

A Prospective Study on the Incidence and Predictors of Postpartum Depression among Pregnant Women Attending an Antenatal Clinic in Kano, Northern Nigeria

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Abstract

Depressive disorder is a major contributor to years lived with disability (YLD) globally. It is estimated that 13% of all women experience the disorder in the first year postpartum. Postpartum depression (PPD) has significant implications to the physical and mental wellbeing of both the mother and her baby. Only non-depressed pregnant women (score of ≤ 6 on Edinburgh Postnatal Depression Scale) were recruited into this study. Data collection was done at 2 different stages; at recruitment stage (during the third trimester of pregnancy) and at the follow up stage (4th - 6th week postpartum). During the recruitment stage, intimate partner violence (IPV) and level of social support perception, among the women, were assessed using Hurt Insult Threaten Scream (HITS) and Multidimensional Scale of Perceived Social Support (MSPSS) questionnaires respectively. While at the follow up stage, the Obstetric questionnaire and Mini International Neuropsychiatric Interview (MINI-7) were used respectively to obtain obstetric-related data and to diagnose for occurrence of depression. The incidence of PPD was found to be 16.34%. Several factors such as level of education, husband's socioeconomic status, stressful life events, low perception of social support, obstetric instrumentation and not having a baby of preferred gender were significantly associated with PPD. Positive predictors of PPD included not practicing breast feeding (OR = 186.72, 95% CI = 8.32 - 4188.35), family history of mental illness (OR = 4.95, 95% CI = 1.04 - 23.81) and pregnancy lasting beyond 40 weeks (OR = 7.26, 95% CI = 1.51 - 34.88). High incidence of PPD with nu-

merous associated but largely modifiable risk factors call for more proactive measures, such as PPD screening among pregnant women.

Keywords

Postpartum, Depression, Pregnant Women

1. Introduction

Major Depressive Disorder (MDD) is the third leading cause of YLD, according to the global burden of disease 2015 report [1]. It is the leading cause of neuropsychiatric burden of diseases in Low and Middle Income Countries (LMIC) including Nigeria [2]. Though depression is one of the most common perinatal mental disorders, it is often neglected especially in the developing world, where the burden is even much higher compared to the developed countries [3].

PPD affects 13% of women in developed countries but weighted prevalence is 18.3% in Africa [4].

In Nigeria, studies have shown varying prevalence rates of PPD as between and within regions. For instance, prevalence estimates of 21.8% and 23% were reported from North Central and South Western Nigeria respectively [5] [6]. Other studies have shown even higher increase in the risk of depression about 8th week after childbirth [7].

PPD is the most commonly recognized disorder that occurs in women after childbirth, begins within the first 4 weeks and may last up to a year but is distinct from the more commonly experienced “baby blues” that presents in up to seventy percent of new mothers but usually resolves within 2 weeks [4]. Its symptoms present like those of a major depressive episode occurring outside of the postpartum period including suicidal ideations.

Depression in its context decreases functionality, creativity, quality of life and leads to losses in workforce, as well as poor maternal and infant attachment, hostile mother-infant communication, poor compliance to antenatal care, increased risk of developing complications [8]. Cognitive, emotional, social, and behavioral difficulties commonly occur in children of mothers with PPD, in addition to poor parenting behaviors, malnutrition, attempted infanticide [9].

It has been hypothesized that a complex interplay of demographical, psychological, obstetrics and other biological factors predispose women to develop PPD [7]. Factors such as lack of intimate relationship, previous psychiatric illness, socioeconomic problems, stressful and adverse life events have also been found to predict PPD [4].

Exploring the economic consequences of perinatal depression on child development reveal cost consequences related to adverse child outcomes associated to quality of life, public sector costs and costs due to reduced earnings, children exposed to perinatal depression have a higher demand for special educational interventions [10].

Despite a high burden of PPD among mothers in low income countries, the disorder is often understudied and it is unclear if these findings of risk factors could be generalized to both sides of global socio-economic divides. Studies on the incidence of PPD are relatively scarce, especially in poor countries like Nigeria, with most of the relevant and higher quality studies originating from the western world [4]. Studies from some developed countries identified poor marital relationship, past history of psychopathology, psychological disorders in pregnancy, poor social and financial support and stressful life events as the major risk factors of PPD, but little is known about risk factors in African countries [4]. PPD is now considered a burden and a major public health concern for women from diverse cultures [8]. Bindt and colleagues are among the few researchers whom have explored the pregnancy and child outcomes of depression in Africa using longitudinal studies [3].

