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Incidence of Postpartum Depression in Primiparous Women with Obesity and Gestational Diabetes Mellitus: A Retrospective Study

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Abstract **Original Research Article**

Background*:** The postpartum period is a challenging and stressful transition phase for new mothers, accompanied by increased risk of Post partum depression (PPD). Althouh numerous studies have assessed the relationship between gestational diabetes mellitus (GDM) and PPD, research evidence regarding the possible association of GDM and obesity with PPD is scarce. Therefore, the aim of this study was to determine the incidence of PPD in primiparous women with obesity and GDM and establish if there is an association between PPD, GDM and obesity. ***Methods: This is a retrospective record-based study of women with body mass index (BMI) ≥ 30 kg/m2 and suffering from GDM attending the primary health care centres in PHCC for first prenatal visit up to 8 weeks post-delivery. PPD diagnosed as Edinburgh Postnatal Depression Scale (EPDS) score ≥9. We computed BMI using self-reported pre-pregnancy weight and measured height. Logistic regression used to estimate odds of primary outcome. ***Results*:** The data comprised of a total of 2800 patients of various nationalities. This spectrum included Indians 431 (15.4%), Egyptian 334 (11.9%), Qatari 381 (13.6%), Pakistani 257 (9.2%), Syrian 199 (7.1%), Yemini 158 (5.6%), Sudanese 123 (4.4%), Filipino 118 (4.2%), Tunisian 77 (2.8%), Jordanian 156 (5.6%). Off these patients with increased EPDS risk score 771(27.5%) had a history of GDM and 193(6.9%) had a history obesity respectively. The data compiled showed an increased risk association of obese women with depression (p=0.040) as compared to the GDM (p=0.526) subgroup. All patients' data was categorised as mild, moderate, or severe risk in accordance with the EPDS screening tool. The risk association was 1.957 times more in those patients with severe risk as compared to the patients with mild risk (p=0.008). ***Conclusion*:** Our results showed that pregnant women particulary those who are overweight had an increased succeptibility to developing PPD as per the EPDS scores.

Keywords: Postpartum Depression, Primiparous Women, Obesity, Gestational Diabetes Mellitus, EPDS.

INTRODUCTION

Postpartum depression (PPD) is a significant public health problem adversely affecting mothers, their newborns and other family members. The negative outcomes of PPD are profound with detrimental long term effects that include poor parenting practices, compromised physiological, psychological, emotional and psychomotor development in infancy and early childhood. Primiparous mothers are more vulnerable to the onset of mental problems during the postpartum period since it is a challenging and stressful transition phase for them [1]. According to the recommendations published by the National Institute for Health and Care Excellence (NICE), mental health illnesses are commonly underdiagnosed or overlooked throughout pregnancy and the postnatal period.

Postpartum depression (PPD) refers to non psychotic depressive episodes during the postpartum period that typically develop within a few weeks to a year of giving birth and persist for more than two weeks.The Edinburgh Postnatal Depression Scale (EPDS) is a screening instrument used to identify PPD within 6-8 weeks after birth. PPD has an estimated worldwide prevalence of 17% with a higher prevalence in the Middle East and Asia compared to western countries [2].

The etiology of PPD may be multifactorial including psycholosocial, physiological and biochemical factors [3] and it is commonly characterised by transient mood lability, insomnia, disorganised behaviour, irritability and agitation.

In the context of pregnancy, GDM is described as "any degree of glucose intolerance with onset or first

recognition of pregnancy". Its prevalence is estimated between 5% to 10% of worldwide pregnancies, and it has been linked to both adverse pregnancy outcomes and mental health conditions. Twenty-four percent of pregnant women were diagnosed with diabetes for the first time, and of them, 89.6 percent had GDM [4]. According to the systematic review findings women who are obese during their pregnancy have significantly higher odds of elevated depression symptoms than normal weight women during the antenatal and postnatal periods, about 43% and 30% increased odds respectively, adding to the growing body of evidence suggesting that GDM and obesity may be associated with an increased risk of mental health disorders, particularly PPD [5, 6].

