwifery, Dire Dawa University, Ethiopia.

Submitted: 2023, Mar 31; Accepted: 2023, Apr 20; Published: 2023, Jun 02

Citation: Mohammed, A., Aliyi, A. (2023). Pregnant Women's Knowledge and Practice in Preventing Coronavirus Disease and Its Associated Factors in the Dire Dawa Administration, Ethiopia. *Int J Women's Health Care*, 8(1), 28-38.

Abstract

Background: Severe acute respiratory infections are a group of respiratory tract infections caused by a beta coronavirus (SARS-COV2). Corona Virus Disease ("COVID-19") is a family of SARS caused by a novel coronavirus that has recently spread rapidly throughout the world. The literature reveals gaps in preventive measures for specific groups, such as pregnant women. Thus, this study was aimed at assessing this gap to help with interventions.

Methods: A cross-sectional study was conducted from May 1 to 30, 2022, in the Dire Dawa city administration, Ethiopia. A systematic random sampling technique was employed to select participants, and data were collected through face-to-face interviews using a pre-tested structured questionnaire. Data were entered and cleaned by Epi DATA (Version 3.1) and analyzed using SPSS (Version 22). A P-value < 0.25 at bivariate to select variables for multivariate and ≤ 0.05 at multivariate with 95% confidence intervals was considered statistically significant.

Results: A total of 404 participants were included, for a response rate of 96.4%. About 60.6 percent and 46.3 percent of pregnant women attending antenatal care (ANC) were knowledgeable and had good practice against COVID-19 prevention measures, respectively. The predictors for knowledge were urban residence (AOR = 0.10, 95% CI: 0.06–0.17), media exposure (AOR = 2.0, 95% CI: 1.17–3.40), antenatal care visits (AOR = 2.70, 95% CI: 1.33–5.35), and parity (AOR = 0.40, 95% CI: 0.18–0.88). While urban residence (AOR = 6.60, 95% CI: 4.01–10.90), low income (AOR = 0.60, 95% CI: 0.37–0.93), and wanted pregnancy (AOR = 1.75, 95% CI: 1.01–3.04) were predictors for practice.

Conclusion: Knowledge of pregnant women on COVID-19 was moderate compared to other studies, but their prevention practice was poor. Increased health education programs about COVID-19 were recommended for both urban and rural areas, as well as at hospital ANC wards.

Keywords: COVID-19, Knowledge, Practice, Pregnant, Women

Abbreviations

SARS: Severe Acute Respiratory Syndrome

COVID 19: Corona Virus Diseases 2019

ANC: Antenatal Care

AOR: Adjusted odds

CI: Confidence Interval

COR: Crude odds ratio

SPSS: Statistical Package for Social Sciences

1. Introduction

Severe acute respiratory infection (SARS) is a group of respiratory tract infections caused by a beta coronavirus (SARS-COV2). Corona Virus Disease-2019 ("COVID-19") is a family of SARS caused by Novel Coronavirus and was first detected in December 2019 in Wuhan, China. Since it has been declared a global pandemic by the World Health Organization (WHO), it has made the rapid spread across the world and causes high morbidity and mortality [1-3].

While evidence for airborne transmission of COVID-19 is currently incomplete, several hospital-based studies have performed air-sampling for SARS-COV-2, including one published paper [4]. Droplets, aerosol, and close contact are the significant factors to transfer the infection (COVID-19 pandemic) to the suspect [5,6]. Based on currently available data, neither absence nor presences of signs or symptoms are accurate enough to rule in or rule out COVID-19 disease [7]. Worldwide, there is an estimated number of 5.8 million cases and nearly half a million deaths is occurred at the end of 2020 by COVID-19 [8]. COVID-19 disease is not limited to the respiratory system and it affects other organs too like renal dysfunction, gastrointestinal complications, liver dysfunction, cardiac manifestations, neurological abnormalities, and hematological manifestations are among the reported extra pulmonary complications [9]. Moreover, according to studies in China and United States, on effects of COVID-19 on college students' mental health show increased stress and anxiety due to the COVID-19 outbreak [10]. Increases in negative affect and symptoms of anxiety and depression are observed after 2 weeks of confinement in China [10]. And of the 195 students, 71% indicate increased stress and anxiety due to the COVID-19 outbreak in the United States [11].

Due to the long-lasting pandemic situation and onerous measures such as lockdown and stay-at-home orders, the COVID-19 pandemic brings negative impacts on higher education [12,13]. Some of these negative impacts are psychological impacts vulnerability to other diseases, burden of health care centers and workers politics and social interaction, leadership disturbance. Moreover, education process disturbances, Economic, social and political issues, the risks of sudden loss of income or access to social support have consequences that are difficult to estimate and constitute a challenge [14-23]. Another concern in African countries is that the response to COVID-19 will come at the expense of treating other diseases. So far, no definitive treatment for COVID-19 has been invented, and the disease has become a pandemic. Therefore, observation of hand hygiene, disinfection of high-touch surfaces, observation of social distance, and lack of presence in public places and wearing masks are recommended as preventive measures [24]. Currently, the principle fighting tool being promoted by the World Health Organization (WHO) is the prevention of acquiring SARS-COV-2 infection by following basic health hygiene rules and social distancing along with taking available COVID-19 vaccine [25]. Studies conducted across the globe, Africa including Ethiopia have been investigated the knowledge, attitude and practices toward the preventive measures of COVID-19 pandemic predominantly focused on health care workers and patients [26]. Currently most countries including Ethiopia have taken incredible preven-

tive measures including Vaccine. The severity of the COVID-19 pandemic has demanded the emergency use of COVID-19 prevention methods including vaccines. However, there is still limited evidence in COVID-19 vaccine acceptability and perceived barriers among some subgroups like pregnant women. In the study area, knowledge and practice to COVID-19 preventive measures among pregnant women, who constitute vulnerable groups, are yet to be assessed. Therefore, this study was aimed to investigate pregnant women's knowledge and practice in preventing coronavirus disease and its associated factors in the Dire Dawa administration, Ethiopia