Longitudinal design, used in this study, has the advantage of better inference in optimizing predictive power and causal relationship therefore avoids retrospective bias as opposed to cross-sectional studies. The objectives of the study included:

- 1) To determine the incidence of depression among parturient women after childbirth;
- 2) To determine the socio-demographic factors that predict postpartum depression among the pregnant women;
- 3) To determine the interpersonal relationship, and stressful life event-related factors associated with PPD;
- 4) To determine obstetrics and other related factors associated with postpartum depression.

2. Materials and Methods

The study was conducted between November 2020 and April 2021 at the Antenatal and Postnatal/Immunization Clinics of Aminu Kano Teaching Hospital (AKTH) in Kano, Northern Nigeria. Ethical approval was obtained from the same institution. Participation in the study was voluntary and confidentiality was vigorously ensured. It was a prospective study in which pregnant women aged 18 - 49 years of age were recruited during their last trimesters (at Antenatal Clinics) and followed up at their 4th to 6th postpartum week (at Postnatal and Immunization Clinics). However, some of the respondents were reached via telephone interviews in the course of second stage data collection, as they were not able to come to the hospital for postnatal care and or immunization services. Women with personal history of depression or psychosis, those found to be depressed at recruitment (EPDS score >6) and those who had reported fetal death during index pregnancy were excluded from the study. The 300 participants were selected using systematic random sampling technique. English and standard Hausa translated versions of the following instruments were used.

2.1. Socio-Demographic Questionnaire

Used at recruitment (first) stage to assessed socio-demographic variables among

the respondents.

2.2. Multidimensional Scale of Perceived Social Support

Also used in the first stage of the study, the Multidimensional Scale of Perceived Social Support (MSPSS) assesses level of perception of partner, family and friends support and its adequacy amongst participants. It has 12-items rated on a 7-level likert-like scale with scores of 1, 2, 3, 4, 5, 6 and 7 respectively representing “very strongly disagree”, “strongly disagree”, “mildly disagree”, “neutral”, “mildly disagree”, “strongly agree” and “very strongly agree” with respect to each of the 12 items presented as a statement.

2.3. Hit Insult Threaten Scream HITS (Domestic Violence Screening Instrument)

It was used in the study to objectively assess intimate partner violence (IPV) in a relationship. It has 4-items which are all scored on a 5-level likert scale from 1 signifying “never” to 5 which signifies “frequently”. The total score ranges from 4 to 20 and a score of 10.5 and above indicates the occurrence of IPV. This instrument was used to screen for partner violence during the index pregnancy.

2.4. Edinburgh Postpartum Depression Scale (EPDS)

EPDS is a 10-item self-report screening instrument developed and validated for detecting depression in antepartum or postpartum women. It is a 10 item self-report questionnaire in which women are asked to rate how they felt in the previous 7 days. A participant selects one of four possible responses (“no, not at all” to “yes, quite often”) each question rated 1 - 3 while assessment was done by adding the total score of 0 - 30. The higher the score the more the depressive symptoms. EPDS was used in this study to exclude those found to be depressed (a score of >6) during recruitment.

2.5. The MINI International Neuropsychiatric Interview (MINI)-7.0.2

The MINI international neuropsychiatric interview (MINI) 7th version is a brief structured diagnostic interview developed for clinical and research purposes. It was designed for international classification of diseases tenth edition (ICD-10) and DSM-1V, recently updated to MINI (7.0.2) include the ICD-11 and DSM-V diagnostic criteria. The MINI 7.0.2 has 17 modules representing a diagnostic category. The instrument was used to diagnose depression among the respondents at follow up (second) stage of data collection.

2.6. Obstetrics History-Related Questionnaire

The questionnaire assessed perinatal factors such as gestational hypertension and diabetic diseases, preeclampsia, parity, mode of delivery, sex of baby, preferred sex of baby, birth complications, persistent wound pain, breast feeding

etc. It was also administered at the second stage of data collection.