Researchers have looked at several potential mechanisms leading to a bidirectional relationship between type 2 diabetes mellitus and mental health conditions including disruption of the hypothalamic-pituitary-adrenal axis, low-grade inflammation caused by cytokines, and common socioenvironmental risk factors including obesity and poverty [7]. There is a dearth of data about the likely link between obesity, GDM and PPD, despite the fact that all three conditions represent serious health implications to women navigating the trials and challenges of pregnancy and parenthood.

Mothers experience mental and physical changes throughout pregnancy and the postpartum period [8] with a wide spectrum of maternal mental health issues ranging from mild to severe degree. It often manifests within a week to a month after giving birth [9]. Variable prevalence estimates for PPD have been reported between 0.5% and 60% across studies conducted in a variety of countries [10].

Having PPD has a devastating impact on a mother's quality of life causing hardship in effectively adapting to her newborn,partner and family, resulting in tragic outcomes of maternal suicide and infanticide if the condition is not diagnosed early or treated well [11]. Biological, psychological, and social variables are all speculated to have a role in the aetiology of PPD. Many changes that occur in the postpartum period make it difficult to diagnose this problem, including shifts in sleep and appetite and extreme exhaustion. A number of studies have revealed that a woman's vulnerability to PPD increases if she has specific medical issues during her pregnancy. Patients with conditions such as diabetes, hypertension, or preeclampsia are 5-10 times more likely to have depression [8, 12].

Mental health disorders are very prevalent during pregnancy and post-partum period and PPD has been noted to be on the rise across the world. This study attempts to analyse and establish if there is an association of PPD in primiparous women who have a history of GDM and obesity [13]. This study indicates the risk factors can have a positive or negative impact on PPD which can in turn help to strategically plan and modify the current service provision for women in the antental and postnatal stages. The aim of study was to determine the incidence of PPD in primiparous women with obesity and GDM and to establish if there is an association between the risk factors and incidence of PPD.

PATIENTS AND METHODS

A retrospective record-based study was conducted from 1st March 2019 to 1st March 2020. The study population included pregnant women who attended primary health care facilities both for antenatal and postnatal care up to 8 weeks post-delivery that fit the inclusion and exclusion criteria. The subgroups were divided based on Health centres, Nationality and Age and a random sampling method was used for the equal proportion of sample size. By using the WHO calculator, the prevalence of postpartum depression was set as 60% [10] with the confidence interval at 95% with margin of error at 5% to maximise the probability of having accurate data which reflects the entire chosen population. A total of 2800 patients were included to complete the study.

Participants in the current analysis included primiparous women who have a diagnosis of GDM (FBG 5.1mmol/l, 1hour post 75g OGTT: 10.0mmol/l, 2 hours post 75g OGTT: 8.5mmol/l) with BMI 30-40 kg/m2. Other inclusion criteria included: age 20-50 years, pre-pregnancy BMI 30-40 kg/m^2, and no history of type 2 diabetes. Women with a BMI >40 kg/m^2, previous history of mental health disorders, and those with multiple gestation were excluded from the study. The first postpartum study visit was to occur between 6-8 weeks postpartum. Therefore all measurements for the current analysis were conducted before randomization took place. The research committee approved the retrospective study conducted.

Measurements:

Weight was recorded during pregnancy or within two days of delivery. Height was measured using *stadiometer*. At postpartum study visit, all participants completed socio-demographic, and medical history.

