Comparison of Anxiety and Depression Among HIV-Positive and HIV-Negative Pregnant Women During COVID-19 Pandemic in Ekiti State, Southwest Nigeria

Idowu Pius Ade-Ojo 1, Mobolaji Usman Dada 2, Toluope Benedict Adeyanju 3

1 Department of Obstetrics & Gynecology, Ekiti State University, Ado-Ekiti, Ekiti State, Nigeria; 2 Department of Psychiatry, Ekiti State University, Ado-Ekiti, Ekiti State, Nigeria; 3 Department of Obstetrics & Gynecology, Afe Babalola University, Ado-Ekiti, Ekiti State, Nigeria

Correspondence: Idowu Pius Ade-Ojo, Department of Obstetrics & Gynecology, Ekiti State University, PMB 5363, Ado-Ekiti, Ekiti State, Nigeria, Tel +234 8033886173, Email idowu.ade-ojo@eksu.edu.ng

Purpose: Coronavirus disease 2019 (COVID-19) pandemic is the significant public health crisis of the 21st century that has disrupted personal, local, and international territorial relationships. Earlier studies have shown that people with HIV were at least twice at risk of dying from COVID-19 than the general population. There are also deep concerns about the indirect impact of COVID-19 on women within the reproductive age group in Sub-Saharan Africa who were already struggling to access reproductive healthcare services. In addition, pregnant HIV-positive women have an increased rate of anxiety and depression. This study, therefore, examined depression and anxiety disorders in pregnant HIV-positive women in response to the COVID-19 pandemic.

Patients and Methods: This cross-sectional study used a structured questionnaire containing sociodemographic information, Patient Health Questionnaire-9 (PHQ-9), and General Anxiety Disorder-7 (GAD-7) assessment tools. Data obtained were analyzed using Statistical Package for Social Science version 26.

Results: Ninety-nine (99) representing 78% of 127 pregnant HIV-positive women enrolled in the PMTCT program were eligible for this study. This number matched 99 randomly selected pregnant HIV-negative in the study areas as controls. Major depressive disorder (MDD) and severe anxiety disorder were significantly higher among the HIV-positive group than in the HIV-negative group (PHQ-9 Mean ± SD 8.0 ± 5.4 vs 2.3 ± 2.9; p = 0.000) and (GAD-7 Mean ± SD 5.9 ± 4.6 vs 1.2 ± 2.2; p = 0.000).

Conclusion: Given the high prevalence of major depressive disorder and severe anxiety disorder among pregnant HIV-positive women, mental health care should be incorporated into the prevention with positive interventions and strategies to reduce the indirect consequences of the COVID-19 pandemic.

