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Original Article

Psychological Impact of Female Human Immune Deficiency Virus Serodiscordance on Birth Weight Among Retroviral Disease Positive Pregnant Women Attending Antenatal Clinic in Imo State University Teaching Hospital, Orlu

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Abstract *- This study aims to determine if the psychological trauma (stress, anxiety, and depression) experienced by the HIV serodiscordant pregnant patient because of her retroviral status in the index pregnancy has any effect on the birth weight of her baby. Dedicated doctors, midwives, nurses, and laboratory scientists working at Imo State University Teaching Hospital, Orlu, Imo State, were recruited as facilitators for the study. Consenting HIV serodiscordant pregnant women who met the inclusion criteria were interviewed by a psychologist recruited for the study during the third trimester of their pregnancy using a prepared questionnaire containing questions relevant to the study. The women were grouped into two groups, A and B. Group A was for those women that are confirmed to be HIV serodiscordant but did not experience emotional distress (stress, anxiety, and depression) in the index pregnancy because of their serodiscordance, while group B was for those HIV serodiscordant patients who experienced emotional distress in the index pregnancy because of their serodiscordance. Those with emotional distress because of their serodiscordance were further classified into the stressed group, anxiety group, and those with frank depression using the DAS scale (Depression, Anxiety, and Stress). At delivery, the birth weights from the two groups were recorded in the notebook provided by the researcher for the study. Using the Statistical Package for Social Sciences (SPSS) for data analysis, the study revealed the statistical difference between the birth weights of babies delivered by mothers that had emotional distress (stress, anxiety and depression) in pregnancy and mothers that did not have emotional distress in pregnancy, and significant difference between the mean birth weights of the neonates in group A and group B was identified as well.*

Keywords *- Birth Weight, HIV, Psychological, Retroviral Disease, Serodiscordance.*

1. Introduction

Low birth weight is a significant public health problem that newborns face [1, 2]. Preterm births and low birth weights are the leading causes of infant morbidity and mortality [1, 3, 4, 5]. Apart from immediate problems like increased neonatal care, respiratory and ear infections, they are associated with both short-term and long-term morbidity [6, 7, 8]. Long-term morbidity includes an increased rate of neurological disorders like cerebral palsy, cognitive problems like attention deficits, low intelligence, and a deficiency of language and motor skills [2, 9, 10]. These children are also prone to other long-term morbidities like conduct disorders, poor growth attainment, obesity, and diabetes mellitus [3, 9, 11]. Recent indices of low birth weight and preterm births are 12% and 7.8% respectively [4, 12].

Human Immunodeficiency Virus (HIV) is a form of persistent infection caused by a virus, and for which a total cure is still unknown [13, 14, 15]. The continuous formation of HIV results in AIDS [5, 6]. Among the twenty-four percent maternal mortality in Sub-Saharan Africa, HIV is a

causal factor [7, 16], and also the cause of maternal emotional trauma in pregnancy [1, 17], which often results in faulty birth outcomes [1, 18], which are sometimes referred to as an act of God.

Identification of serodiscordancy in the pregnant patient is usually done during couple HIV counseling and testing during booking visits in the antenatal clinic [19, 20, 49, 50]. Between 20-80% of diagnosed HIV positive pregnant patients may have partners who test negative for the virus, depending on the setting [7, 8, 21]. In Sub-Saharan Africa, the prevalence of female serodiscordance is about 60% among married/ cohabiting couples [7, 15].

Studies have shown that the negative psychological impact emanating from the hostile nature of the husband may result in substance abuse, depression, alcoholism, anxiety, disorder, sleep disorder, stress, avoidance of antenatal clinic, and suicidal tendencies [31, 32, 33, 34, 35 36, 36, 37, 38]. These women have been reported to have at least twice the risk of inadequate prenatal care compared to those who are HIV negative [42]. It is also associated with more adverse pregnancy outcomes and decreased use of paediatric care after birth [42, 43, 44]. The children from such mothers have been linked with developmental delay, antisocial behavior, and criminality [44, 45, 46].