Postpartum Depression Assessment:

The Edinburgh Postnatal Depression Scale (EPDS) was administered to eualuate prenatal depressive and PPD symptoms. The EPDS questionnaire assesses the severity of PPD during postpartum period. EPDS comprises of 10-item questionnaire that has been validated as a screening instrument for PPD and each question is scored from 0 to 3, with total scores ranging from 0~30 and higher scores demonstrating greater levels of depression. An EPDS score of 0-8 indicates a low risk normal, 9-12 suggest mild postpartum depression, 14–19 modrete,

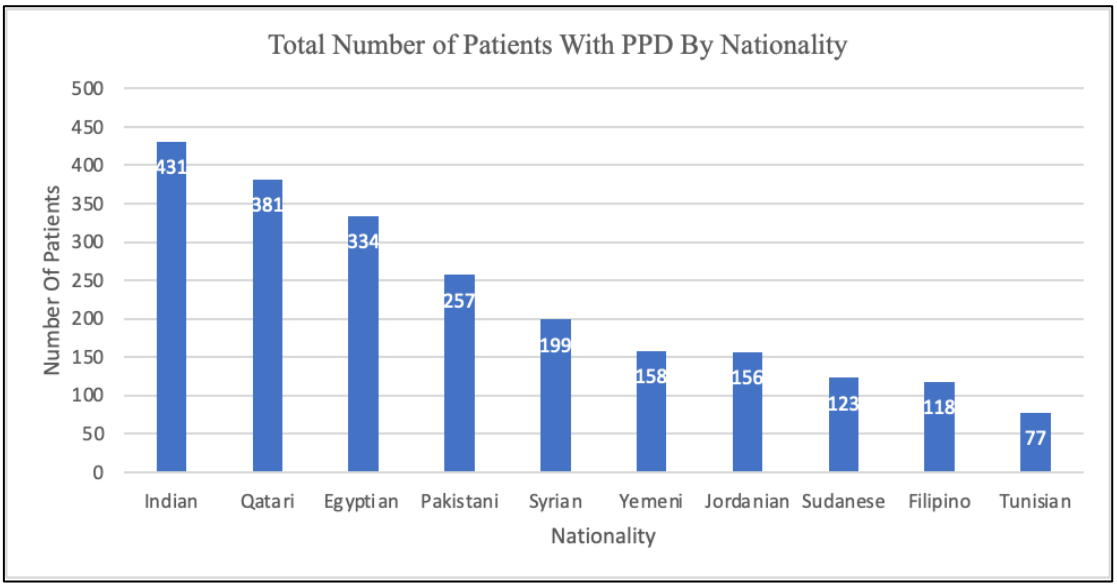
and 20 or higher severe PPD. The current study adopted cut off criteria of EPDS of 9 or more. All patients with EPDS 9 or more were further subdivided into categories with history of Gestational Diabetes Mellitus (GDM) and obesity.

Statistical Analysis:

In order to conduct the statistical analysis, version 20 of IBM's SPSS Statistics was used. Both qualitative and quantitative data were subjected to the process of calculating descriptive statistics (mean, standard deviation, percentage, and frequency) to measure the incidence of PPD in the study population. The regression analysis was carried out in order to assess and examine if there is an association between PPD, obesity and GDM in primiparous women. A p-value of 0.05 or less was chosen as the statistical significance.

RESULTS

The total study population comprised of 2800 patients,the ethnic profile included Indian 431 (15.4%), Qatari 381 (13.6%), Egyptians 334 (11.9%), Pakistani 257 (9.2%), Syrian 199 (7.1%), Yemini 158 (5.6%), Jordanian 156 (5.6%), Sudanese 123 (4.4%), Filipino 118 (4.2%),Tunisian 77 (2.8%), all other nationalities accounted for less than 1%.