Keywords: COVID-19 pandemic, HIV, pregnancy, depression, anxiety

Introduction

The emergence of severe acute respiratory syndrome corona virus-2 (SARS-CoV-2) in Wuhan city of China in late December 2019 has dramatically impacted lives and relationships. 1,2 Coronavirus disease 2019 (COVID-19) has been described by WHO as the leading health crisis of the 21st century. 3–5 It seems that the coronavirus will be around for a long time. Although there was an initial decline in its pandemic curve, another wave of COVID-19 is rapidly re-surfacing in most countries of the world, 6 hence, the need to devise strategies to continue to neutralize its direct and indirect effects on morbidity and mortality. Most countries in the world have improved their human capital over the past decades; unfortunately, this is being threatened by the impact of the pandemic on healthcare, citizens’ liberties, and the economies of nations. There are deep concerns about the indirect impact of COVID-19 on women within the reproductive age group who already struggle to access reproductive healthcare services, particularly in resource-constrained countries. Shreds of evidence have supported that COVID-19 affects pregnant women and those who have co-morbidities disproportionately. 7,8 Although Human
Immunodeficiency Virus (HIV) presents a more chronic progression than COVID-19, it continues to be a significant global public health issue, having claimed more than a 36.3 million lives so far. The availability of antiretroviral drugs has reduced HIV infection to chronic disease. HIV-positive women now live longer, achieve pregnancies, and are exposed to and infected with SARS-CoV-2. Earlier studies from South Africa and the United Kingdom have shown that people living with HIV were at least twice at risk of dying from COVID-19 than the general population. There is a consensus among studies that the highest risk of mortality is among blacks, Asians, and other people from minority ethnic communities living with HIV. Contrary to the above, a scoping review of literature by Prabhu et al did not show a higher risk of morbidity from Covid-19 among HIV-positive people compared to the general population. Supposedly, pregnancy should be a period of psychological well-being, particularly among Africans with a high premium on childbearing. However, mental health disorders are prevalent among African women during pregnancy. Depression and anxiety disorders are the most common mental health disorders frequently encountered in pregnancy. The literature has quoted a prevalence of 13% and 12%, respectively. According to the National Institute for Health and Care Excellence guidelines, various forms of anxiety disorders (including generalized anxiety disorder, obsessive-compulsive disorder, panic disorder, phobias, post-traumatic stress disorder, social anxiety disorder, and tokophobia (extreme fear of childbirth), and depression are under-recognized throughout pregnancy and the postnatal period. Mothers with these disorders may not get proper antenatal care services and pay less attention to their health status. Studies have shown that depression and anxiety are associated with low birth weight, preterm delivery, and intrauterine growth restriction. These may be due to the stimulation of the hypothalamic-pituitary-adrenal axis by the physical and psychological stressors associated with maternal depression and anxiety disorders. In the postpartum period, there may be a problem with proper bonding between the mothers with mental health disorders and their newborns, reduced attention for the care of newborns with the risk for infant infections, under-immunization, malnutrition, impaired childhood growth and development, and even behavioral problems culminating into developing mental disorders in adulthood. Expectedly, pregnant HIV-positive women will have a heightened rate of anxiety and depression. The current escalating COVID-19 pandemic may worsen this. This study investigated the prevalence of depression and anxiety among pregnant HIV-positive women during the COVID-19 pandemic. The PHQ-9 and GAD-7 scales were used to measure depression and anxiety, respectively, in pregnant HIV-positive women as cases, and the outcome was compared with those of pregnant HIV-negative women who will serve as controls. This study was the first to address this subject in our environment and the first to compare the prevalence of depression and anxiety among HIV-positive and HIV-negative. This study would serve as a baseline for comparing future studies. In addition, the outcome of this study will help formulate management plans that will mitigate the indirect impact of COVID-19 on people living with HIV.

Materials and Methods

Participants
This study was a cross-sectional design conducted among pregnant HIV-positive pregnant and HIV-negative women in Ekiti State, Nigeria. Participants were drawn from eight health facilities in the three senatorial zones between June 1 to November 30, 2020. The study group (cases) comprised all pregnant women who tested positive for HIV and were attending antenatal care clinics at the Ekiti State University Teaching Hospital Ado-Ekiti, State Specialists’ Hospital Iker-Ekiti, Federal Teaching Hospital Ido Ekiti, State Specialists’ Hospital Ikole-Ekiti, General Hospital Emure-Ekiti, and State Specialists’ Hospital Ijero-Ekiti. In addition, they were matched with HIV-negative pregnant women at those hospitals as controls. The exclusion criteria were pregnant HIV-positive and HIV-negative women who had existing mental illnesses, co-morbid illnesses, or refused consent.

Procedure
Trained clinical nurses and mentor mothers recruited pregnant women with HIV who presented for their routine antenatal care clinics. All (127) pregnant HIV-positive women enrolled in the PMTCT program in the study areas during the study period were approached to participate, but only 99, representing 78%, gave their consent to participate. Consequently, 99 pregnant HIV-negative women attending antenatal care clinics were equally selected by simple random sampling to serve as the control. First out of every 3 HIV-negative women were counseled, and those who consented and met the inclusion...
criteria were recruited until the desired number (99) was attained. The questionnaire’s content was explained to each participant in English or local languages, depending on her preference. Those who agreed to participate were given consent forms to sign, and those who could not sign were made to thumbprint on the appropriate column. The interviews were conducted in the private offices allocated within the premises of the hospitals where the research was conducted. Participants who were discomfited with the questions were encouraged by the trained study nurse and mentor mothers and were later referred back to the clinic counselor for further counseling.