This study aims to study the effect of psychological distress as a result of female HIV serodiscordance on birth weight among HIV seropositive pregnant patients attending the antenatal clinic in IMSUTH, Orlu. Imo State, Nigeria, and proffer solutions if necessary, with a view to:

- Determining birth weights of neonates delivered to serodiscordant mothers with psychological distress in pregnancy, and also HIV serodiscordant mothers without psychological distress in pregnancy.
- Determining the mean birth weights of neonates delivered by HIV serodiscordant mothers with psychological distress during pregnancy and neonates delivered by HIV serodiscordant mothers but without psychological distress during pregnancy.
- Determining if there is a significant statistical difference between the birth weights of neonates delivered by HIV serodiscordant mothers with psychological distress (stress, anxiety, and depression) during pregnancy and the birth weights of neonates delivered by HIV serodiscordant mothers without psychological distress during pregnancy.

2. Literature Review

2.1. Serodiscordance

A serodiscordant couple, also known as serodivergent, magnetic, or HIV positive/negative couple, is one in which one partner is HIV positive and the other is HIV negative [15]. When the female tests positive for HIV and the partner tests negative, it is called female serodiscordance. If the male partner tests positive and the female tests negative, it is called male serodiscordance—these contrast with seroconcordance, where both partners have the same serostatus [15]. The discordance rate is reported to be increasing and is said to be as high as 45% in the University College Hospital, Ibadan, Prevention of Mother-to-Child Transmission clinic [12].

Several studies done in Sub-Saharan Africa have noted a high prevalence of HIV serodiscordance among heterosexual couples [13, 14, 15], ranging from 2% in Rwanda [23] and Lesotho [24] and 80% in Nigeria [25]. The prevalence of female serodiscordance is very high [26], with married and cohabiting couples being disproportionately affected [27]. The cause of this discrepancy is unknown, but certain factors have been postulated to contribute to it. These factors include unfaithfulness, the anatomical or biological structure of the female genitalia, duration of cohabitation, and virulence of the HIV strain [30].

The vagina has a large mucosal surface and contains a large volume of body fluids that is exposed to semen and facilitates transmission of the virus. On the other hand, male circumcision has a protective effect on males from contracting the virus [30]. The virulence of the infecting HIV is also said to contribute to the discrepancy. Some strains are highly virulent and can be easily transmitted to a partner, while others are less virulent and are not easily transmitted.

Sexual experience at the time of marriage may also influence the discrepancy. Women are more vulnerable to HIV infection due to reasons ranging from biological to social, economic, cultural, and religious factors. Young women are exposed to sexual intercourse early in life and usually with older partners [30]. Another important factor is the length of cohabitation as a married couple; the average length of cohabitation has been postulated to be approximately 2 years for serodiscordant couples [10].

In a study done on HIV serodiscordant pregnant women in Lagos, Nigeria, it was found that the discordant rate was higher in women aged less than 35 years, primipara, secondary educational level, increasing social class, history of induced abortion more than two times, life time sexual partners of about 2-4 and gestational age more than 13 weeks [28]. Receiving an HIV diagnosis during pregnancy is particularly traumatic as the diagnosis is further complicated by the husband's seronegativity [55].

2.2. Spousal Response to Serodiscordance

Spousal response to the serodiscordance may vary depending on the age, marital status, level of education of the partner, cultural background, religious belief, Parity of the woman, and means of acquisition of the HIV by the woman. The response may be that of understanding, care, and

support; some may react with hostility, which may lead to intimate partner violence [17].

Anticipated consequences, which are well documented in the literature, include fear of accusation of infidelity [16, 17], abandonment [17, 18], violence [17, 19, 20], stigma and discrimination [18, 21, 22], separation [48], and fear of loss of economic support. Hostile response of the partner to the serodiscordance may worsen the woman's psychological distress in the form of loss of interest in life, feeling of worthlessness, suicidal ideation, and anxiety [36].