2. Methods

2.1. Study Design and Setting

An institution based cross-sectional study was conducted from May 01 to 30, 2022 in Dire Dawa city administration 2 public and 2 private hospitals. These hospitals are found in Dire Dawa city which is located to the eastern part about 515 kilometers away from Addis Ababa, the capital city of Ethiopia. According to 2020 population projections, 506,000 people live in Dire Dawa city Administration (68% estimated to be urban inhabitants) and have 38 rural and 9 urban kebeles (smallest administrative units). It has an estimated 37,142 households. Dire Dawa city has six hospitals (2 public and 4 private), 15 health centers and 34 health posts. Additionally there are a total of 58 different level clinics, 35 pharmacy and 35 drug shops, Family Guidance Association and Marie Stopes International clinics [27].

2.2. Study Subjects

All pregnant women in Dire Dawa administration were the source population of this study. All pregnant women who had come to those hospitals for ANC follow-up in the study period were included. However, pregnant women who were critically ill and admitted to the inpatient department were excluded.

2.3. Sample Size and Sampling Procedure

The sample size was determined by a single population proportion formula with assumptions: standard normal distribution ($z=1.96$), 95% level of significance, 5% margin of error (d), proportion of knowledge and practice of preventive measures against COVID-19 54.84% and 76.2 %/ respectively and 10% consideration of non-response rate and the final sample size became 419. The total sample size was deployed proportionally to each hospital according to their ANC flow. A systematic random sampling technique was employed in this study [28]. The intervals for subjects to be selected were calculated for each hospital in accordance with their case flow in Figure.

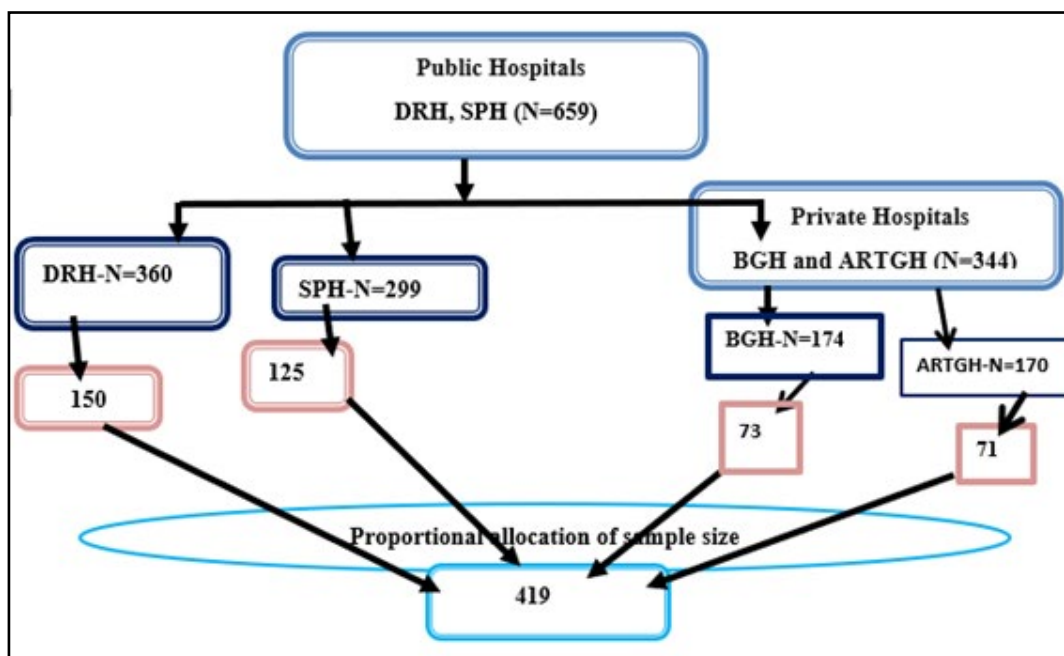


Figure: Diagrammatic Presentation of the Sampling Procedure for the Study in Public and Private Hospitals of the Dire Dawa Administration, Eastern Ethiopia, 2022

Both public hospitals (DRH, Dilchora Referral and SPH, Sabiyan primary) and 2 private hospitals (Bilal and ART General hospitals) were included by simple random techniques. According to the average information obtained from the 2-months record from the ANC registry books, each have DRH (720), SPH(598), BGH (348) and ARTGH (340) estimated number of ANC follower pregnant women. Then the result is divided into two to get average number of ANC followers over one month. This results DRH=360 SPH=299, BGH=174 and ARTGH=170. Total ANC following pregnant women in four hospitals over a month equals to 1003. So, the sample size was proportionally allocated for each hospital (Figure).

Four Health professionals who have a Bachelor of Science (BSc) degree in midwifery working in ANC were data collectors and two supervisors were selected in their respective hospitals. One day training for supervisors and data collectors in each hospital was given on how to conduct data collection. The training discloses the possible benefit and purpose of the study to the study participants before the start of data collection. Orders of interview and intervals of selection were according to their ANC clinic entry. The objective of the study, how they are selected, and voluntary participation were clarified. The interview was conducted after routine services were given in ANC wards.

