

# Frequency of Preeclampsia in Obese Woman Presenting at Civil Hospital Karachi

JAHORAN MARIYAH BIBI GOOLAMNOBEE<sup>1</sup>, GULFISHAN HAQ<sup>2</sup>, SADAF SABIR<sup>3</sup>, SAIMA SHAIKH<sup>4</sup>, SHEIK MAMODE ADEEL AUCKLOO<sup>5</sup>, NUSRAT SHAH<sup>6</sup>

<sup>1</sup>Registrar, Civil Hospital Karachi, Dow University of Health Sciences.

<sup>2</sup>Associate Professor Obstetrics and Gynecology, Civil Hospital Karachi, Dow University of Health Sciences.

<sup>3</sup>Consultant obstetrics and gynecology, Civil Hospital Karachi, Dow University of Health Sciences.

<sup>4</sup>Consultant obstetrics and gynecology, Civil Hospital Karachi, Dow University of Health Sciences.

<sup>5</sup>Senior Registrar, Jinnah Medical and Dental College

<sup>6</sup>Professor of Obstetrics and Gynecology, Pro Vice Chancellor Dow University of Health Sciences.

Correspondence to: Dr. Sadaf Sabir, Email ID; [dr.sadafsabir@hotmail.com](mailto:dr.sadafsabir@hotmail.com)

## ABSTRACT

**Objectives:** To determine the frequency of preeclampsia in obese women at civil hospital Karachi.

**Methods:** A total 126 patients from March-2020 up to December-2021 were inducted in the study with non-probability consecutive sampling. Women of 18-40 years of age having singleton pregnancy with obesity with gestational age  $\geq 20$  weeks were included after informed consent. Blood pressure (BP) was measured after 20 weeks of gestation. Urine for protein was checked if BP was found to be  $\geq 140/90$  mmHg for diagnosis of pre-eclampsia.

**Result:** The women had a mean age of  $28.56 \pm 3.848$  years. Age at presentation was highest in the group 25-31 years which represented 87 (69.04%). 23.02% of the women were nulliparous, 76.98% were multiparous. The mean  $\pm$  SD gestational age was  $34.52 \pm 3.775$  and 72 (57.1%) were in their 35-40 weeks of gestation. 91 women representing 72.2% had a BMI of 30-33 kg/m<sup>2</sup>. Pre-eclampsia was diagnosed in 33 (26.2%) obese patients (Table 2).

**Conclusion:** The frequency of 26.2% of Pre-eclampsia in obese women is significantly high. Women should be counseled before conception to decrease their BMI.

**Keywords:** Obesity, Pre-eclampsia, Blood pressure

## INTRODUCTION

Obesity has become an epidemic worldwide. It is a condition in which fat body leading to morbidity<sup>1</sup>. The World Health Organization has defined obesity as a BMI of 30 kg/m<sup>2</sup> or greater which is calculated by dividing a person's weight by the square of the person's height. Some countries have customized values and therefore less than the standard of WHO.<sup>2,3</sup> The incidence of obesity has increasing trend in the last four decades. All over the world the prevalence of obesity nearly tripled in last thirty years. The prevalence of obesity in Pakistan is 6.0 among adult males and 11.3 among adult females<sup>4</sup>. Obesity increases the likelihood of several diseases and morbidities like heart diseases, uncontrolled sugar levels, high blood pressure, cerebrovascular disease, metabolic syndrome, lung abnormalities, gastrointestinal abnormalities, infertility, psychosocial problems, joint problems, certain types of cancers and a decreased life expectancy.<sup>1</sup> As the trend of obesity is increasing, so is the number of women between ages of 18-35 that are obese. Women who get pregnancy with high baseline weight and are also more likely to retain pregnancy weight every time she gets pregnant.<sup>5</sup> Obese mothers have linked poor pregnancy outcome. Maternal complications include a higher prevalence for hypertension thromboembolism and gestational diabetes.<sup>6</sup> Preeclampsia is a pregnancy induced condition that affects around ten percent of pregnancies. It needs to be treated as it can give rise to significant mother and baby morbidity and mortality.<sup>7</sup> It is a disorder of high blood pressure and according to the World Health Organization, this condition is one of the main causes of mother and baby complications.<sup>8,9</sup> Pregnant women with Preeclampsia if not treated can have severe complications such as fits, hepatic involvement, stroke, lung and kidney issues, which can be fatal. Preeclampsia is also related with growth issues of baby and delivery before term.<sup>9</sup> Many predisposing factors cause preeclampsia. These include nulliparity, maternal age of greater than 35 years, pre pregnancy high blood pressure, high blood sugars, thyroid issues, kidney disease, previous history or family history of similar condition.<sup>7</sup>

Maternal increased body mass index is a well-known risk factor for the development of preeclampsia. Several large population studies have shown that higher weight women are two to three times more likely to develop preeclampsia than thinner.<sup>10-14</sup> The aim of this study was to determine the frequency of preeclampsia in obese women.