2.3. Serodiscordance and Its Effect on Pregnancy

Unlike individuals affected with other chronic illnesses, the serodiscordant woman experiences multiple distresses. Psychologically, they experience distress that emanates from living with chronic illness, complex medical treatments, and fear of infecting their baby and their husband [67, 68, 72]. Physiologically, they may experience decreased appetite, weight loss [31], and weakened immunological resilience that may hasten the onset of AIDS and its progression. Both the psychological and physiological distress will induce different complications like substance abuse, suicidal attempts, and reduced adherence to pharmacological treatments [15].

The serodiscordant pregnant patient also faces other problems like reduced quality of life, stigmatization, fear of rejection, violence from intimate partner violence, and concerns about sexuality and reproductive health [33, 34]. Another psychological problem faced by the serodiscordant patient is the fear of transmitting the virus to her husband [47, 48, 67].

The HIV serodiscordant woman is also bordered by the fear of possibly transmitting the virus to her unborn child. Studies have shown that the cumulative risk of transmitting the virus to the fetus is about 10% in pregnancy, 19-21% during labour and delivery, and 31-39% during 24 months of breastfeeding 68 She is also worried by the guilt of being responsible for the transmission of the virus to the unborn child and the lifelong stigma the child is going to face after delivery. Another potential dilemma faced by the woman is the fear of the potential side effects of the Highly Active Anti-Retroviral Therapy she is taking during the pregnancy. These drugs have potential side effects both to the mother and to the fetus. Zidovudine is known to cause macrocytic anaemia in the mother, Abacavir is known to cause myocardial infarction, and nevirapine is associated with hepatitis 72

The total of these is enormous psychological distress on this patient in the form of anxiety, depression, and daily hassles, which may have adverse birth outcomes in the form of low birth weight, preterm delivery, still birth, low head circumference, and low Apgar score [1].

2.4. Effect of Serodiscordance on Birth Weight

Birth outcomes are indices used to describe the health of a neonate at delivery. These criteria include low birth weight, preterm delivery, congenital anomaly, stillbirth, and neurodevelopmental defects [1]. Low Birth weight (LBW) is defined as a birth weight of less than 2500g regardless of gestational age. Most researchers use low birth weight to determine birth outcomes because it is easily measurable and reproducible [72]. It represents maternal exposure to health risks during pregnancy and the infant's current and future morbidity and mortality risks [73].

Low birth weight is a crucial indicator in determining birth outcomes because it is a significant marker of multifaceted public health issues, including long-term maternal malnutrition, poor health, and inadequate healthcare during pregnancy [73]. It also represents maternal exposure to health risks during pregnancy. It constitutes about 16% of all deliveries, and Africa contributes 15-25% of the total [73]. Causes of LBW include preterm labour, poor maternal nutritional status, lack of prenatal care, maternal sickness during pregnancy, maternal emotional status, and sex of the baby [87]. Others include Parity of the mother, age of the mother, social status of the mother, and lifestyle, such as smoking and alcohol intake [87].

Low birth weight, prematurity, and intra-uterine growth restrictions are the leading causes of perinatal morbidity and mortality [87]. It contributes 60-80% of infant mortality in the developing countries [74]. It is an important predictor of newborn health and survival and is associated with childhood mortality [75]. It is also tied to low brain volume in children [76]. Other problems associated with LBW are a higher rate of sensorineural impairments, such as cerebral palsy, visual, auditory, and intellectual impairments. These can impose a substantial burden on special education and social services on families and caretakers of the infants and society in general [77].

Studies done with animals have demonstrated that exposing animals to stressors during pregnancy can cause low birth weight, but results have been conflicting in humans [78]. The Avlon Longitudinal Study of Parents and Children (ALSPAC) reported an association between lower birth weight and maternal depression, although this was significantly affected by cofounders like smoking [79]. An association was shown by Diego et. al between maternal psychological distress (anxiety, depression, and daily hassles) and low fetal birth weight [80].

