

RELATIONSHIP BETWEEN PHYSICAL ACTIVITY LEVEL AND POSTPARTUM DEPRESSION SYMPTOMS AMONG POSTPARTUM WOMEN IN ENUGU, NIGERIA.

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ABSTRACT

Studies are sparse on the relationship between physical activities and postpartum depression (PPD) in sub-Saharan Africa, particularly Nigeria. The study explored the relationship between Physical activity level (PAL) and PPD among postpartum women in Enugu, Nigeria. 232 postpartum mothers within 1 - 52 weeks postpartum duration completed the Edinburgh Postnatal Depression Scale (EPDS) and Kaiser Physical Activity level (KPAL) Survey questionnaires, which assessed PPD status and PAL, respectively. PAL was measured in four different domains (household/caregiving, occupational activities, active living habits, and participation in sports and exercise. PAL of women who showed PPD symptoms were compared with those that did not. Most of the women showed no symptoms of PPD (65%) and had low PAL (89%). Significant differences did not exist between KPAL scores of PPD positive and negative women ($p > 0.05$). Similarly, there was no significant association ($p > 0.05$) between their EPDS and KPAL scores. PPD was not prevalent among the study population. And although respondents PAL were not determinants of their reported PPD symptoms, an increase in PAL scores leads to a decrease in EPDS scores which indicates that higher physical activity levels reduce the risk of PPD.



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Among all common mental health disorders, depression is the most common illness-affecting people and by the year 2030, is expected to be the second most prevalent health problem globally [1], [2]. In 2004, the World Health Organisation estimated that 10% of the over 150 million people living with depressive disorders were in Africa [3], [4]. Considering the higher prevalence of depression among females, relative to their male counterparts [5], [6] maternal mental health has become a vital public health issue and poses a challenge across the globe.

Postpartum depression (PPD) is defined as a psychological mood disorder with a perinatal onset as those beginning in either pregnancy or within the first 4 weeks postpartum [7]. Three main depressive disorders may occur in women in the postpartum period including baby blues, postnatal depression, and postpartum psychosis [8]. These disorders may have a negative impact on the development of the mother-child relationship [9], [10]. More than 50% of postpartum women report elevated depressive symptoms at some point in the first 12 months after birth, and 6.5% of women are depressed at 12 months postpartum [11]. Depressive symptoms typically include sad mood, loss of interest in activities, feelings of helplessness and hopelessness, decreased energy, decision-making difficulties, sleep problems, restlessness, irritability, changes in eating patterns, and suicidal ideations or attempts are some of the depressive symptoms seen among women with PPD [12], [13].

The worldwide incidence of PPD varies from approximately 9.5% in high-income countries, about 20.8% in middle-income countries, and 25.8% in low-income countries [14]. In Africa, PPD is the most prevalent psychological disorder in the perinatal period, with a pooled prevalence of 18.3% [15]. In South Africa, the peri-urban area has a prevalence of 34.7% [16] while a recent study reported a prevalence of 50.3% in a rural setting [17]. In western Nigeria, the lowest and highest prevalence of PPD reported were 14.6% and 23.0% respectively [18]. Two different studies conducted in South-eastern Nigeria reported a low prevalence of 10.7% in one and a high prevalence of 30.0% in the other [19]. In Northern Nigeria, seemingly high prevalence rates of 44.5% and 21.8% were reported [20]. The varying prevalence worldwide and within Nigeria could be attributed to the different types of screening methods used, the study designs, the differences in geographical location, differences in socioeconomic status, the cut-off score of the screening instruments as well as the various risk and predictive factors associated with developing PPD in such studies.

Pregnancy and postpartum periods are as well associated with physical and mental changes [21]. During the puerperium period, 6–8 weeks from the birth of the child, [22] several processes restore the woman to her pre-pregnancy status. However, during the recovery processes, there are sets of new physiological changes that may alter the physical and mental states of the woman. Many have speculated that postpartum disorders are caused, at least in part, by the rapid change in the reproductive hormones estradiol and progesterone before and immediately after delivery [23], [24]. During breastfeeding, a woman's body follows a natural order toward hormonal balance [25]. The breastfeeding process has anxiolytic and anti-depressive effects due to the release of oxytocin, [26] which plays a role in the reduction of stress and anxiety [27] and, at the same time, due to a decrease of maternal adrenocorticotrophic hormone (ACTH) and cortisol release levels, [28] which supports the finding that lactation attenuates neuro-endocrine responses to stress. Women who continued to breastfeed up to 4 months after giving birth had lower depression scores in the first month than those who stopped breastfeeding [29].

