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Prevalence of antenatal depression and associated factors among pregnant women during COVID-19 pandemic in North Shewa zone, Amhara region, Ethiopia

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ABSTRACT

Background: Antenatal depression is a form of depression that occurs during pregnancy. This problem may worsen during the COVID-19 epidemic and may result in serious consequences for pregnant women, including depression and other multiple psychosocial problems. However, the prevalence of depression during the COVID-19 pandemic in pregnant women and its associated factors has not been studied in the study area, even in Ethiopia.

Methods: An institution-based cross-sectional study was conducted among 422 pregnant women who were attending antenatal care in public health institutions in the North Shewa Zone, Ethiopia. The data were collected from May 1- June 30, 2021. A logistic regression model with adjusted odds ratio (AOR) and P-value < 0.05 at the 95% confidence interval was used to determine significantly associated factors.

Results: The prevalence of antenatal depression among pregnant women during the COVID-19 pandemic was 34.1% (95% CI: 29.6–38.9). Divorced marital status (AOR = 7.52, CI: 2.707–20.911), husband's educational status "cannot read and write" (AOR = 4.05, CI: 1.834–8.962) and "can read and write without formal education" (AOR = 2.39, CI: 1.107–5.154) are statistically significant variables associated with depression among pregnant women during the COVID-19 pandemic.

Conclusions: In this study, the prevalence of antenatal depression in pregnant women during the novel coronavirus pandemic was high. To reduce the level of depression in pregnant women, strategies have to be designed for the early detection of divorced pregnant women with inadequate social support and address enough information for pregnant women and their husbands about depression and COVID-19 during the pandemic.

1. Background

Depression is the most common mental health condition in the general population (Lim et al., 2018) and is characterized by sadness, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, feelings of tiredness, and poor concentration (Lu et al., 2014). Antenatal depression is depression that occurs during pregnancy (Ashley, Harper, Arms-Chavez, & LoBello, 2016). A novel coronavirus was identified at the end of 2019 as the cause of a cluster of pneumonia cases in Wuhan, a city in the Hubei Province of China, and in February

2020, the World Health Organization designated the disease COVID-19, which stands for coronavirus disease 2019 (McIntosh, Hirsch, & Bloom, 2020).

COVID-19 subsequently affects most countries worldwide (Huang et al., 2020). On 30 January 2020, the WHO Director-General declared that the current outbreak constituted a public health emergency of international concern (Organization, 2020). COVID-19 is an acute disease, but it can also be deadly, with a 2% case fatality rate. Severe disease onset might result in death due to massive alveolar damage and progressive respiratory failure (Chan et al., 2020; Xu et al., 2020).

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One of the alarming impacts of COVID-19 infection on mental health is depression (Mazza et al., 2020). People may experience fear of COVID-19 and its consequences and contagion, and consequently, they may experience depression, which may affect preventive adherence (Xiang et al., 2020), and this may worsen for pregnant women because pregnancy by itself does not safeguard women against depressive illness (Vergel et al., 2019). As COVID-19 still appears to be spreading, more infections in pregnant women are likely to be encountered in different regions, countries, and continents (Liang & Acharya, 2020). The uncertainty and low predictability of COVID-19 not only threaten people's physical health but also affect people's mental health, and people are likely to develop negative emotions (Li, Wang, Xue, Zhao, & Zhu, 2020). This problem may worsen during the COVID-19 epidemic and may result in serious consequences for pregnant women, including depression and other multiple psychosocial problems. However, the prevalence of depression during the COVID-19 pandemic in pregnant women and its associated factors have not been studied in the study area, even in Ethiopia.

Rates of depression during pregnancy have been reported to be as high as 50% (Khanghah, Khalesi, & Afagh, 2020). The high frequency of antenatal depression can lead to an increase in the frequency of obstetric and maternal complications in the short and long term (Koyucu & Karaca, 2021). Early detection of the level of antenatal depression during the COVID-19 pandemic is critical because depression can adversely affect birth outcomes and neonatal health and, if left untreated, can persist after birth (Vergel et al., 2019).

Nurses who understand the prevalence, signs, symptoms, and risk factors associated with antenatal depression can help to identify it and prevent the sequelae on the mother and fetus (Glasser, Hadad, Bina, Boyko, & Magnezi, 2016). This study is helpful for nurses and other health care providers to have information about the magnitude of antenatal depression and its predictors, and they can intervene to reduce the problem accordingly.