Preterm birth, defined as delivery before 37 completed weeks, represents the most significant problem in maternal-child health. It is the leading cause of infant mortality and morbidity. Its aetiology is largely unknown, but maternal distress in pregnancy has been implicated as one of the causes [87]. It was reported that women exposed to high

stressors in pregnancy have an average of approximately a 25-60% increased risk for preterm birth compared to women reporting low stress level in pregnancy, and this has necessitated health researchers to study the impact of prenatal distress on preterm birth [81]. A recent report suggests that a maternal distress signal, elevated cortisol early in pregnancy, is associated with a significant and precocious rise in placental corticosteroid-releasing hormone later in pregnancy, and this effect is associated with preterm birth [82]. Petraglia and colleagues in their in vivo studies demonstrated that CRH is released from the cultured human placental cells in a dose-response manner in response to stress [83].

2.5. Couple Counselling Uptake

A major difficulty anticipated in this study will be convincing the husband of the patient to come for the HIV testing. Uptake of couples' HIV counseling and testing has remained consistently low (below 30%) over the years [91]. In sub-Saharan Africa, a large proportion of newly acquired HIV infection among adults occurred within discordant marital or cohabiting relationships [91]. However, several studies have shown that over 80% of married couples are not aware of their own status or their partner's HIV status [92]

Several factors have been found to hamper effective uptake of couples' HIV counseling and testing. These include fear of marital consequences following the HIV testing and counseling, low male participation, age of the partner, prior HIV testing and counseling, knowledge of voluntary counseling and testing services, stigmatization, and engagement in sexual relationship outside their matrimony [90].

Several studies have shown that females are more likely to uptake HIV counseling and testing compared to males, it was suggested that this may be due to the fact that females tend to start having sexual activities earlier than the males and also the fact that the males are not fully involving themselves in HIV prevention programs making it difficult for them to recognize the importance of knowing their status [12] Another factor influencing uptake of HIV counseling and testing is the level of education. Studies have shown that the uptake of HCT increases with the level of education. It is postulated that this may be due to the fact that the educated males or females are more exposed to education on HCT and HIV infections, which provides them with more confidence in undergoing HCT [88].

Anxiety and stress from fear of stigmatization from the family or community is another factor that hampers partners from HCT. This is because the partner may lack knowledge and confidence on how to cope with either of the test results [90]. The HIV positive woman may face this dilemma of how to convince her husband to go for HCT; thus, she may refuse to disclose her status to her partner or postpone it indefinitely because of the unpredictability of his response [9, 10].

Several studies have implicated psychological distress in pregnancy as one of the factors responsible for adverse birth outcomes, as evidenced by preterm delivery, low birth weight, and low head circumference [81, 82, 84, 85, 86]. The purpose of this study is to determine the effect of psychological distress on the birth weight of neonates of HIV serodiscordant pregnant women attending the antenatal clinic in Imo State University Teaching Hospital, Orlu, and, if possible, proffer solutions.

3. Materials and Methods

3.1. Study Design

This was a comparative analytical study conducted in the labour ward of Imo State University Teaching Hospital (IMSUTH), Orlu. In this study, the birth weights of neonates delivered by HIV serodiscordant mothers who experienced psychological distress (stress, anxiety, and depression) during pregnancy will be compared with the birth weights of neonates delivered by HIV serodiscordant mothers who did not experience psychological distress during pregnancy.

3.2. Study Area

Orlu is a semi-urban town in Imo State, Southern Nigeria. It is the second largest city in Imo state after Owerri. It has an estimated population of 420,000. Imo State University Teaching Hospital, Orlu, is a referral tertiary hospital that is located in Orlu in Imo state, Nigeria. It serves as a teaching hospital for medical students of Imo State University(IMSU), Owerri, and also as a referral center for hospitals in Imo state and surrounding states like Anambra, Abia, Ebonyi, Rivers, Enugu, and Bayelsa states.