2.7. Data Analysis

Data were analyzed using SPSS-version 20 and presented using frequency tables and charts. Statistical significance was determined as two-sided *p* values using level of 5%. At univariate level, quantitative variables were summarized using measures of central tendency and dispersion while qualitative variables were summarized using whole numbers and percentages. Cumulative incidence of postpartum depression was determined and expressed as a percentage.

The Chi-square test or Fisher's exact test were used to determine associations between postpartum depression and categorical risk factors such as intimate partner violence. Logistic regression was used for multiple variables that were considered simultaneously, Odds ratio (OR) was presented with 95% Confidence Intervals (CI).

3. Results

Two hundred and sixty three pregnant women, out of the 300 recruited, were able to complete the study. This resulted in an attrition rate of 12.3%.

3.1. Sociodemographic Characteristics of Respondents

The study population was made up of a total 263 pregnant women within an age range of 20 - 44 years. The mean age was 29.40 (SD \pm 5.63) years. Majority are younger adults (20 - 30) years making up to 62% of the population. The mean years of education of participants was 13.94 (SD \pm 2.59) years. Most of the study participants were unemployed 132 (50.2%) while 27% and 22.8% were employed and self-employed respectively. The married participants were the vast majority of the participants constituting 247 (94%) of the total while only 9 (3.4%) were divorced. The singles were only 5 in number (2.6%).

The family structure for majority of the participants was monogamous 174 (66.2%). Almost all the husbands were employed, only a negligible 1% of them were currently unemployed. An overwhelming majority of the participants do not have a family history of mental illness. Only 39 (15%) have a family history of psychiatric illness whose type was not specified (**Table 1**).

3.2. Cumulative Incidence of Postpartum Depression

Out of the 263 women who completed the study, 43 were found to have developed postpartum depression. This gives a cumulative PPD incidence of 16.34%.

3.3. Association between Sociodemographic Variables and Postpartum Depression

Only about 14% of those who were married were found to have developed depression in the course of this study, as opposed to up to about 40% of those with other marital statuses. The difference was clinically significant. Similarly, less

Table 1. Socio-demographic characteristics of the respondents.

Variable	N = 263	%
Age groups (years)		
20 - 30	163	62.00
30 - 40	90	32.40
>40	10	3.80
Education years		
High (>14)	144	54.80
Moderate (7 - 14)	109	41.40
Low (<7)	10	3.80
Employment Status		
Employed	71	27.00
Unemployed	132	50.20
Self-employed	60	22.80
Marital Status		
Single	7	2.67
Married	247	93.91
Divorced	9	3.42
Family Structure		
Monogamous	174	66.00
Polygamous	89	34.00
Husband Employment Status		
Employed	260	99.00
Unemployed	3	1.00
Family History of Mental Illness		
Yes	39	15.00
No	224	85.00

educated respondents, those from polygamous homes and those with family history of depression had significantly higher incidence of depression. See the details in **Table 2**.

3.4. Association between Stressful/Interpersonal Factors and Postpartum Depression

In this regard, intimate partner violence and low level of social support perception have been found to be significant predictors of PPD; more in **Table 3**.

Table 2. Socio-demographic correlates of postpartum depression.

Variable	Depressed	Non-Depressed	χ^2	<i>p</i> -value
Age (years)				
20 - 30	14 (15.56)	76 (84.4)	1.423	0.491
30 - 40	3 (30)	7 (70.0)		
>40	26.0 (16.0)	137 (84.0)		
Employment status				
Employed	6 (8.45)	65 (91.55)	5.601	0.061
Unemployed	28 (21.2)	104 (78.8)		
Self-employed	9 (15.0)	51 (85.0)		
Marital status				
Married	36 (14.6)	211 (85.4)	13.123	0.011***
Others	7 (43.7)	9 (56.3)		
Family structure				
Monogamous	18 (10.4)	156 (89.6)	13.557	<0.0001***
Polygamous	25 (28.1)	64 (71.9)		
Total education years				
<14 years	31 (25.2)	92 (74.8)	13.243	<0.0001***
>14 years	12 (8.6)	128 (91.4)		

Table 3. Stressful life events (intimate partner violence)/interpersonal relationship (perceived social support) factors and postpartum depression.