**Questionnaire**

A structured questionnaire composed in the English language was administered to the participants, and clarification was provided by the investigators when requested. The questionnaire was divided into two sections. Section one obtained information on the participants’ social demographic, antenatal care, and HIV status characteristics. After completing the first section, the participants were counseled to tick their desired answers in section two, which assessed depression using the Patient Health Questionnaire-9 (PHQ-9) and anxiety using the Generalized Anxiety Disorders-7 (GAD-7). The questions were explained verbally in the requisite local language (Yoruba) for those not fluent in English. The questionnaire was pretested to avoid possible ambiguity by administering it to 50 randomly selected antenatal clinic attendees at the Ekiti State University Teaching Hospital in the month preceding the month of commencement of the research. The coefficient of reliability of 0.85 was obtained, which was considered appropriate.

**Patient Health Questionnaire**

The severity of depression in participants was measured using the Patient Health Questionnaire-9 (PHQ-9) scale. The scale contained 9 questions assessing depressive symptoms based on the Diagnostic and Statistical Manual 4th edition (DSM-4) diagnostic criteria. Each question has four possible responses (not at all, several days, more often, and nearly every day), with an allocated score of 0 to 3. The total possible score ranged from 0 to 27, with 0–4 depicting none/minimal, 5–9 mild, 10–14 moderate, 15–19 moderately severe, and 20–27 severe depression. Scores ≥10 were considered major depressive disorders (MDD).

**Generalized Anxiety Disorder**

Similarly, the severity of anxiety was measured using the Generalized Anxiety Disorder-7 (GAD-7). The scale contained seven questions assessing anxiety symptoms. Each question has four possible responses (not at all, several days, more often, and nearly every day), with an allocated score of 0 to 3. The total possible score ranged from 0 to 21. A total score of 8 was set as a cut-point for identifying probable cases of generalized anxiety disorder. The severity of anxiety was further divided into 0–4 minimal, 5–9 mild, 10–14 moderate, and 15–21 severe anxiety.

**Statistical Analysis**

Data obtained from the completed questionnaire and assessment tools were analyzed using Statistical Package for Social Science version 26 (SPSS, Inc., Chicago, IL). Shapiro Wilk test for normality was used to check for normality of continuous and logarithm transformation was also used to reduce the influence of the data on each other. Continuous variables are presented as mean ± standard deviation and categorical variables as frequency (percentage). We compared cases and control data using the Mann–Whitney U-test or Chi-square tests to compare proportions. Statistical significance was set at a p-value <0.05.

**Ethics Approval**

The Human Research and Ethics committee of Ekiti State University Teaching, Ado-Ekiti, approved the questionnaire and methodology for this study with protocol number EKSUTH/A67/2021/04/005. We obtained the consent of all the patients before including them in this study. There was no implication for those who declined consent. There were no undue risks to participants during the process of data collection. There was no financial cost to the subjects at any study stage. The study complies with the guidelines of the Declaration of Helsinki, Good Clinical Practice, and the World Association for Social, Opinion, and Market Research (ESOMAR).
Results
A total of 99 HIV-positive and 99 HIV-negative pregnant women participated in the study. Table 1 represents the sociodemographic details of the participants. There was no significant difference in most of the sociodemographic characteristics between cases and the controls except that the mean age of the pregnant HIV-positive women was significantly higher than the mean age of pregnant HIV-negative pregnant women (34.2 ± 4.1 years vs 32.0 ± 3.5 years and p < 0.000). The majority of the participants were married, in a monogamous family setting, and were Christians. Approximately half of the participants were para 1, with about half of the participants within 15–28 weeks estimated gestational age. A high proportion of the participants were unemployed (45.5% of cases and 33.3% among controls).