The HIV unit of the Obstetrics and Gynaecology caters to a large population of women who registered for antenatal care in the hospital, and also for those who are referred from peripheral centers in Imo state and surrounding states. The patients are seen every Tuesday in the HIV clinic. Emergency cases are attended to by the unit on call every day.

3.3. Materials

Consent was obtained from the ethical committee of the hospital, and with the knowledge of my supervisor, willing resident doctors, house officers, midwives, and staff nurses who work in the labour ward and delivery unit of the department of Obstetrics and Gynaecology, and a psychologist who works in the Teaching Hospital were recruited as facilitators for the study. The staff of the haematology department were also informed about the study. Those recruited were educated about the research and its methodology. A notebook that was used in the labour ward to document birth weights was provided by the researcher.

3.4. Patients' Recruitment

Recruitment of patients for the study started at the antenatal clinic. After the initial assessment of the pregnant patient, pretest HIV counseling was given to the patient. Then, under aseptic conditions, 2 mL of blood was collected for HIV screening. A confirmatory HIV test was done for those who screened positive. Post-test counseling was provided to those who screened positive, and those who screened negative were counseled on how to prevent contracting the virus and the importance of repeating the test in three months' time. A confirmatory test was conducted for those who initially screened positive for the virus. Those who were confirmed to have the virus were advised to attend their next antenatal visit accompanied by their husbands.

3.5. Data Collection

During the visit, blood samples were collected from her husband after extensive counseling for HIV-1 and HIV-2 screening and confirmatory tests. A trained laboratory scientist in the hematology department at IMSUTH carried out the tests, and strict confidentiality was maintained. Those whose husbands are HIV negative were counseled about the study, and those who were eligible and consented to the study were monitored. During their third trimester of pregnancy, the patient was given a questionnaire to complete.

The next phase of the study involved collecting data. This was done in the labour ward by the researcher or the hospital staff recruited for the study and involved in the delivery of these women participating in the study. When the patient comes in labour, her weight is measured in kilograms, and at delivery, the baby's weight is measured in kilograms with a weighing scale by the researcher or the hospital staff recruited for the study. The weight was measured in kilograms, and the result was recorded in the notebook provided by the researcher for this purpose. This process was repeated for these women in both groups till the desired number in both groups was achieved.

3.6. Data Analysis

The data obtained from both groups were recorded and stored in the database. The mean and standard deviation were determined for each group [100]. Statistical analysis of the data was performed using the Statistical Package for the Social Sciences (SPSS) [101].

3.7. Sample Size Determination

Sample size calculation for dependent samples (paired t-test)

Using the formula $n = (z\ \alpha/2 + z\ \beta\ )2\ x(sd)2/d2.94$

n= Number of patients in each group.

$z\alpha/2$ = Standard normal deviate corresponding to the probability of a type 1 error

. $z\beta$ = Standard normal deviate corresponding to the probability of a type 2 error.

Sd. Estimated standard deviation of paired response differences (ie, standard deviation of the difference of the means between group A and B.

D Effect or the difference between the means of the two groups that will be considered clinically significant.

The power of the study will be set at 80% with a type 1 error rate of 5%, then $z\alpha/2 = 1.96$ and $z\beta = 0.84$.
Sd estimated from previous study = 45.32 and d = 10.

Thus n = 161

The sample size for each group in this study was 161 women.

The total number of patients recruited for this study was 322.

3.8. Inclusion and Exclusion Criteria

3.8.1. Inclusion criteria

[1] All pregnant women attending the antenatal clinic at IMSUTH, Orlu, who consented to HIV testing.
[2] Those who are confirmed to be HIV positive.
[3] Those whose husbands tested negative for HIV and consented to participate in the study.
[4] HIV positive serodiscordant mothers who do not have medical conditions like diabetes mellitus or hypertension.
[5] HIV serodiscordant antenatal patients with a singleton.