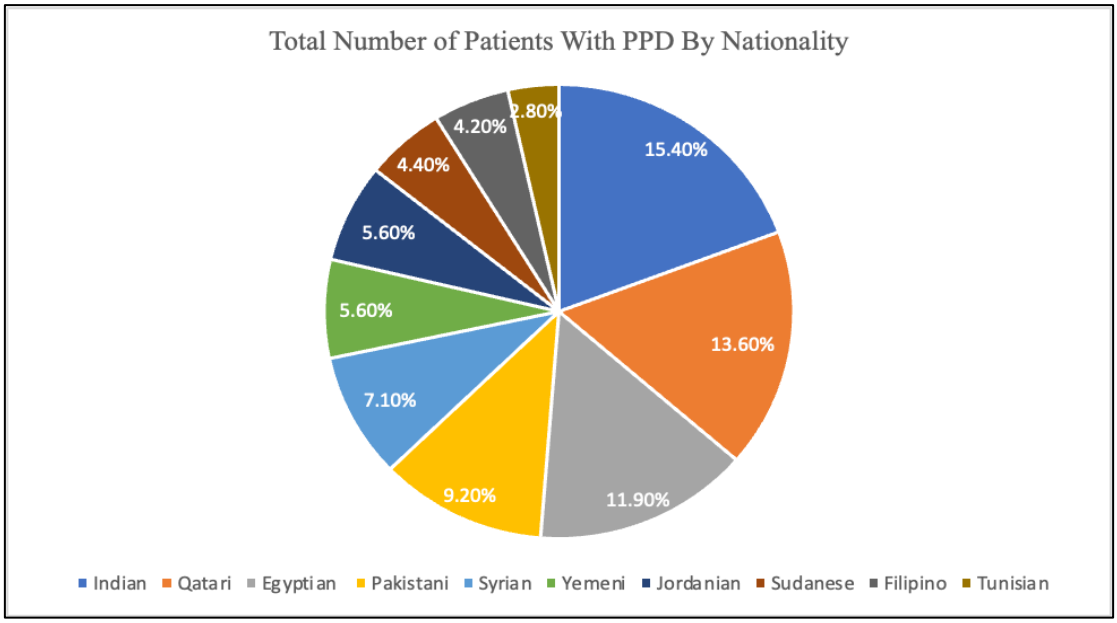


Figure 1 demonstrates the proportion of postpartum depressed patients with a history of GDM 771(27.5%) and obesity and 193(6.9%) respectively and Figure 2 shows the three subgroups of patients based on the EPDS score criteria.