2.4. Data Collection Methods

The data was collected using pre-tested, interviewer guided, semi-structured questionnaire which was adapted from previous literatures designed for same study purpose and then variables were reviewed to suit the local context [29,30]. The questionnaire was developed in English language and translated into the local languages (Afan Oromo, Somali and Amharic) and then back to

English to keep its consistency. The questionnaires have 15-item scale for knowledge assessment questions and an 8-item scale for practice questions. The scoring system of pregnant women's knowledge and practice of preventive measures were either 1 (for correct answer) or 0 (for incorrect answer). The minimum score was 1, whereas the maximum score was 8 for each of knowledge and practice component of the questionnaire. The reliability of the questionnaire was checked by conducting a pretest among pregnant women (21=5% of sample size) in Hiwotfana Specialized University hospital ANC clinic.

2.5. Operational Definitions

The knowledge level of the study participants was determined using 15 knowledge assessing questions. A value of 1 and 0 was given for each correct and incorrect answer respectively and labeled as good and poor knowledge based on mean score. Those participants who scored greater than or equals to the mean score were considered as having a good knowledge whereas those who score less than the mean score labeled as poor knowledge [31]. Practice of participant was also determined based on 8 preventive measures. A value of 1 and 0 was given for each practiced and unpracticed preventive measures respectively and labeled as good and poor practice based on mean score. Pregnant women who scored greater than or equals to the mean score were considered as having good practice; while those who scored less than the mean score were considered as poor practice.

2.6. Data Quality Control

The principal investigators checked the completeness and consistency of questionnaires filled by the data collectors to ensure the quality of data. To check the clarity, skipping pattern and order of questions, the questionnaire was pretested (5% of sample size

at Haramaya) before the start of the actual data collection. After pre-test, questions were revised, edited, and those found to be unclear were modified. The questionnaire was developed in English language and translated into the local languages (Afan Oromo, Somali and Amharic) and then back to English to keep its consistency by experts. All data collectors and supervisors were selected based on their ability to speak local languages and experience of data collection and trained for one day. Questionnaires were prepared in three local languages for data collection and used according to the skills of the clients. Questionnaires-secured in a safe place for confidentiality and as a backup for later in case a need to check is necessary. Data-entered into EPI DATA software as part of data management. Double data entry was done by two data clerks, and consistency of the entered data will be cross-checked.

2.7. Data Management and Analysis

Data were checked manually for completeness. Data marked as complete were entered in to Epi Data (Version 3.1) software. For further analysis the data were exported to the SPSS (Version 22) software. Descriptive statistics were carried out as a frequency and

percentage. Bivariate and multivariate analysis was used to see the effect of independent variable over dependent variable. Variables which were significant on bivariate analysis at a P-value less than 0.20 were taken to multivariate analysis. The fitness of model was checked by Hosmer and Lemeshow test (with the value >0.05). In multivariate analysis P-value of less than 0.05 and 95% confidence level was used as a cut-off point for the presence of association. Finally, results were compiled and presented using tables, graphs, charts, and texts.

3. Results

3.1. Socio-Demographic Characteristics

In this study, a total of 404 study participants were included, yielding a response rate of 96.4%. The age of respondents was ranged from 18 to 40 (mean =26.5 years, SD±5.7 years). Majority of the participants 274 (67.8%) were married and house wife (47%) by occupation. More than half (58.4%) had primary level education and 263 (65.1%) were urban dwellers Majority of husbands, 211(52.2%) had primary level education and 169 (41.8%) were merchant by occupation (Table 1).

Variables	Category of variables	Frequency (n=404)	Percentage (%)
Age (in complete years)	≤19	34	8.4
	20-24	111	27.5
	25-29	125	30.9
	30-34	81	20
	35 and above	53	13.1
Marital status	Married	274	67.8
	Widowed	89	22
	Divorced	41	10.1
Residence	Urban	263	65.1
	Rural	141	34.9
Religion	Muslim	168	41.6
	Orthodox	113	28
	Protestant	110	27.2
	Catholic	13	3.2
Occupation(women)	House-wife	187	47
	Farmer	99	24.9
	Employee	88	21.8
	No job currently	24	5.9
Occupation(husbands')	Merchant	169	41.8
	Farmer	112	27.7
	Employee	110	27.2
	No job currently	13	3.2
Education level(women)	No formal education	42	10.4
	Primary level(1-8 th grade)	236	58.4
	Secondary and above	126	31.2
Education level (husbands')	No formal education	32	7.9
	Primary level(1-8 th grade)	211	52.2
	Secondary and above	161	39.9
Media exposure	Exposed more than one	179	44.3
	Exposed only one	225	55.7

Table 1: Distribution of the Study Participants by their Socio-Demographics, Dire Daw Administration, Ethiopia, 2022 (n=404)

3.2. Reproductive Health and Obstetric Characteristics

More than half (53.2%) of study participants were primipara and had more than half (65.8%) had more than three living children.

Regarding the current pregnancy, majority (77%) was wanted and had more than three ANC visit. Only 86(21.3%) had reported previous adverse pregnancy outcomes (Table 2).