3.8.2. Exclusion Criteria

[1] Those who declined to give consent for HIV testing.
[2] Those whose husbands tested positive for HIV.
[3] Those pregnant women who tested negative for HIV.
[4] Those who tested positive for HIV but declined to participate in the study.
[5] HIV serodiscordant pregnant women who had medical conditions in pregnancy, such as hypertension and diabetes mellitus.
[6] HIV serodiscordant pregnant women that has multiple pregnancies.
[7] Those with advanced HIV disease should avoid their influence on the birth weight.

3.9. Measure of Outcome

The measure of outcome of the study was the determination of a statistically significant difference in the mean birth weights between the neonates delivered by mothers from the two groups.

4. Results

Three hundred and twenty two HIV positive pregnant women with serodiscordance participated in the study, one hundred and sixty one women have the support of their husband despite the irserodiscordance and thus did not have emotional distress in pregnancy because of their serodiscordance and were in group A, and the other one hundred and sixty one women with serodiscordance who had varying degree of emotional distress as a result of their husband's hostility because of their serodiscordance were in group B.

Those in group B were interviewed during the third trimester of their pregnancy using the DASS questionnaire. Out of the one hundred and sixty-one women interviewed, eighty-eight women (54.7%) scored from 0-7, which corresponds to mild emotional distress, fifty-six women (34.8%)scored from 8-14, which corresponds to moderate emotional distress, and seventeen women (10.6%)scored from 15- 21, which corresponds to severe distress.

Table 1. Demographic Distribution of Patients Based on Their Response to the DASS Questionnaire

Mild	Moderate	Severe
88 (54.7%)	56 (34.8%)	17 (10.6%)

Table 2. Demographic Distribution of Women in Both Groups according to their Weights and Parity

Maternal weight in kg	Group A	Group B
45.0-49.9	7	25
50.0-54.9	20	45
55.0-59.9	30	66
60.0-64.9	35	10
65.0-69.9	40	10
70.0-74.9	20	3
≥75.0	9	2

Table 3. Demographic Distribution of the Women in Both Groups according to their Parity

Parity	Group A	Group B
1	10	43
2	40	67
3	50	30
4	25	13
5	20	6
≥6	16	2

Table 4(a). Distribution of Babies Born to Mothers in Both Groups Based on Their Sex

Sex	Group A	Group B
Male	72	68
Female	89	93

The distribution in Table 1 shows that most of the women in group B belong to the subgroup with mild emotional distress (54.7%). In comparison, only 10.6% belong to the subgroup with severe emotional distress. While most of the women in group A had mild emotional distress.

Table 4(b). Distribution of Birthweights in kg in Group A and Group B

"Birth weights in kg"	"Group A"	"Group B"
"≤ 2.49"	18	23
"2.50-2.99"	33	65
"3.00-3.49"	56	36
"3.50-3.99"	38	21
"4.00-4.49"	13	11
"≥4.50"	3	5

Table 2 shows the distribution of patients according to their weights. Seven women in group A, representing 4.3% of the total, weighed less than 50.0kg, while twenty women in group B, representing 15.2% of the total, weighed less than 50.0kg. 9 women in group A, representing 5.6% weighed 75kg or more, while 2 women in group B, representing 1.2% weighed more than 75kg or more. The mean weight of women in group A is 56.3kg. The mean weight of women in group B is 55.2kg.

In group A, only 10 women, representing 6.2%, were para 1, while in group B, 43 women, representing 26.7%, were para 1. In group A, 16 women, representing 9.8%, have equal to or more than 6 children, while in group B, 10 women, representing 1.2%, have equal to or more than 6 children. Para 3 has the highest number of women in Group A, with 50 women representing 31.1%, and in Group B, Para 2, with 67 women representing 41.6% of the total, has the highest number of women. The mean Parity in group A is 3, while the mean Parity in group B is 2.

Showing that there is no significant difference between them.