Systematic reviews have found that risk factors for PPD include low social support, stressful life events, previous history of depression, and depression during pregnancy [30]. Women who have experienced sexual, physical, and psychological abuse in childhood or adulthood are at particular risk of developing PPD [31], [32]. Feeling of anxiety and despondency during pregnancy, low self-esteem, poor partner relations, low

socioeconomic status, and loneliness also predisposes women to PPD [33]. Women at risk of perinatal complications, hospitalization during pregnancy, or termination of childbirth by cesarean section after an earlier start of nature are also at risk [34]. Stress associated with caring for a child [35] and the lack of body acceptance after childbirth can cause depression in women [36].

Clinical treatment of PPD is commonly via medication and psychotherapy [37]. However, pharmacological agents pose several dangers to breastfeeding infants [38]. Thus the recommendation of non-pharmacological approaches, including psychotherapy, increased physical activity levels, and participation in structured physical exercises [39]. Physical activity has a significant impact on both the physical and mental state of pregnant women [33]. The American College of Obstetricians and Gynecologists recommends a minimum of 150 min of moderate physical activity within a week for pregnant women and after childbirth [40].

Exercises during pregnancy improve the return to form and minimizes the risk of postpartum depression, [41] as well as reduce the symptoms of depression [42]. Aerobic exercises, including jogging, swimming, cycling, walking, gardening, and dancing, have been proved to reduce anxiety and depression [43]. These improvements in mood are proposed to be caused by an exercise-induced increase in blood circulation to the brain and by an influence on the hypothalamic-pituitary-adrenal (HPA) axis and, thus, on the physiologic reactivity to stress [44]. Physical activity during the postpartum period improves blood circulation, strengthens the abdominal and spine muscles, stimulates lactation, accelerates the constriction of the uterus, prevents urogynecological dysfunction, as well as improves the mental and physical condition of the mother [33].

Several studies reported that pelvic floor muscle training, progressive muscle training, postnatal exercises, pilates, and yoga have been shown to significantly improve the quality of life for postpartum women [45-47]. Other studies report on Pilates and aerobics reduce fatigue and can improve the sleep quality of postpartum women [48], [49]. However, in sub-Saharan Africa, particularly Nigeria, studies are sparse on the relationship between physical activities and PPD. With the increasing reports of PPD in Nigeria, [50] there is need to explore the relationship between physical activity levels and PPD to enhance preventive and management strategies towards PPD. Therefore, this study was designed to explore the relationship between PPD and physical activity levels of postpartum women in Enugu, Nigeria.

2. Methods

2.1 Participants and study design

This cross-sectional descriptive survey included 232 consenting postpartum women within 1 - 52 weeks postpartum duration who were conveniently recruited from three antenatal clinics in Enugu, Nigeria. Women with known memory challenges, dead infants, and/or diagnosed health challenges that could limit participation in physical activity were excluded from this study. Ethical clearance was obtained from the Health Research Ethics Committee, University of Nigeria Teaching Hospital, Ituku-Ozalla Enugu, Nigeria. Written informed consent was obtained from all the respondents before participation in the study.

2.2 Data collection

Relevant information on respondents' demographic and obstetrics characteristics was collected before they responded to two of the study instruments [Edinburgh Postnatal Depression Scale (EPDS)51 and Kaiser Physical Activity Survey questionnaire (KPAL) [52]. The EPDS is a 10-item screening instrument, which is developed to detect depression among postnatal women. Assessment is done by summing up the total score for each of the 10 items. The higher the score, the more depressive symptoms. This scale has been used and

validated in Nigeria [53]. A cutoff point of 10 is used for milder cases of depression while a cutoff point of 13 is suggested for severe cases.

The second questionnaire which have also been previously used in Nigerian studies, [54], [55] KPAS is a self-report measure, divided into four distinct domains: (1) household/caregiving (caring for a child, house chores, such as washing, cleaning, and gardening); (2) occupational activities (types of job, and the intensity of work); (3) active living habits (walking, watching TV, bike riding); and (4) participation in sports and exercise (favorite sport, the frequency of the exercise, and the exercise intensity). Their responses were reduced according to the KPAL guidelines.