The Severity of Depression and Anxiety
Table 2 depicts the severity of depression and anxiety on the PHQ-9 and GAD-7 scales. More participants in the study group experienced more severe forms of depression and anxiety than the control group. Depression (None/
Table 2 Severity of Depression and Anxiety Using PHQ-9 and GAD-7 Scales

|                  | HIV Positive | HIV Negative | Total | Mann–Whitney U | p-value |
|------------------|--------------|--------------|-------|----------------|---------|
| **Depression**   |              |              |       |                |         |
| None Minimal     | 17(17.2)     | 53(53.5)     | 70(35.4) | 2180.000       | 0.000   |
| Mild             | 33(33.3)     | 25(25.3)     | 58(29.3) |                |         |
| Moderate         | 29(29.3)     | 15(15.2)     | 44(22.2) |                |         |
| Moderately Severe| 15(15.2)     | 5(5.1)       | 20(10.1) |                |         |
| Severe           | 5(5.1)       | 1(1.0)       | 6(3.0)   |                |         |
| **Anxiety**      |              |              |       |                |         |
| Minimal          | 18(18.2)     | 51(51.5)     | 69(69.7) | 2507.000       | 0.000   |
| Mild             | 44(44.4)     | 27(27.3)     | 71(71.7) |                |         |
| Moderate         | 28(28.3)     | 17(17.2)     | 45(45.5) |                |         |
| Severe           | 9(9.1)       | 4(4.0)       | 13(13.1) |                |         |

Table 2 highlights the severity of depression and anxiety using PHQ-9 and GAD-7 scales among HIV-positive and HIV-negative pregnant women. The table shows the distribution of each depression and anxiety category and the corresponding statistical tests (Mann–Whitney U and p-value) to compare the two groups. The results indicate significant differences in the severity of depression and anxiety between the two groups, with higher scores in the HIV-positive group, especially for severe depression and anxiety.

Association Between Sociodemographic Characteristics and PHQ-9 Score Among HIV-Positive Pregnant Women

Table 4 highlights the factors associated with the PHQ-9 score among HIV-positive pregnant women. PHQ-9 score was significantly associated with religion on both simple and multiple linear regression analyses with an estimate of p = 0.002 and $\beta_3 = 3.032$ p = 0.031, respectively. In addition, simple linear regression analysis showed that type of marriage was significantly associated with PHQ-9 score with an estimate $\beta_3 = 3.032$ and p-value of 0.036. There was no significant association between other sociodemographic characteristics and PHQ-9 scores.
Discussion
COVID-19 pandemic heralded an unprecedented heightened psychosocial distress among everyone and everywhere. This current study compares depression and anxiety among pregnant HIV-positive and HIV-negative women during the current COVID-19 pandemic. This study revealed that 49.5% of pregnant HIV-positive women met the criteria for major depressive disorder MDD (PHQ-9 ≥ 10) with a mean and standard deviation (PHQ-9 Mean ± SD 8.0 ± 5.4 vs 2.3 ± 2.9; p = 0.000). The study also observed that 37.4% of pregnant HIV-positive women have severe anxiety disorder with a mean and standard deviation (GAD-7 Mean ± SD 5.9 ± 4.6 vs 1.2 ± 2.2; p = 0.000). Various researchers have observed that pregnant women are physiologically prone to mental disorders during stressful life events due to the elevation in plasma cortisol levels.\(^\text{21}\) While this may be one of the reasons for the high rate of psychological morbidity among the participants during the pandemic, others have also observed that women living with HIV have an increased prevalence of most common mental health disorders.\(^\text{10-13}\) Although studies have shown that common mental disorders like depression and anxiety are common in pregnancy,\(^\text{16,29,30}\) there have been few studies among pregnant HIV-positive women.\(^\text{31,32}\) We are not aware of any study that has compared depression and anxiety among HIV-positive and HIV-negative pregnant women in our environment. In Nigeria, Thompson and Ajayi\(^\text{33}\) found a prevalence of antenatal depression of 24.5% among pregnant women; similarly, in a study done in Ekiti State among pregnant women, psychological morbidity was 36.7%.\(^\text{34}\) These prevalence rates are far less than 49.5% found among HIV-positive pregnant women but slightly higher than 21.2% found among HIV-negative pregnant women in this study. Studies from other African countries among HIV-positive pregnant women by Ngocho et al\(^\text{32}\) and Yousuf et al\(^\text{25}\) conducted before the COVID-19 found a prevalence of depression and