Variables	Category of variables	Frequency (n=404)	Percentage (%)
Parity	Nulliparous	78	19.3
	Primipara	215	53.2
	Multipara	111	27.5
Number of living children	≤3 children	138	31.2
	>3 children	266	65.8
Number of ANC visit (n=404)	>3	311	77
	≤3	93	23
Condition of current pregnancy	unwanted	93	23
	Wanted	311	77
Previous adverse pregnancy outcomes	Yes	86	21.3
	No	318	78.7
perceive that COVID-19 has a poor prognosis on people with chronic disease	Yes	281	69.6
	No	123	30.4

Table 2: Reproductive and Obstetrics Characteristics of Study Participants, Dire Daw Administration, Ethiopia, 2022 (n=404)

3.3. Pregnant Women's Knowledge about Preventive Measures against COVID-19

In this study a total of 404 participants were included with response rate of 96.4%. Pregnant women who were attending ANC in the hospitals were asked 15 questions to assess their knowledge in the preventive measures against COVID-19. Accordingly, 60.6

%((95% CI: 55.9%-65.3%) of pregnant women were knowledgeable. Great majority of study participants 398(98.5%) were up-to-date that they had ever heard about COVID-19. Most common symptoms of COVID-19 mentioned by the pregnant women were headache 288 (71.3%), fever 249 (61.6%) and sore throat 212 (52.5%) (Table 3).

Variables	Category	Frequency [31]	Percentage
Ever heard about COVID-19	Yes	398	98.5
	No	6	1.5
COVID-19 is contagious	Yes	279	69
	No	125	31
Respiratory droplets and close contact are the main transmission routes of COVID-19	Yes	194	48
	No	210	52
Incubation period of COVID-19 is 2-14 days	Yes	373	92.4
	No	31	7.6
All peoples are generally susceptible for COVID-19	Yes	259	64.1
	No	145	35.9
Fever is a symptom of COVID-19	Yes	249	61.6
	No	155	38.4
Dry cough is a symptom of COVID-19	Yes	133	32.9
	No	271	67.1
Headache is a symptom of COVID-19	Yes	288	71.3
	No	116	28.7
Sore throat is a symptom of COVID-19	Yes	212	52.5
	No	192	47.5
Runny nose is a symptom of COVID-19	Yes	169	41.8
	No	235	58.2

Difficulty of breathing is a symptom of COVID-19	Yes	177	43.8
	No	227	56.2
Stay at home and wearing face mask can prevent transmission of COVID-19	Yes	162	40
	No	242	60
People with co-existing disease and smokers had poor prognostic outcomes if infected with COVID-19	Yes	241	59.65
	No	163	40.35
Person with COVID-19 can transmit the virus to others without development of sign and symptoms	Yes	198	49
	No	206	51
pregnant women are at high risk than others if infected with COVID -19	Yes	340	84.2
	No	64	15.8

Table 3: Pregnant Women's Knowledge about Preventive Measures against COVID-19 in Dire Dawa Administration, Ethiopia, 2022 (n=404)

3.4. Pregnant Women's Knowledge about Preventive Measures against COVID-19

A total of 404 pregnant women who were attending ANC in the hospitals were asked eight questions to assess their practice on what should be done to prevent against COVID-19. Consequently, 46.3 % (95% CI: 41.3%-51.2%) of pregnant women had good practice in preventive measures against COVID-19. Participants

were asked. Majority of the participants 295 (73%) were practiced preventive measure against COVID-19 by wearing face mask in public, 284 (70.3%) via avoiding handshaking, hugging and kissing, 203 (50.3%) were practiced by staying in-door if it is not must to get out and 194 (48%) by covering mouth and nose during coughing or sneezing (Table 4).

Questions	category	frequency	percent
Did you wash your hands frequently with soap and water or alcohol-based sanitizers?	Yes	201	49.75
	No	203	50.25
Did you maintaining at least 2 meter distance between yourself and others?	Yes	172	42.6
	No	232	57.4
Did you wear face mask in public?	Yes	295	73
	No	109	27
Have you stop going to public or crowded place after the COVID-19 pandemic confirmed in Ethiopia?	Yes	184	45.5
	No	144	54.5
Did you stay in-door if it is not must to get out?	Yes	203	50.3
	No	201	49.7
In order to prevent contracting and spreading COVID-19 do you avoid handshaking, hugging and kissing?	Yes	284	70.3
	No	120	29.7
Avoid touching eyes and mouth with unwashed hand.	Yes	203	50.3
	No	201	49.7
Cover mouth and nose during coughing or sneezing	Yes	194	48
	No	210	52

Table 4: Pregnant Women's Practices Regarding Preventive Measures against COVID-19 in Dire Dawa Administration, Ethiopia, 2022 (n=404)

3.5. Predictors of Pregnant Women's Knowledge of Preventive Measures against COVID-19

In binary logistic regression age (30-34), residence (urban), level of education (secondary and above) , occupation of pregnant women, husband level of education (secondary and above), media exposure parity, number of living children, number of ANC visit and previous adverse pregnancy outcomes had association with level of knowledge on preventive measures against COVID-19.

Through multivariable logistic regression analysis after adjusting other co-variables by using backward likelihood stepwise method; residence/urban (AOR=0.10, 95% CI: 0.06- 0.17), media exposure (AOR=2.0, 95% CI: 1.17-3.39), number of ANC visit (AOR: 2.70; 95% CI: 1.33-5.35) and parity (AOR=0.40, 95% CI: 0.18-0.88) were found to have significant statistical association with knowledge of COVID-19.