These questionnaires were administered to each respondent on a face-to-face basis and collected immediately after they responded. For clarity purposes, the questions were read out to them to ensure increased understanding and response rates.

2.3 Data analysis

Data were summarized with descriptive statistics of frequency, percentage, mean and standard deviation. Inferential statistics of independent t-test and Pearson correlation analysis were further used to analyze data at an alpha level of 0.05. Data analysis was done with the statistical package of social sciences software version 24(SPSS inc, USA).

3. Results

The general characteristics of the respondents are presented in table 1. Most of the respondents aged between 19 -35 years (82.8%) are married (93.5%), self-employed (49.1%), and Christians (99.1%). More than half of them have had 2-4 pregnancies (61.2 %) with 2-4 births (62.5%) and are within the range of 7-24 weeks' postpartum duration (53.4%). A greater percentage gave birth through normal vaginal delivery (90.0%) with no life history of infant loss in any pregnancy (87.9%). Furthermore, 72 out of 232 of the respondents were ill during their last pregnancies of which most were diagnosed with malaria (70.8%). None of the women (0%) reported any abnormality in their infants' growth and/or development. A greater percentage of them practiced antenatal exercise(s) during their last pregnancy (94.8%) although currently, most of them are not engaging in any form of post-natal exercise practices (88.8%).

Respondents' mean EPDS score is 10.98 ± 3.94 . Most (65%) scored <13 EPDS values, indicating the absence of PPD symptoms (table 2). With this result, we categorized the women into two - PPD positive and negative women. The mean values of the Kaiser physical activity level scores of the two categories of women are presented in Table 3. Comparisons of these mean values between the two groups of women across the four domains of physical activity yielded no significant differences ($p > 0.05$). Furthermore, correlation analyses between the EPDS and KPAL scores of the respondents also showed no significant ($p > 0.05$) associations across all domains (table 3). However, the results showed that marginally, PPD-negative women recorded higher KPAL values in the four domains of physical activity practice (household/caregiving, occupational activities, active living habits, and participation in sports and exercise).

4. Discussion

This study explored the relationship between Physical activity level (PAL) and postpartum depression (PPD) among postpartum women in Enugu, Nigeria. The major findings of this study is that more than half of the respondent did not have PPD symptoms. The prevalence rate was of PPD is low (35.3%), which confirms those reported in previous studies. For instance, [56] reported a similar prevalence of 30.6%. [57] reported a prevalence of 22.9%. In a survey done in Midwestern Nigeria, [58] reported a PPD incidence of 27.2%. In

other African countries, similar low prevalence rates were reported as well. An example is a Ugandan study by [59] who reported a 43% prevalence rate of PPD while in South Africa, a 34.7% prevalence rate was reported [60].

Only few works reported contradictory findings, which showed a high prevalence of PPD in some African countries. These countries include the Democratic Republic of Congo where 50.8% of the women had PPD [61]. This could be because of differences in the screening tool for PPD in their study. This study reported different values when using different screening tool; 50.8% using the Edinburgh Postnatal Depression Scale (EPDS) and 44.2% using the Goldberg scale. In addition, the difference in the postpartum periods used in the research may have a great impact on the prevalence of PPD. Generally, there seem to be varying results about PPD when using varied sampling size, the specific instrument used to evaluate depression, the period for evaluation using EPDS, and EPDS cut-off scores. Thus, this finding suggest that the prevalence of PPD among postnatal women in Enugu is comparable to that obtained in other regions in Nigeria and on other African continents.

This study also found out that women with PPD have lower activity levels based on measures from the Kaiser Physical Activity. However, a further Pearson correlation analysis showed there was no relationship between physical activity levels scores and EPDS scores but some of them have a negative relationship, which indicates that an increase in physical activity levels score leads to a decrease in EPDS score. This corroborates with previous findings that higher activity levels could reduce the risk of PPD [33], [62]. [63] in Turkey similarly showed that physical activity level during the postpartum period has a significant negative correlation between the IPAQ and EPDS total score averages of the women who were included in the study as it was found that when the physical activity levels of women increased, the symptoms of PPD decreased. Similarly, in a meta-analysis study conducted by [64], the effect of exercise on PPD was examined and it was found that physical activity in the postpartum period reduced the symptoms of PPD. Optimum physical activity is widely recommended for improving many health outcomes, [65] which this adds as a recommended strategy and care interventions to reduce PPD in mothers of all sociodemographic context.