It is important that pregnant women and their families, as well as the general public and healthcare providers, should receive as much accurate information to prevent transmission and to reduce its mental health impact.

Determining the prevalence and its determinants is helpful to reduce the level of depression and its impact on pregnant women and fetuses. The current study therefore aimed to assess the prevalence of antenatal depression and associated factors among pregnant women attending antenatal care services during the novel coronavirus disease (COVID-19) pandemic in the North Shewa Zone, Ethiopia. Any significant findings may be useful for researchers as an input to conduct further studies and policymakers to design strategies to reduce the magnitude of the problem.

2. Methods and materials

2.1. Study design and period

An institution-based cross-sectional study was employed from May 1, 2021, to June 30, 2021.

2.2. Source and study population

The source populations for the study were all (2,500) pregnant women who were attending antenatal care services during the COVID-19 pandemic in public health institutions in the North Shewa Zone, Amhara region, Ethiopia. All (1,242) pregnant women attending antenatal care services during the COVID-19 pandemic in the selected health institutions during the study period were included in the study population.

2.3. Sample size and sampling techniques

The sample size was calculated using a single population proportion formula by assuming a proportion of 50% (Ezhumalai, 2017) since there is no study conducted on this issue in Ethiopia.

$$n = (za/2)^2 \cdot p(1-p)/w^2$$

n = initial sample size.

α = level of significance P = proportion.

W = marginal error of 5%.

$$n = (1.96)^2 \cdot 0.5(1-0.5)/(0.05)^2$$

→ 384.

- By assuming a 10% non-response rate, the final required minimum sample size was estimated to be 422.

Study participants were selected from 5 public hospitals and 40 health centers in the North Shewa Zone, and then, based on the number of pregnant women who visited the public health facilities during the preceding month before data collection, proportional allocation of the total sample size was carried out to obtain the required sample size from each public health facility. Finally, the determined samples were selected by a systematic random sampling technique.

2.4. Inclusion and exclusion criteria

All pregnant women who visited public health institutions during the COVID-19 pandemic in the North Shewa Zone for antenatal care services were included in the study. Pregnant women who were unable to communicate effectively due to serious illness were excluded from the study.

2.5. Operational definitions

Antenatal depression: In this study, antenatal depression was defined based on the DASS-21 (Depression, Anxiety and Stress Scale-21) depression subscale, and pregnant women who scored greater than or equal to 10 were considered to have depression (Coker, Coker, & Sanni, 2018).

2.6. Data collection tools and procedures

Data were collected using an interviewer-administered structured questionnaire. The first two parts contained baseline data regarding the sociodemographic information and the obstetrics/reproductive health-related questions. The remaining part of the questionnaire was composed of items for depression assessment using the Depression Anxiety Stress Scale-21 (DASS-21). This assessment tool has 21 items with three subscales. Each of the three DASS scales contains 7 items. The depression scale assesses dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest or involvement, anhedonia, and inertia. Each item is scored from 0 (did not apply to me) to 3 (applied to me very much or most of the time). The reliability of the DASS-21 depression subscale showed that it has an excellent Cronbach's alpha value of 0.87, and we found that it is reliable, valid, and easy to administer for our participants. The questionnaires were developed in English and translated into the local language Amharic and then retranslated back to English to check the consistency. Pretest was conducted at public health institutions in the East Gojjam zone among 10%(43) of the sample size and necessary corrections to the tool were done accordingly, especially terms and statements difficult to understand were modified and made clear and understandable to the interviewee. Two days of training was given to data collectors and supervisors about the purpose of the study, data collection tools, collection techniques, and ethical issues during the

selection and collection of the data. The participants were selected by data collectors and supervisors through systematic random sampling among women who visited public health institutions during the COVID-19 pandemic in the North Shewa Zone for antenatal care services. The data collection was undertaken at the public health institutions by 30 trained midwife data collectors and 15 BSc midwife supervisors. All answers to the questions were ticking off the response of the respondent on the questionnaire by the interviewer. The average time needed to complete the interview for each participant was 30 min. The supervisors assessed the consistency and completeness of the data on a daily basis.

2.7. Statistical analysis

The data entry was performed using the statistical program EPI INFO™ 7 version and then exported into SPSS 21 for analysis. The mean, standard deviation, interquartile range, median, frequency, and percentage were calculated for the description of the results. Logistic regression was performed to identify statistically significant variables using a cutoff $p < 0.2$ in the bivariable analysis, and adjusted odds ratios with a 95% uncertainty interval were used to identify statistically significant variables based on $p < 0.05$ in the multivariable logistic regression model. Hosmer and Lemeshow goodness of fit tests were performed.