Variables	Depressed	Non-Depressed	χ^2	<i>p</i> -Value
Stressful life event (Intimate partner violence)				
Yes	6 (66.6)	3 (33.3)	#	0.001**
No	37 (14.6)	217 (88.4)		
Overall significant others support				
Low support	13 (92.8)	1 (7.2)	64.926	<0.0001***
Medium support	14 (15.1)	79 (84.9)		
High support	16 (10.25)	140 (89.75)		
Overall family support				
Low support	11 (91.7)	1 (8.3)	52.862	0.001***
Medium support	7 (41.2)	10 (58.8)		
High support	25 (10.7)	209 (89.3)		
Overall friends support				
Low support	21 (18.4)	93 (81.6)	0.639	0.639
Medium support	10 (16.7)	50 (83.8)		
High support	12 (13.5)	77 (86.5)		
Overall support score				
Low support	13 (92.9)	1 (7.1)	64.267	<0.0001***
Medium support	14 (15.1)	79 (84.9)		
High support	16 (10.3)	140 (89.7)		

***Fisher's exact Test applied; ***statistical significance.

3.5. Association between Obstetric Related Factors and Postpartum Depression

History of obstetric instrumentation, preference or a given baby gender pregnancy beyond 40 weeks as well as non-practice of breast feeding were associated with significantly higher incidence of PPD. **Table 4** shows the details.

3.6. Predictors of PPD

A logistic regression was run to determine the independent predictors of PPD among the women. Non breast feeding and family history of mental illness were the only identified significant predictors, as shown in **Table 5**.

Table 4. Obstetric factors associated with postpartum depression.

Variables	Depressed	Non-Depressed	χ^2	<i>p-value</i>
Instrumentation				
Yes	4 (50)	4 (50)	#	0.027**
No	39 (15.4)	215 (84.6)		
Mode of delivery				
Vaginal	35 (17.5)	165 (82.5)	0.729	0.440
CS	8 (12.9)	54 (87.1)		
Medical illness				
Yes	8 (25.8)	23 (74.2)	2.298	0.192
No	35 (15.1)	197 (84.9)		
Preferred gender				
Yes	28 (13.0)	187 (87.0)	9.532	0.0002***
No	15 (31.3)	33 (68.8)		
Pregnancy planned				
Yes	30 (15.0)	170 (85.0)	1.112	0.292
No	13 (20.69)	50 (79.4)		
Age of pregnancy (weeks)				
≤40	13 (8.2)	146 (91.8)	19.642	<0.0001***
≥40	30 (28.8)	74 (71.2)		
Birth complications				
Yes	9 (17.3)	43 (82.7)	0.043	1.000
No	34 (16.1)	177 (83.9)		

Table 5. Predictors of postpartum depression at logistic regression.

Variable	Significance	Adjusted OR	95% CI	
			Lower	Upper
Husband's job	0.999	1.000	0.000	1.000
IPV status	0.997	1.000	0.000	1.000
Instrumentation	0.368	5.865	0.124	276.79
Preferred gender	0.296	2.449	0.456	13.13
Not Breastfeeding	0.001 ***	186.716	8.324	4188.346
Family history of mental illness	0.045 ***	4.9500	1.040	23.81
Marital status	0.998	1.000	0.000	1.000
Age of pregnancy	0.013 ***	7.260	1.511	34.880
Level of education	0.202	27.02	0.588	12.429
Overall perceived social support	0.950	1.053	0.210	5.275

4. Discussion

Majority of the respondents (62%) were aged less than 20 years, this is an expected finding from a culture where women get married and bear children at a relatively younger age. While the age range of 20 to 44 years, among the respondents, is a replication of similar findings in other areas of northern Nigeria [11].

In this study, marital status has been found to be associated with risk of developing PPD as has been documented in literature that specifically women with depression are more likely to be either single, widowed or separated and or from polygamous families [4]. Same findings have been made among pregnant women in Jos, North-Central Nigeria [5]. Ethiopian researchers have reported that being single was the first socio-demographic variable associated with PPD and that single mothers were 5 times more likely to develop PPD than the married mothers [12]. Marriage in the African context makes a woman to be more acceptable and respectable and therefore having a baby the “legitimate way” boosts their self-esteem and gives them a perception of increased worth both within their homes and the wider society. Contrarily, maternal marital status was not significantly associated with PPD in an observational cross-sectional study in Cameroon [13]. Probably this is a reflection of difference in cultural values or study design.