Some structured physical activity programs that have been recommended from experimental findings include low-intensity aerobic activities such as walking with a baby cart, which was shown to significantly reduce symptoms of PPD [66]. In another randomized controlled study, [67] showed that postpartum exercise that is structured, planned, and repetitive reduced the symptoms of mild-moderate depression over normal care. This finding further informs on what parameters that physical activities aimed at achieving PPD should be defined as every normal daily life activities does not automatically translate to exercise for health benefits [68], [69].

5. Limitations

The study population was not a mix of people as the entire respondents are from one particular ethnic group (Igbo) in Nigeria and most respondents are educated and students, consequently a generalization must be careful.

6. Conclusion

Although respondents physical activity levels (PAL) were not determinants of their reported postpartum depression (PPD) symptoms, there is a low prevalence of PPD among postpartum women who are more physically active as women with PPD had lower physical activity levels. An increase in PAL scores leads to a decrease in EPDS scores which indicates that higher physical activity levels reduce the risk of PPD.

Declarations

Authors Contribution: OCP, OCG, and AO drew the design and concept of the study, including the data collection and data analysis; IJJ, ECU and OCP did the data analysis and statistical analysis; ESS and OPC did the literature search, manuscript preparation and editing. All authors reviewed and approved the manuscript. IJJ is the 'guarantor' for this study.

Ethical approval: Ethical clearance was obtained from the Health Research Ethics Committee, University of Nigeria Teaching Hospital, Ituku-Ozalla Enugu, Nigeria before the commencement of the study.

7. Reference

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differentiating between exercise, physical activity, and training. Autoimmun Rev. 2016;15(1):110-1.

Table 1: General Characteristics of the Respondents (n=232)

Variable	Frequency	Percentage
Age years		
≤18	1	0.4
19-35	192	82.8
>35	39	16.8
Marital status		
Single	15	6.5
Married	215	93.5
Occupation		
Housewife	22	9.5
Self-employed	114	49.1
Civil servant	24	23.3
Student	42	18.1
Religion		
Christianity	230	99.1
Islam	1	0.4
Traditional	1	0.4
Gravidity (no of pregnancy)		
1	70	30.2
2-4	142	61.2
>4	20	8.6
Number of Childbirths		
1	71	6.9
2-4	145	62.5
>4	16	30.6
Number of Children alive		
1	71	30.6
2-4	149	64.2
>4	12	5.2
Postpartum duration(weeks)		
<6	86	37.1

7-24	124	53.4
25-36	18	7.8
37-52	4	1.7
Mode of delivery		
Vaginal	208	90.4
Caesarian section	22	9.6
History of Infant loss		
Yes	28	12.1
No	204	87.9
Illness during the last pregnancy		
Yes	72	31.0
No	160	69.0
Type of illness (n=72)		
Malaria	51	70.8
Malaria/Typhoid	12	16.7
High blood pressure	8	11.1
Low blood pressure	1	1.4
Perceived abnormality in infant growth and development		
Yes	0	0.00
No	232	100
The practice of Antenatal exercise during the last pregnancy		
Yes	220	94.8
No	12	5.2
The current practice of Postnatal exercise		
Yes	26	11.2
No	206	88.8

Table 2: Prevalence of Postpartum Depression (psychological distress) among the respondents.

Variable	Frequency	Percentage
Absence of PPD (Normal	150	64.7

EPDS score of<13)		
Presence of PPD (Abnormal EPDS score≥13)	82	35.3
Mean EPDS score	10.98±3.94	

*PPD - Postpartum depression; EPDS - Edinburgh postpartum depression scale; Absence of PPD symptoms - EPDS score of <13; Presence of PPD symptoms – EPDS score of ≥ 13.

Table 3: Comparison and correlation analyses of postpartum depression and physical activity level indices of the respondents.

Variable	Mean +_ standard deviation	Minimum value	Maximum value
KAISER PHYSICAL ACTIVITY LEVEL INDEX			
Household and family care activities	6.64+_1.29	2.64	12.00
Occupational activities	8.02+_3.12	2.00	19.00
Active living habits	6.23+_2.22	0.75	13.75
Participation in sports and exercise.	4.70+_1.67	0.75	11.50

*KPAL – Kaiser Physical Activity Level; PPD – Postpartum Depression; PPD negative - the absence of PPD symptoms with EPDS score of <13; PPD positive - the presence of PPD symptoms with EPDS score of ≥ 13.