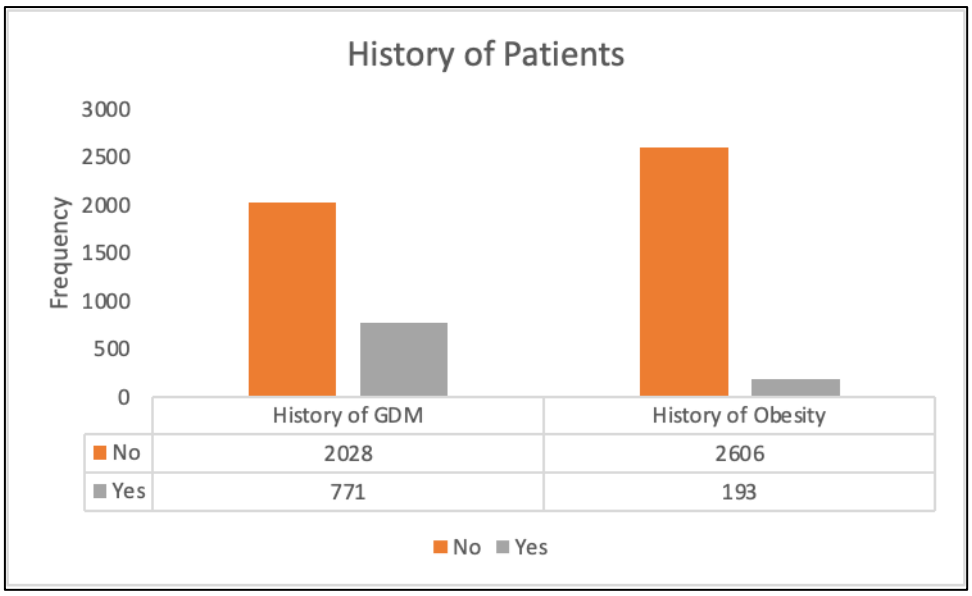


Figure 1: History of GDM and Obesity

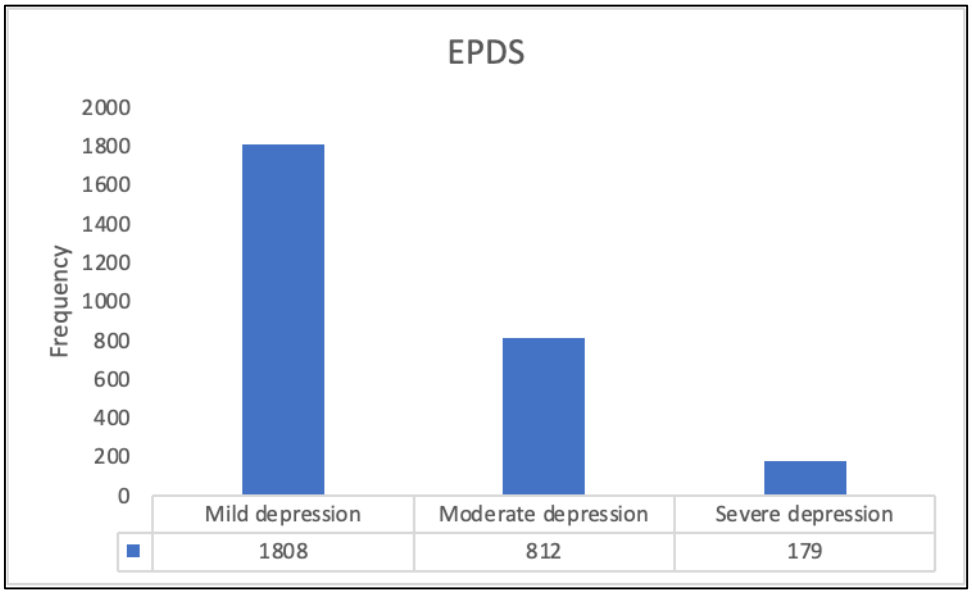


Figure 2: The Edinburgh Postnatal Depression Scale of participants

In Table-I Patients with a history of GDM or obesity were divided on the basis of EPDS. According to the table, 499 women who were suffering from GDM in their pregnancy were found to have mild depression in postpartum period. However, 115 women with obesity in pregnancy reported mild depression after birth.

Table-I: Distribution of postpartum depressed women based on their medical history.

		History of GDM	
		No	Yes
EPDS scoring	Low risk	1309	499
	Moderate risk	594	218
	Severe risk	125	54
		History of Obesity	
		No	Yes
EPDS scoring	Low risk	1693	115
	Moderate risk	755	57
	Severe risk	158	21

In Tables-II and III the regression analysis was done for the risk association of GDM or obesity with postpartum depression. Data showed that obese women were more succeptible to have depression (p=0.040) as compared to the GDM (p=0.526) sub group. All patients' data were scored as mild, moderate, or severe depression. The risk association was 1.957 times higher in patients with severe EPDS category as compared to the mild EPDS score (p=0.008).

Table-II: Risk association of depressed women with GDM and obesity

Variables		Odds ratio	95% C.I.		S.E.	Sig.
			Lower	Upper		
GDM	EPDS	1.007	.985	1.030	.011	0.526
Obesity	EPDS	1.040	1.002	1.080	.019	0.040*

Table-III: Risk association according to EPDS with GDM and obesity

Variables		Odds ratio	95% C.I.		S.E.	Sig.
			Lower	Upper		
GDM	**Mild EPDS**	Reference	1	1		
	Moderate EPDS	0.963	0.799	1.16	0.095	0.69
	Severe EPDS	1.133	0.81	1.585	0.171	0.465
Obesity	**Mild EPDS**	Reference				
	Moderate EPDS	1.110	0.800	1.544	.168	.529
	Severe EPDS	1.957	1.195	3.203	0.251	0.008**