Pregnant women who had more than one media exposure were two times more likely to had good level of knowledge of preventive measures against COVID-19 (AOR:2.0; 95% CI: 1.17-3.39) than pregnant women having a single media exposure. Similarly, the odds of having good knowledge of preventive measures against

COVID-19 was almost three times higher among pregnant women who had more than three ANC visits (AOR: 2.70; 95% CI: 1.33-5.35) as compared to those who had less than three ANC visits (Table 5).

Variables	Category	Knowledge of COVID-19		COR (95% CI)	AOR (95% CI)
		Good	poor		
Age	≤19	21(61.8%)	13(38.2%)	1.20(0.50-2.95)	1.75(0.57-5.40)
	20-24	71(64%)	40(36%)	1.09(0.55-2.18)	1.22(0.52-2.86)
	25-29	79(63.2%)	46(36.8%)	1.13(0.58-2.22)	0.86(0.37-1.96)
	30-34	39(48.1%)	42(51.9%)	2.09(1.02-4.29)*	1.53(0.63-3.75)
	35 and above	35(66%)	18(34%)	1	1
Residence	Urban	208(79%)	55(20.9%)	0.09(0.06-0.15)***	0.10(0.06-0.17)***
	Rural	37(26.2%)	104(73.8%)	1	1
Level of education	Secondary and above	57(45.2%)	69(54.8%)	2.42(1.16-5.03)*	1.71(0.36-8.12)
	Primary level(1-8th grade)	160(67.8%)	76(32.2%)	0.95(0.47-1.91)	0.76(0.12-4.55)
	No formal education	28(66.7%)	14(33.3%)	1	1
Occupation	House-wife	113(60.4%)	74(39.6%)	2.49(0.89-6.95)*	2.20(0.66-7.30)
	Farmer	60(60.6%)	39(39.4%)	2.47(0.85-7.16)*	3.07(0.88-10.72)
	Employee	47(53.4%)	41(46.6%)	3.31(1.14-9.67)*	3.03(0.84-10.93)
	No job currently	19(79.2%)	5(20.8%)	1	1
Level of education(husband)	Secondary and above n	79(49.1%)	82(50.9%)	3.11(1.32-7.34)**	2.03(0.35-11.88)
	Primary level(1-8 th grade)	142(67.3%)	69(32.7%)	1.46(0.62-3.41)	2.11(0.26-16.86)
	No formal education	24(75%)	8(25%)	1	1
Media exposure	Exposed more than one	90(50.3%)	89(49.7%)	2.20(1.46-3.29)***	2.0(1.17-3.39)*
	Exposed only one	155(68.9%)	70(31.1%)	1	1
parity	Nulliparous	56(71.8%)	22(28.2%)	0.43(0.23-0.80)**	0.40(0.18-0.88)*
	Primipara	131(60.9%)	84(39.1%)	0.70(0.44-1.11)	1.04(0.60-1.86)
	Multipara	58(52.3%)	53(47.7%)	1	1
Number of children	≤3 children	94(68.1%)	44(31.9%)	0.61(0.40-0.95)*	0.67(0.38-1.18)
	>3 children	151(56.8%)	115(43.2%)	1	1
Number of ANC visit	>3	168(54%)	143(46%)	4.10(2.29-7.34)***	2.67(1.33-5.35)**
	≤3	77(82.8%)	16(17.2%)	1	1
Previous adverse pregnancy outcomes	Yes	42(48.8%)	44(51.2%)	1.84(1.14-2.98)	1.02(0.50-2.08)
	No	202(63.7%)	115(36.3%)	1	1

Significant at *p<0.05, **p<0.01, ***p=0.000, 1=reference

Table 5: Bivariate and Multivariable Analysis of Factors Associated with Pregnant Women's Knowledge on Preventive Measures against COVID-19 in the Dire Dawa Administration, Ethiopia, 2022 (n = 404)

3.6. Predictors of Pregnant Women's Practice of Preventive Measures against COVID-19

In binary logistic regression age(30-34), residence(urban), media exposure parity, number of living children, number of ANC visit, condition of current pregnancy and perceiving COVID-19 has a poor prognosis on people with chronic disease had association with level of practice on preventive measures against COVID-19. Through multivariable logistic regression analysis after adjusting other co-variables by using backward likelihood stepwise method; residence/urban (AOR=6.60, 95% CI: 4.01-10.90), media exposure (AOR=0.60, 95% CI: 0.37-0.93) and Condition of current

pregnancy/wanted (AOR=1.75, 95% CI: 1.01-3.04) were predictors for practice.

Urban resident pregnant women were almost seven times more likely to had good level of practice of preventive measures against COVID-19(AOR=6.60, 95% CI: 4.01-10.90) compared to rural residents. However, in this study pregnant women with unwanted pregnancy had almost two times more likely to had good level of practice of preventive measures against COVID-19 (AOR=1.75, 95% CI: 1.01-3.04) compared to pregnant women with wanted pregnancy (Table 6).