Table 3 shows the distribution of women according to their Parity. In group A, only 10 women, representing 6.2%, were para 1, while in group B, 43 women, representing 26.7%, were para 1. In group A, 16 women, representing 9.9%, have equal to or more than 6 children, while in group B, 10 women, representing 1.2%, have equal to or more than 6 children. Para 3 has the highest number of women in Group A, with 50 women representing 31.1%, and in Group B, Para 2 has the highest number of women, with 67 women representing 41.6% of the total. The mean Parity in group A is 3, while the mean Parity in group B is 2.

The distribution of neonates born to mothers in both groups A and B shows that in group A, 72 male neonates, representing 44.7%, were delivered, while the remaining 55.3% were females. In group B, 68 neonates representing 42.2% were males, while 93 neonates representing 57.8%

were females. This indicates that more males were born to the women in group A (See Table 4a).

Table 4b shows that 18 neonates representing 11.2% weighed less than 2.50kg in group A, while 23 neonates representing 14.2% in group B weighed less than 2.50kg. Most babies in group A, 56 representing 34.8% weighed between 3.00-3.49kg, while in group B, most babies, 65 representing 40.4% weighed between 3.00-3.49kg. The mean weight of babies in group A is 3.3kg, while the mean weight of babies in group B is 3.1kg. This indicates a statistically significant difference in mean birth weight between the two groups.

Table 5. Relationship Between Gestational Age at Delivery (Ga) in Weeks and Degree of Emotional Distress

Gestational age in completed weeks	No distress (Group A)	Mild distress	Moderate distress	Severe distress
31-33	9	5	7	5
34-36	15	25	25	9
37-39	110	50	18	2
≥40	27	10	4	1

Table 5 shows the relationship between the level of distress and the gestational age at delivery. In group A, 24 women representing 26% of the patients in the group delivered before 37 completed weeks, while in the group of women with severe emotional distress, 11 women in the group representing 64.7% delivered before 37 completed weeks. 137 women in group A, representing 85.1% delivered after 37 completed weeks, while in the group with severe emotional distress, 6 women, representing 35.3% delivered after 37 completed weeks. In group A, the mean gestational age at delivery was 38 weeks, while in group B, the mean gestational age at delivery varied across the subgroups: 36 weeks for those with mild distress, 34 weeks for those with moderate emotional distress, and 31 weeks for those with severe emotional distress.

Table 6. Relationship between Birth Weight and Degree of Distress

"Birthweight in kg"	"Group A"	"Mild distress"	"Moderate distress"	"Severe distress"
"≤ 2.49"	18	9	7	7
"2.50-2.99"	33	36	24	5
"3.00-3.49"	56	21	11	4
"3.50-3.99"	38	12	8	1
"4.00-4.49"	13	8	3	Nil
"≥4.50"	3	2	3	Nil

The distribution of birth weights according to degree of distress in Table 6 shows that in group A, 18 neonates, representing 11.2% of the neonates delivered by women in this group, weighed less than 2.50kg at delivery. In contrast, in group B, the women with severe emotional distress, 7 neonates representing 41.2% weighed less than 2.50kg. In group A, 26 neonates, representing 16.1% of the neonates delivered by women in this group, weighed 4.00kg or more.

In contrast, in group B, none of the neonates delivered by women in this group weighed 3.5kg or more, as all of them had severe emotional distress. The mean weight of neonates delivered by the women in group A was 3.4kg. In comparison, the mean weight of neonates delivered by the women in group B was 3.0kg, 2.8kg, and 2.5kg for those with mild, moderate, and severe emotional distress, respectively.

Table 7. Multiple Sample Statistics

	N	Mean	Std deviation	Std error mean
Without distress	6	3.40	5.36421	3.19026
Mild distress	6	3.00	7.81452	4.96432
Moderate distress	6	2.80	12.16004	6.18924
Severe distress	6	2.50	19.23972	9.85458

Table 7 presents the statistical tabulation of mean birth weights, standard deviation, and standard error of the mean in each group and subgroup, indicating a statistically significant difference between them.