2.8. Ethical consideration

Ethical clearance was obtained from Debre Berhan University, College of Health Science Research Committee. An official permission letter was obtained from the North Shewa Zone health office. Written informed consent was given to each participant before conducting the actual data collection process. Participant name has not been written, and the information they provided has never been shared with others. The participants had the autonomy not to answer any questions that they did not want to answer.

3. Result

3.1. Socio-demographic characteristics of the study participants and their partners

A total of 422 participants were found from the selected public health institutions, and all participants were interviewed with a response rate of 100%. The mean age of the participants was 28 years (SD ± 4.86 years), and 41.5% of the participants were between 15 and 25 years old. The majority of the study participants, 414 (98.1%) were orthodox Christian by religion. Over half of the participants, 219 (51.9%), were housewives by occupation. Regarding the occupation of the husband, 148 (35.1%) were government employees, and 101 (20.9%) of them had secondary education. (Table 1).

3.2. Reproductive/maternity health care service-related characteristics

Of the total study participants, 250 (59.2%) women had 2–4 pregnancies. The majority of the study subjects, 336, (79.6%) had 1–3 ANC visits in their recent pregnancy, of whom only 20.4% completed four ANC visits. (Table 2).

3.3. Prevalence of antenatal depression during the COVID-19 pandemic

A total of 34.1% of pregnant women who scored greater than or equal to 10 on the DASS depression subscale indicated possible depression.

In the multivariable logistic regression analysis, the odds of having antenatal depression were higher for those who were divorced. Women whose husbands could not read and write were four times more likely to have antenatal depression than those whose husbands had a diploma

Table 1
Socio-demographic characteristics of the study participants and their partners.

| Variables | Category | Frequency | Percent (%) |
|----------------------------|-----------------------|-----------|-------------|
| Marital Status | Single | 87 | 20.6 |
| | Married | 247 | 58.5 |
| | Divorced | 78 | 18.5 |
| | Widowed | 40 | 2.4 |
| Educational status | cannot read and write | 121 | 28.7 |
| | Can read and write | 156 | 37.0 |
| | Primary | 35 | 8.3 |
| | Secondary | 46 | 10.9 |
| | Diploma and above | 64 | 15.2 |
| Occupation | Housewife | 219 | 51.9 |
| | Merchant | 20 | 4.7 |
| | Government employee | 76 | 18.0 |
| | Private employee | 37 | 8.8 |
| | Student | 70 | 16.6 |
| Occupation | Housewife | 219 | 51.9 |
| | Merchant | 20 | 4.7 |
| | Government employee | 76 | 18.0 |
| | Private employee | 37 | 8.8 |
| | Student | 70 | 16.6 |
| Husband's education status | Cannot read and write | 88 | 20.9 |
| | can read and write | 101 | 23.9 |
| | Primary | 47 | 11.1 |
| | Secondary | 101 | 23.9 |
| | Diploma and above | 85 | 20.1 |
| Have had Radio | Yes | 344 | 81.5 |
| | No | 78 | 18.5 |
| Ever read newspaper | Yes | 40 | 9.5 |
| | No | 382 | 90.5 |
| Ever watch TV | Yes | 146 | 34.6 |
| | No | 276 | 65.4 |

Table 2
Reproductive/maternity health care service-related characteristics.

| Variable | Category | Frequency | Percentage |
|------------------------|--------------|-----------|------------|
| Gravidity | Primi gravid | 172 | 40.8 |
| | Multi gravid | 250 | 59.2 |
| Have ANC visit | Yes | 362 | 85.8 |
| | No | 60 | 14.2 |
| Frequency of ANC visit | 1–3 Visit | 336 | 79.6 |
| | ≥4 Visit | 86 | 20.4 |

and above. Similarly, women whose husbands could read and write without formal education were over two times more susceptible to antenatal depression during the COVID-19 pandemic. (Table 3).