Variables	Category	Practice of COVID-19		COR (95% CI)	AOR (95% CI)
		Good	poor		
Age	≤19	16(47.1%)	18(52.9%)	0.70(0.28-1.63)	0.51(0.19-1.35)
	20-24	49(44.1%)	62(55.9%)	0.77(0.39-1.50)	0.61(0.28-1.30)
	25-29	57(45.6%)	68(54.4%)	0.72(0.37-1.40)	0.73(0.35-1.56)
	30-34	45(55.6%)	36(44.4%)	0.48(0.24-0.98)*	0.60(0.26-1.33)
	35 and above	20(37.7%)	33(62.3%)	1	1
Residence	Urban	80(30.4%)	183(69.6%)	7.20(4.51-11.48)***	6.60(4.01-10.90)***
	Rural	107(75.9%)	34(24%)	1	1
Media exposure	Exposed more than one	98(54.7%)	81(45.3%)	0.54(0.36-0.80)**	0.60(0.37-0.93)*
	Exposed only one	89(39.6%)	136(60.4%)	1	1
parity	Nulliparous	30(38.5%)	48(61.5%)	1.81(1.01-3.27)*	1.54(0.78-3.06)
	Primipara	98(45.6%)	117(54.4%)	1.35(0.86-2.14)	1.10(0.63-1.81)
	Multipara	59(53.2%)	52(46.8%)	1	1
Number of children	≤3 children	53(38.4%)	85(61.6%)	1.63(1.07-2.47)*	1.61(0.99-2.62)
	>3 children	134(50.4%)	132(49.6%)	1	1
Number of ANC visit	>3	162(52.1%)	149(47.9%)	0.34(0.20-0.56)***	0.60(0.22-1.67)
	≤3	25(26.9%)	68(73.1%)	1	1
Condition of current pregnancy	unwanted	33(35.5%)	60(64.5%)	1.78 (1.10-2.88)*	1.75 (1.01-3.04)*
	wanted	154(49.5%)	157(50.5%)	1	1
Perception/COVID-19 has a poor prognosis on people with chronic disease	Yes	144(51.2%)	137(48.8%)	0.51(0.33-0.79)**	0.85(0.34-2.10)
	No	43(35%)	80(65%)	1	1

Significant at *p<0.05, **p<0.01, ***p=0.000, 1=reference

Table 6: Bivariate and Multivariate Analysis of Factors Associated with Pregnant Women's Practice of Preventive Measures against COVID-19 in Dire Dawa Administration, Ethiopia, 2022 (n = 404)

4. Discussion

So far there is no definite treatment for COVID-19. Therefore, recognizing the level of knowledge and practice of preventive measures against it is critical to put prevention and controlling intervention particularly for low resources countries) like Ethiopia. This study presents pregnant women's knowledge and practice in preventing coronavirus disease and its associated factors in the Dire Dawa administration, Ethiopia. Accordingly, this study shows that 60.6 percent (95% CI: 55.9%–65.3%) of pregnant women were knowledgeable on preventive measures against COVID-19. The

finding of this study was in line with a study conducted in Ghana (62.7%) and Abakaliki, Nigeria (60.9%). higher than studies conducted in South Africa (43.5%), in Guraghe Zone, southern Ethiopia (54.84%) and Debretabor town, northern Ethiopia (48.6%). lower than studies in Pakistan (85.7%), southwestern Iran (70%) and India (75.3%). This study is also lower than a study conducted in southwest Nigeria (87.2%).

This study shows that 46.3 % (95% CI: 41.3%-51.2%) of pregnant women had good practice on preventive measures against

COVID-19. The finding of this study was in line with studies conducted in Abakaliki, southeast Nigeria and Debretabor town, northern Ethiopia (47.6 %). However, it is lower than a finding of studies conducted in china (71.0%), India (92.7 %) and Pakistan (69.9%). The finding of this study is also lower than some studies in Africa and Ethiopia like South Africa (76%) Southwest Nigeria 79.2% and Guraghe Zone, southern Ethiopia (76.2 %). The finding of this study regarding the practice against COVID-19 by pregnant women is higher than a study conducted in Abakaliki, Nigeria (30.3 %).

The findings of this study suggest significant knowledge and practice gaps between the amount of information available about COVID-19 and the depth of knowledge among the pregnant women. As the global threat of COVID-19 continues to emerge, it is critical to improving knowledge and practice in prevention and control against COVID-19 among pregnant women and the general people in the Dire Dawa city administration.

5. Conclusions

In conclusion, this study showed that average number of pregnant women had knowledge and practice to prevent against COVID-19. The use of social media, antenatal care follow up, parity and residence showed a significant association with pregnant women's knowledge in prevention against COVID-19. While residence, media exposure and wanted pregnancy showed a significant association with pregnant women's practice in prevention against COVID-19 [32-38]. As per the finding promoting and increasing health education program regarding to the pandemic via different mass Medias and social Medias, promoting and increasing ANC follow up of pregnant women considering residence is recommended to hospitals and community administrators and all other stakeholders. It is also recommended that mixed methods research, program evaluations, and longitudinal research efforts to be undertaken to explore many other factors related to the knowledge and practice of pregnant women against prevention of COVID-19 and address effect of COVID-19 on pregnancy and pregnancy outcomes too.

Strengths and Limitation

As this study is about the new devastating pandemic, it tried to determine the predictor of knowledge and practice of pregnant women to prevent against COVID-19 and as there is scarcity of studied literatures on this specific study. The study focuses on risky groups (pregnant women) and included many study centers (study areas) which increase the external validity of the study.

Limitation of the Study

Since the study design was cross-sectional, cause and effect could not be identified. Social desirability bias is expecting in this study. But efforts were made to manage them through pre-testing the questionnaire, training of data collectors, and supervisors on how to approach respondents, interviewing privately, close supervision of data collectors, and explaining the purpose of the study for the study participants.

Availability of Data and Materials

The datasets used and analyzed during the current study are not available publicly due to privacy reasons, but are available from the corresponding author on reasonable request.

Acknowledgments

The author is grateful to the data collectors, supervisors, and study participants. Last but not least, my thanks go to hospital administrators (Both public hospitals (Dilchora Referral, Sabiyan, Bilal and ART General hospitals) and those individuals who directly or indirectly contributed their skills and knowledge toward the accomplishment of this study.