### Table 4 Relationship Between Sociodemographic and PHQ-9 Depression Score Among HIV Positive Pregnant Women

| Characteristics          | B(SE)          | P-value | B(SE)          | P-value |
|--------------------------|----------------|---------|----------------|---------|
| Age                      | -0.449(0.481) | 0.353   | -0.247(0.518) | 0.635   |
| Marital Status           | -0.030(2.112) | 0.989   | -0.339(2.169) | 0.876   |
| Type of Marriage         | 3.032(1.429)  | 0.036   | 2.370(1.550)  | 0.130   |
| Parity                   | 0.565(0.611)  | 0.357   | 0.583(0.673)  | 0.363   |
| Estimated Gestational Age| 0.667(0.912)  | 0.466   | 0.150(0.933)  | 0.872   |
| Religion                 | 4.078(1.520)  | 0.022   | 3.040(1.389)  | 0.031   |
| Level of Education       | -0.579(0.366) | 0.117   | -0.217(0.420) | 0.606   |
| Occupation               | 1.989(1.089)  | 0.071   | 0.943(1.278)  | 0.463   |
| Partner HIV status       | -1.191(0.786) | 0.133   | -0.399(0.888) | 0.654   |

### Table 5 Relationship Between Sociodemographic and GAD-7 Anxiety Score Among HIV Positive Pregnant Women

| Characteristics          | B(SE)          | P-value | B(SE)          | P-value |
|--------------------------|----------------|---------|----------------|---------|
| Age                      | -0.449(0.409) | 0.275   | -0.140(0.422) | 0.741   |
| Marital Status           | -1.231(1.794) | 0.494   | -0.666(1.766) | 0.707   |
| Type of Marriage         | 3.269(1.199)  | 0.008   | 2.472(1.262)  | 0.053   |
| Parity                   | 0.285(0.521)  | 0.586   | 0.307(0.519)  | 0.556   |
| Estimated Gestational Age| 0.194(0.778)  | 0.803   | -0.189(0.760) | 0.804   |
| Religion                 | 4.215(1.036)  | 0.000   | 3.262(1.131)  | 0.005   |
| Level of Education       | -0.526(0.311) | 0.094   | -0.220(0.342) | 0.522   |
| Occupation               | 1.324(0.986)  | 0.183   | 0.736(0.104)  | 0.481   |
| Partner HIV Status       | -1.210(0.665) | 0.072   | -0.461(0.723) | 0.526   |
anxiety (25% and 24.3%) and (32.5% and 28.9%) in Tanzania and Ethiopia respectively. The prevalence of depression and anxiety found in these studies was far less than in our study conducted during the COVID-19 pandemic. The finding of significantly higher mean age of pregnant HIV-positive women than the HIV-negative women seen in this study (34.2±4.1 vs 32.0±3.5) may be due to stigmatization, higher use of family planning and more reported cases of union dissolution may delay marriage, conception and childbearing among the HIV-positive women. This study also found a strong association between marriage type and psychiatric morbidity among HIV-positive patients. Frequent marital disharmony in polygamous marriages in southwestern Nigeria may be responsible for this finding. This finding supports previous meta-analyses that have indicated that women in polygamous family settings are more susceptible to worsened mental health than their monogamous counterparts.

A significant limitation of this study is the small sample size. However, this may have little effect on outcome because the prevalence of HIV in Ekiti State is about 2.9% according to the 2014 sentinel survey. Another limitation is the study’s cross-sectional nature, which makes it difficult to establish causality.

Conclusion

Major depressive disorder (MDD) and severe anxiety disorders are common in pregnancy, with a more significant proportion in pregnant HIV-positive women than HIV-negative pregnant women. The prevalence of MDD and severe anxiety disorder found among pregnant HIV-negative women in this study was comparable with those found by other investigators before and during COVID-19. We, however, found a higher prevalence of these mental disorders in pregnant HIV-positive women than those found by other researchers before the advent of the COVID-19 pandemic. Therefore, the findings in this study may suggest that the COVID-19 pandemic has heightened depression and anxiety in pregnant HIV-positive women. We suggest that mental health care should be incorporated into the prevention with positive intervention and strategies to fill this conspicuous mental health gap and mitigate against the indirect consequences of the COVID-19 pandemic among HIV-positive pregnant women.

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Disclosure

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