Table 3

Factors associated with antenatal depression among pregnant women attending antenatal care in public health institutions during the COVID-19 pandemic in the North Shewa Zone, Amhara region, Ethiopia.

| Variable | Depression | | COR(95% CI) | AOR(95% CI) |
|---|------------|--------|-------------------------|---------------------------|
| | Yes (%) | No (%) | | |
| Marital status | | | | |
| Married | 97 | 250 | 1 | 1 |
| Single | 26 | 22 | 3.046 (1.648–5.630) | 1.982 (0.948–4.146) |
| Divorced | 21 | 6 | 9.021 (3.534–23.026) | 7.523 (2.707–20.911)** |
| Husband's education status | | | | |
| Cannot read and write | 49 | 39 | 6.372(3.130, 12.972) | 4.054 (1.834–8.962)** |
| Can read and write without formal education | 42 | 59 | 3.610(1.799, 7.244) | 2.388 (1.107–5.154)* |
| Primary | 11 | 36 | 1.550(0.639, 3.757) | 1.482 (0.548–4.007) |
| Secondary | 28 | 73 | 1.945(0.947, 3.996) | 1.662 (0.746–3.705) |

** significant at p-value < 0.001.

* significant at p-value < 0.05.

4. Discussion

In this study, the prevalence of antenatal depression during the COVID-19 pandemic among pregnant women attending antenatal care in public health institutions in the North Shewa Zone was 34.1%. This finding was in line with the study conducted in Iran (32.7%)(Effati-Daryani et al., 2020) and Turkey (35.4%)(Durankuş & Aksu, 2020). The results of the study were higher than those of studies conducted in Nigeria (7.2%)(Nwafor, Okedo-Alex, & Ikeotunye, 2021), Sri Lanka (19.5%)(Patabendige, Gamage, Weerasinghe, & Jayawardane, 2020), China (27.43%)(Bo et al., 2021), Belgium (25.3%)(Ceulemans, Hompes, & Foulon, 2020), Mexico (17.5%)(Medina-Jimenez & Bermudez-Rojas, 2020), and Japan (17%)(Matsushima & Horiguchi, 2020). The finding of this study was lower than that of a web-based cross-sectional study conducted in Turkey (56.3%)(Sut & Kucukkaya, 2020). The different measurement tools, socio-demographic and economic differences, and methodological differences among studies might be the reason for the difference in the prevalence of antenatal depression among these countries.

Looking at the factors associated with antenatal depression during the COVID-19 pandemic, antenatal depression was significantly higher among women who had divorced marital status. Participants who were divorced were 7.52 times more likely to have depression during the COVID-19 pandemic than married women. This finding was supported by different studies conducted in Shenzhen, China(Wu et al., 2021), and Japan (Matsushima & Horiguchi, 2020). This might be because divorce is considered a traumatic life event that can result in depression in pregnant women(Health, 2016), and depression is a fairly common and potentially debilitating mental health condition that impacts every aspect of life. The chances of a pregnant woman falling into depression increased greatly during the COVID-19 pandemic following a divorce.

The analysis of this study showed that the odds of having antenatal depression were 4.05 times higher among women whose husbands could not read and write. Similarly, this study also revealed that women whose husbands can read and write without formal education were 2.39 times more likely to have antenatal depression during the COVID-19 pandemic. This finding was in line with the findings of a study performed in Iran(Effati-Daryani et al., 2020). The possible explanation for this might be that even though women are well educated, they may be

worried about COVID-19 transmission because of their uneducated husbands, and this results in women becoming depressed. Lower educational attainment is associated with an increased risk of depressive symptoms (Cohen, Nussbaum, Weintraub, Nichols, & Yen, 2020). The reasons touted are that educated people have a greater number of choices and thus more control over their lives and better response toward COVID-19 prevention; meanwhile, low education has been linked to a lack of a sense of control against transmission and resilience. Education may affect depression during the pandemic through various socioeconomic pathways. First, people with less schooling may have fewer economic and social resources to address depressive episodes due to COVID-19 (Aartsen, Veenstra, & Hansen, 2017). Second, education affects the socioeconomic position, and people who ranked themselves lower in the social milieu, based in part on lower educational attainment, had higher odds of depression than those educated with higher social ranks (Scott et al., 2014). Third, education increases access to employment opportunities that are more creative, mentally stimulating, and involve higher autonomy and safety from COVID-19 transmission, which may also affect mental well-being (Mirowsky & Ross, 2017).

5. Conclusion

This study identified that the prevalence of depression in pregnant women during the novel coronavirus pandemic is high.

Factors such as divorced marital status, husband's educational status "cannot read and write" and "can read and write without formal education" are statistically significant variables associated with antenatal depression during the novel coronavirus COVID-19 pandemic.

Based on the findings of this study, to reduce the level of depression and other psychological impacts of COVID-19 on pregnant women, strategies have to be designed for the early detection of divorced pregnant women with inadequate social support and address enough information for pregnant women and their husbands about depression and COVID-19 during the pandemic.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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