Funding

The research received no specific Grant from any funding agency in the public, commercial, or not-for profit sectors.

Author Information

Aminu Mohammed and Ahmedin Aliyi have contributed to this work.

Contributions

Aminu Mohammed: He was responsible for all aspects of this study, supervising data collectors along with supervisors, including the study's design and implementation, analysis, interpretation of study results, and manuscript preparation, revision, writing and submission to the journal.

Ahmedin Aliyi: Assisted in supervision, data analysis, draft revision, result interpretation, and writing manuscript

Ethics Declaration

Ethics Approval and Consent to Participate

Ethical approval was obtained on 19 March 2022 from Ethical Committee of Dilchora referral Hospital (File-DRH-2001/M/2022). Besides, an official letter of permission was obtained from the each hospital medical directors (Dilchora referral, Sabiyan, Bilal and ART general hospitals). All protocols were carried out in accordance with relevant guidelines and regulations of Helsinki. Informed voluntary consent was obtained from all subjects and/or their legal guardian(s).

References

1. Wu, D., Wu, T., Liu, Q., & Yang, Z. (2020). The SARS-CoV-2 outbreak: what we know. *International journal of infectious diseases*, 94, 44-48.
2. Zumla, A., Hui, D. S., & Perlman, S. (2015). Middle East respiratory syndrome. *The Lancet*, 386(9997), 995-1007.
3. Lu, H., Stratton, C. W., & Tang, Y. W. (2020). Outbreak of pneumonia of unknown etiology in Wuhan, China: The mystery and the miracle. *Journal of medical virology*, 92(4), 401.
4. Ong, S. W. X., Tan, Y. K., Chia, P. Y., Lee, T. H., Ng, O. T., Wong, M. S. Y. (2020). Air, surface environmental, and personal protective equipment contamination by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) from a symptomatic patient, *Jama*. 323(16):1610-2.
5. Lewis, D. (2020). Is the coronavirus airborne? Experts can't

- agree. *Nature*, 580(7802), 175.
6. Morawska, L., & Cao, J. (2020). Airborne transmission of SARS-CoV-2: The world should face the reality. *Environment international*, 139, 105730.
 7. Struyf, T., Deeks, J. J., Dinnes, J., Takwoingi, Y., Davenport, C., Leeftang, M. M., ... & Cochrane COVID-19 Diagnostic Test Accuracy Group. (2020). Signs and symptoms to determine if a patient presenting in primary care or hospital outpatient settings has COVID-19. *Cochrane Database of Systematic Reviews*, (5).
 8. Organization WH. (2020). Coronavirus disease (COVID-19): situation report, 166.
 9. Behzad, S., Aghaghazvini, L., Radmard, A. R., & Gholamrezanezhad, A. (2020). Extrapulmonary manifestations of COVID-19: radiologic and clinical overview. *Clinical imaging*, 66, 35-41.
 10. Li, H. Y., Cao, H., Leung, D. Y., & Mak, Y. W. (2020). The psychological impacts of a COVID-19 outbreak on college students in China: a longitudinal study. *International journal of environmental research and public health*, 17(11), 3933.
 11. Son, C., Hegde, S., Smith, A., Wang, X., & Sasangohar, F. (2020). Effects of COVID-19 on college students' mental health in the United States: Interview survey study. *Journal of medical internet research*, 22(9), e21279.
 12. Bettinsoli, M. L., Di Riso, D., Napier, J. L., Moretti, L., Bettinsoli, P., Delmedico, M. (2020). Psychological Impact and Contextual Factors Associated With Physical and Mental Health Conditions of Italian Healthcare Professionals During the Covid-19 Disease Outbreak.
 13. Li, S., Wang, Y., Xue, J., Zhao, N., & Zhu, T. (2020). The impact of COVID-19 epidemic declaration on psychological consequences: a study on active Weibo users. *International journal of environmental research and public health*, 17(6), 2032.
 14. Jordan, R. E., Adab, P., & Cheng, K. (2020). Covid-19: risk factors for severe disease and death. *Bmj*, 368.
 15. Sam, P. (2020). Redefining vulnerability in the era of COVID-19. *Lancet*, 395(10230), 1089.
 16. Bradley, N. L., DiPasquale, A. M., Dillabough, K., & Schneider, P. S. (2020). Health care practitioners' responsibility to address intimate partner violence related to the COVID-19 pandemic. *Cmaj*, 192(22), E609-E610.
 17. Nepal, R., Sapkota, K., Adhikari, K., Paudel, P., Adhikari, B., Paudyal, N. (2020). Knowledge, attitude and practice regarding COVID-19 among healthcare workers in Chitwan, Nepal.
 18. Olum, R., Chekwech, G., Wekha, G., Nassozi, D. R., & Bongomin, F. (2020). Coronavirus disease-2019: knowledge, attitude, and practices of health care workers at Makerere University Teaching Hospitals, Uganda. *Frontiers in public health*, 8, 181.
 19. World Health Organization. (2020). COVID-19 and violence against women: what the health sector/system can do, 7 April 2020 (No. WHO/SRH/20.04). World Health Organization.
 20. Roesch, E., Amin, A., Gupta, J., & García-Moreno, C. (2020). Violence against women during covid-19 pandemic restrictions. *Bmj*, 369.
 21. Williamson, B., Eynon, R., & Potter, J. (2020). Pandemic politics, pedagogies and practices: digital technologies and distance education during the coronavirus emergency. *Learning, Media and Technology*, 45(2), 107-114.
 22. Bozkurt, A., Jung, I., Xiao, J., Vladimirci, V., Schuwer, R., Egorov, G., & Paskevicius, M. (2020). A global outlook to the interruption of education due to COVID-19 pandemic: Navigating in a time of uncertainty and crisis. *Asian Journal of Distance Education*, 15(1), 1-126.
 23. Fekene, D. B., Bulto, G. A., and BEM, Gemed, G. M. (2017). Male Partner's Involvement and it's Associated Factors in Promoting Skilled Birth Attendance among Fathers who have Children Less than One Year of Age in Ambo Town, Ethiopia. *EC Gynaecology*. 8.6(2019):465-74.
 24. Arefi, M. F., & Poursadeqiyani, M. (2020). A review of studies on the COVID-19 epidemic crisis disease with a preventive approach. *Work*, 66(4), 717-729.
 25. Sahu, K. K., & Kumar, R. (2020). Preventive and treatment strategies of COVID-19: from community to clinical trials. *Journal of family medicine and primary care*, 9(5), 2149.
 26. Jemal, B., Aweke, Z., Mola, S., Hailu, S., Abiy, S., Dendir, G., ... & Teshome, D. (2021). Knowledge, attitude, and practice of healthcare workers toward COVID-19 and its prevention in Ethiopia: A multicenter study. *SAGE Open Medicine*, 9.
 27. Dire Dawa Health Bureau Health Demographic Statistics. 2020.
 28. Fikadu, Y., Yeshaneh, A., Melis, T., Mesele, M., Anmut, W., & Argaw, M. (2021). Covid-19 preventive measure practices and knowledge of pregnant women in guraghe zone hospitals. *International journal of women's health*, 39-50.
 29. Amsalu, B., Guta, A., Seyoum, Z., Kassie, N., Sema, A., Dejene, W., & Belay, Y. (2021). Practice of COVID-19 prevention measures and associated factors among residents of Dire Dawa City, Eastern Ethiopia: Community-Based Study. *Journal of multidisciplinary healthcare*, 219-228.
 30. Ayele, A. D., Mihretie, G. N., Belay, H. G., Teffera, A. G., Kassa, B. G., & Amsalu, B. T. (2020). Knowledge and Practice to Prevent Against Corona Virus Disease (COVID-19) and Its Associated Factors Among Pregnant Women in Debre Tabor Town Northwest Ethiopia: a Community Based Cross-Sectional Study.
 31. Serwaa, D., Lamptey, E., Appiah, A. B., Senkyire, E. K., & Ameyaw, J. K. (2020). Knowledge, risk perception and preparedness towards coronavirus disease-2019 (COVID-19) outbreak among Ghanaians: a quick online cross-sectional survey. *The Pan African Medical Journal*, 35(Suppl 2).
 32. Nwafor, J. I., Aniuoku, J. K., Anozie, B. O., & Ikeotuonye, A. C. (2020). Knowledge and practice of preventive measures against COVID-19 infection among pregnant women in a low-resource African setting. *MedRxiv*, 2020-04.
 33. Hoque, A. M., Alam, A. M., Hoque, M., Hoque, M. E., & Van Hal, G. (2021). Knowledge, attitudes, and practices towards COVID-19 of pregnant women at a primary health care facility in South Africa. *European Journal of Medical and Health Sciences*, 3(1), 50-55.
 34. Sajid, A., Sajid, A., Sajid, A., Hanif, A., Wazir, A., & Chee-