Women from polygamous homes, in this study, have been found to have significantly higher incidences of PPD. This could be related to increased responsibilities and expectations placed on women in polygamous setting, as well as envy

and rivalry among co-wives, which is so rampant in this culture. Abdollahi and colleagues have equally reported that Iranian women from polygamous families had more PPD incidence, which they attribute to higher marital conflicts [7]. According to this study, the more educated women had lower risk of developing PPD. This could be due to the fact that educated women are expected to make better decisions regarding their health in general and are less likely to tolerate their rights being violated by others. Family history of mental illness has been found to be a risk factor for PPD, so the fact that respondents with family history of mental problem, in this study, had significantly higher PPD incidence is not surprising.

The incidence of PPD found in in this study is within the normal global range of 8% - 38% [14]. But what we found was higher than the average values reported in the some developed countries [15]. A longitudinal study in Iran also reported a lower incidence of PPD, at different postpartum periods, that is 6.9%, 4.6% and 4.8% at 0 - 2 month, 2 - 8 months and 8 - 12 months respectively [16]. The differences in variation of the incidences could be due to the methodology used even though all the above studies were longitudinal, similar to this index study but there exist socio-cultural differences even within the same nation. Other possible explanations of the higher incidence in this study compared to other studies from richer countries include better health seeking behavior, superior maternal mental health services, among others.

However, in neighboring republic of Cameroon, a higher incidence rate of PPD was reported [13]. Though the Cameroonians had used a different study design and included women who were up to twelve month postpartum, there might be differences in interpretation of symptoms as well as cultural practices, either harmful or otherwise, between the two countries.

Although merely 3% of the pregnant women in this study reported any form of IPV, the incidence of PPD was significantly higher among the women with such unfortunate experience. This is in keeping with report that physical and verbal abuse increased the risk of PPD by 18-fold and 7-fold respectively. [9] In addition, Ethiopian researchers reported higher odds of developing PPD among women who had experienced psychological and physical abuse [12].

Among the new mothers with high perception of family and significant other support, the incidence of PPD was significantly lower. The finding in this study that perceived social support is a negative correlate of depression has been replicated in other studies [17]. This could be due to the loss of social support and companionship, among such women especially in a vulnerable state of pregnancy. Various studies have revealed consistent findings of relationship between social support and mental health with particular emphasis that women with depression are more likely to report lack of social support from family or significant other [4]. The results of this study are in agreement to a Chinese study reporting lower satisfaction of relationships to husbands, parents and in-laws is a significant predictor of PPD [18]. Such findings could be because women need

confidants have improved self-esteem, and confidence. Although the respondents in this study were not asked about the specific preferred gender for their babies, those with gender preference were found to have higher prevalence of PPD. This points to the distress and possible disappointments that accompany giving birth to a baby of non-preferred gender. Adewuya and colleagues reported a higher risk of PPD among Nigerian women who gave birth to female babies, while preferring to born male babies [19].

In this study, instrumental delivery has been found to be a significant predictor of PPD. This could be linked to the fact that use of instrument during childbirth is associated with physical and mental trauma, as well as fear of possible complications. In a study of different design, a positive association between use of instrument during delivery and PPD has been reported previously from Nigeria [19].

Prolonged pregnancy is another predictor of PPD, according to this study as those with pregnancy older than 40 weeks had significantly higher risk of developing the disorder. [8] This might probably be due to the increased tension and distress caused by the prolongation of the pregnancy beyond the expected date, compounded by the increased risk of cesarean delivery with its attending possible complications.

Non-breastfeeding was found to be a strongly significant correlate of PPD in this study, indicating a special role of non-breastfeeding in PPD onset. This evidence was similar to a systematic review that practice of breastfeeding is a protective factor and that early initiation of breastfeeding reduces the risk of depression by increasing breastfeeding duration and self-efficacy [20].

Unplanned pregnancy, number of births or abortions, medical illnesses during pregnancy were not associated with PPD in this study, but more studies of this nature are needed to further identify factors associated with PPD.

5. Conclusion

The incidence of PPD found in this study is within the normal range for a resource-poor setting. However, apart from family history of mental illness, all of the factors found to be associated with the disorder, such as poverty, low level of education, non-breastfeeding, obstetric problems and baby's gender preference, are potentially modifiable. So, all hands must be on deck to ensure that the incidence of PPD is reduced by all relevant stakeholders.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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