The decision rule, as conventional, is to reject Ho if and only if the calculated t-value is greater than or equal to the tabulated t-value at the specified Degree of Freedom (DF) and level of significance (α =0.05). The tabulated value under 5 degrees of freedom is 2.57.

Hence, the null hypothesis is rejected and conclude that there is significant statistical difference between the birth weights of neonates delivered by HIV serodiscordant mothers in group A who did not suffer emotional distress because of their serodiscordance during pregnancy and the birth weights of neonates delivered by women in group B who suffered emotional distress because of their husband's abuse due to the irserodiscordance during pregnancy.

Table 8. Multiple-Sample Test of Means

	T	Df	Sig(2-tailed)	Mean difference	Lower	Upper	p-value
Without distress	1.576	5	0.009	3.400	3.300	3.800	0.0001
Mild	3.672	5	0.082	3.000	3.000	3.200	0.0032
Severe	5.603	5	0.536	2.500	2.300	2.600	0.0567

Test value given at 95% (0.05) level of significance

5. Discussion

In this study, it was revealed that newborns whose mothers suffered severe emotional distress in pregnancy as a result of abuse by their husbands due to their serodiscordance had lower birthweights when compared to the newborns whose mothers were not exposed to prenatal stress, and this is consistent with several studies [50, 73, 78, 81, 86]. This result is not supported by some authors [99, 100].

Categorizing the groups into mild, moderate and severe emotional distress, it was revealed that there is a negative effect on birth weight on the neonates whose mothers were in the group with severe emotional distress, (2.5kg vs 3.4kg) a negative but insignificant change in the moderate group (2.8kg vs 3.4kg) and a mild influence in the group with mild emotional distress (3.0kg vs 3.4kg) and those who did not experience emotional distress from abuse.

Studies have also consistently revealed the nexus between prenatal stress and preterm delivery [80, 82, 83, 95, 98]. This was in agreement with the findings in this study, which showed that most of the women with severe emotional distress delivered before the 37th week of gestation, and this further contributed to the low birth weights observed in the group with severe emotional distress. Like other studies, the study was subject to caveats. Most other studies used stress from other sources and not from HIV serodiscordance. Some women were afraid to fully cooperate and answer the questionnaire due to fear of their husbands, despite assurances of confidentiality.

There is also the fear of other cofounders, like physical characteristics, age of the women, lifestyles, medications, and sex of the babies, influencing the birth weights. Efforts were made to minimize these influences. The study has several advantages, including its simplicity, relatively low cost, minimal invasiveness, cooperation from the hospital staff and the women who participated, and the large volume of HIV-positive women who attend our antenatal clinic.

6. Conclusion

Several studies have proved that human immunodeficiency virus-positive serodiscordant pregnant women are subjected to severe emotional distress. Also, this study aims to deliver preterm and low birth weight babies, and these two are major contributors to neonatal morbidity and mortality. Managing the emotional stress of these women during the prenatal period is crucial for a good birth outcome.

Recommendations

Those women at risk need to be psychologically supported by their husbands, families, and friends. The women should have customized antenatal care involving their husbands and a counselor or a psychologist.

Special focus should be given on counseling the husband on showing love, care, and understanding to the wife during this prenatal period, controlling stressful situations, adequate prenatal care, regular light exercise, adequate rest, entertainment, healthy eating habits, avoiding alcohol, tobacco, and drugs.

Counseling by a counselor during antenatal checkups regarding a positive outlook on her pregnancy and delivery can also significantly improve the well-being of both the mother and fetus, ultimately reducing her emotional stress. She should also be counseled about the need to be on her medications.

Contribution to Knowledge

This study was able to reveal the emotional stress faced by female human immunodeficiency virus serodiscordant women during pregnancy. The study also found that these women under this stress also deliver both preterm and low birth weight neonates because of both physical and emotional abuse they suffer from their husbands because of their serodiscordant condition.

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