DISCUSSION

In this study, we came to the conclusion that pregnant women with obesity were more likely to experience anxiety and depression than women with GDM. Women who were obese showed a severe EPDS score more than one times as compared to those with mild EPDS score. On the other hand, there was no statistically significant difference in the levels of state anxiety experienced by women of GDM throughout their pregnancies. On the other hand, there was no statistically significant difference in the levels of state anxiety or depression experienced by women of GDM throughout their pregnancies.Yet, although normal-weight womens' trait anxiety decreased significantly during pregnancy, this trend was not seen in obese women. Just a small number of research studies have looked at anxiety and depression in pregnancy in the context of being overweight, and those studies mostly include the general pregnant community [14, 15]. One cross-sectional study found that women who were overweight before becoming pregnant were more likely to experience anxiety and sadness throughout their pregnancies [16]. GDM is a risk factor for postpartum and antenatal depression due to physiological processes involved with pregnancy state. Increased cortisol levels are linked to depression, which may be caused in part by dysregulation of the hypothalamic-pituitary-adrenal axis brought on by aberrant glucose metabolism. Increased adipokine concentrations and a cytokine-mediated inflammatory response have both been linked to depression, and both are more common in women with GDM. Since most research studies have shown a correlation between GDM and PPD, this suggests that there is a relationship between the two, despite the existence of some conflicting evidence [17, 18].

Several studies have shown that pregnant women who are overweight have an increased risk of some types of birth defects, hypertension, and type 2 diabetes mellitus. However, the sample size of our research prevented us from conclusively linking the existence of particular problems during pregnancy, such as GDM and hypertensive diseases, to elevated anxiety and low mood [2, 19]. The specific causes of the rising rates of anxiety and depression in obese pregnant women should be investigated in future with in-depth qualitative and quantitative studies. Previous studies have confounded that low levels of education**,** intragestational disorders (such as diabetes, hypertension, liver pathologies, and infections), and dissatisfaction with family life were all shown to raise the incidence of PPD [20]. Nevertheless, restrictions on social contact and communication were the most significant risk factors for PPD (p 0.0001, OR 4.4). PPD symptoms were less common among women who reported being pleased and content with their family life after giving birth.

Pregestational obesity was also associated with PPD risk, but in a roundabout way [21]. This is likely because of the stress mechanism that obesity creates. Weight, height, weight gain during pregnancy, body mass index (BMI), and waist-to-hip ratio were shown to be significantly associated with the incidence of mood disorders, as well as the number of suicides after childbirth and the severity of depression [22, 23]. Postpartum depression was less common in couples who used assisted reproductive technology compared to those who conceived normally. Studies reflect actual conditions for assessing pregnant women's mental health and it's true that some things might make you more anxious at different stages of your pregnancy especially new diagnosis of intragestationasl disorders.

During pregnancy, the link between being overweight and experiencing anxiety may become more pronounced [20].

CONCLUSION

Our results show that pregnant women who are overweight or obese have a unique psychological condition. Although validated measures with indicated cut-offs cannot substitute a diagnostic tool (such as a psychiatric assessment), they may help identify pregnant women who might benefit from more intense counselling for psychosocial exposure. The primary goal of this study was to examine the existing research on the link between GDM or obesity with depression. The findings revealed that obesity increases the risk of postpartum depression. Depression was also shown to increase one's likelihood of acquiring GDM. This highlights the apparent two-way causality between GDM and depression. Yet, there is a difference between association and causation, and the latter cannot be demonstrated at this time with the data at hand. In the future, researchers should look for potential endocrine variables shared by both GDM and depression as possible causes. A greater knowledge of the link between GDM/Obesity and depression is vital for the prevention of both, but there is currently a lack of information due to the intricacy of the aetiology of both disease conditions and depression in pregnant women. The findings will aid in data gathering of local demography for future studies and will be useful in raising awareness in clinical team on the significance of PPD so we can reflect and revise our care plan. At an organisational level this study demonstrates the commitment to improve patient care by reviewing current practice.

Conflict of Interest: The authors declare no conflict of interest.

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