- ma, S. (2020). Knowledge Attitude and Practices towards COVID-19 among Pregnant Patients Coming in Lady Aitchison Hospital, Lahore. *Journal of The Society of Obstetricians and Gynaecologists of Pakistan*, 10(3), 153-158.
35. Maharlouei, N., Asadi, N., Bazrafshan, K., Roozmeh, S., Rezaianzadeh, A., Zahed-Roozegar, M. H., & Lankarani, K. B. (2020). Knowledge and attitude regarding COVID-19 among pregnant women in Southwestern Iran in the early period of its outbreak: a cross-sectional study. *The American journal of tropical medicine and hygiene*, 103(6), 2368.
36. Kamal, D., Thakur, V. D., Swain, S. K., & Vikneshram, C. R. (2020). Knowledge, attitude, and practice toward COVID-19 among pregnant women in a tertiary care hospital during the COVID-19 outbreak. *Journal of Marine Medical Society*, 22(3), 66.
37. Aduloju, O. P., Okunola, T. O., Adefisan, A. S., & Aduloju, T. (2019). Knowledge, attitude and practice of preventive measures against coronavirus disease 2019 among pregnant women in a tertiary health facility in southwest Nigeria. *Int J Clin Obstet Gynaecol*, 5(3), 101-7. Anikwe, C. C., Ogah, C. O., Anikwe, I. H., Okorochukwu, B. C., & Ikeoha, C. C. (2020). Coronavirus disease 2019: Knowledge, attitude, and practice of pregnant women in a tertiary hospital in Abakaliki, southeast Nigeria. *International Journal of Gynecology & Obstetrics*, 151(2), 197-202.
38. Ding, W., Lu, J., Zhou, Y., Wei, W., Zhou, Z., & Chen, M. (2021). Knowledge, attitudes, practices, and influencing factors of anxiety among pregnant women in Wuhan during the outbreak of COVID-19: a cross-sectional study. *BMC pregnancy and childbirth*, 21(1), 1-9.

Copyright: ©2023 Aminu Mohammed, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.