## METHADODOLOGY

This Cross-sectional study was conducted in the Department of Gynecology unit III, Civil Hospital Karachi for a period of 10 months as from March-2020 up to December-2021. All women of 18-40 years of age having singleton pregnancy with obesity [It is defined as body mass index (BMI)  $>30$  kg/m<sup>2</sup>. BMI was calculated as the pre-pregnancy weight (kg)/height (m<sup>2</sup>)] with gestational age  $\geq 20$  weeks were included after informed consent. Multiple pregnancy, women with gestational diabetes or eclampsia, women with underlying chronic disease like diabetes mellitus, chronic renal failure or pulmonary disease and already known hypertensive prior to pregnancy were included.

The demographic data like age, gestational age and parity were recorded. Blood pressure (BP) was measured after 20 weeks of gestation. If BP was found to be  $\geq 140/90$  mmHg then urine for protein was checked. Pre-eclampsia was defined as a new onset (not previously diagnosed on history) of hypertension systolic blood pressure  $\geq 140$  mmHg or diastolic blood pressure  $\geq 90$  mmHg at least three readings will be taken) after 20 weeks of gestation (according to LMP) accompanied by proteinuria (by dipstick examination). Where: +1 = 0.1g/dl, +2 = 0.2g/dl, +3 = 0.3g/dl, +4 = 0.4g/dl.]

Data entry and analysis were done using SPSS version 21. Frequency and percentage were computed for categorical variables like the pre-eclampsia. Mean and standard deviations were computed for continuous variables like age, parity and gestational age.

## RESULTS

Out of these 126, 33 (26.2%) were diagnosed with pre-eclampsia. The women had a mean age of  $28.56 \pm 3.848$  years. Age at presentation was highest in the group 25-31 years which represented 87 (69.04%) followed by 24 (19.04%) at 32-38 years and 15 (11.9%) at 18-24 years. 23.02% of the women were nulliparous, 76.98% were multiparous with a parity of between 1 to 9 babies. The mean  $\pm$  SD gestational age was  $34.52 \pm 3.775$ . Out of the 126 women that were included, 72 (57.1%) were in their 35-40 weeks of gestation. 91 women representing 72.2% had a BMI of 30-33 kg/m<sup>2</sup> (Table 1).

Pre-eclampsia was diagnosed in 33 (26.2%) obese patients (Table 2).

Table 1: Descriptive statistics (n = 126)

	Mean	Standard deviation
Age (years)	28.56	3.848
Parity	2.04	1.777
Gestational age(weeks)	34.52	3.775
BMI (kg/m <sup>2</sup> )	32.4968	1.48733

Table 2. Frequency of pre-eclampsia in obese ( BMI ≥ 30) pregnant women (N = 126)

Pre-eclampsia	Frequency	Percentage (%)
yes	33	26.2
no	93	73.8

## DISCUSSION

Pre-eclampsia in the most significant subtype of hypertensive disorders of pregnancy. It is present between five and ten percent of pregnancies, if not treated it can cause complications in mother and baby.<sup>7</sup> The incidence of severe pre-eclampsia has increased by more than 30% in the last 20 years.<sup>16</sup>

Obesity has become an epidemic worldwide with a marked increase in obesity in the last four decades. Between 1975 and 2016 the worldwide prevalence of obesity nearly tripled. As the cases of obesity is increasing, so is the number of women of between ages of 15-40 years that are obese. Women are embark their pregnancy at higher BMI and are also more likely to retain pregnancy weight with each pregnancy (4, 5). Several studies have reported adverse outcomes of pregnancy in obese women<sup>17,18</sup>

In our study 26.2% of obese women developed pre-eclampsia. International, regional and local studies have shown an association between pre-eclampsia and obesity. A systematic review done in 2003 reported increasing risk of pre-eclampsia with rise in BMI. In the 13 cohort studies that was included, they reported that the risk of preeclampsia percentage increasing for each kg/m<sup>2</sup> increase in BMI. Out of the 13 studies, 5 had similar exclusion criteria as our study with the exclusion of women with underlying chronic diseases. However in these studies and other studies that when stratification was done for other variables, the relation between maternal BMI and pre-eclampsia did not change and therefore they concluded that elevated BMI is alone factor for pre-eclampsia.<sup>19</sup>

In 2016 Poorolajal et al. conducted a meta-analysis to find the relationship between weight and preeclampsia. They included 23 studies, of which 17 were cohort studies, 5 were case control studies and 1 was a cross-sectional study. A total of 1,387,599 participants were included and reported that is an increased incidence of pre-eclampsia in obese women with an overall Odds Ratio of 3.15. The limitation of their study was that only 14 studies had adjusted their results for the presence of confounders.<sup>7</sup>

In 2011, Alexandra et al. retrieved data from 2 cross-sectional study of 1983 and 1998 in Greece. Their data consisted of 10% of the annual birth in Greece and was considered significant. A total of 18752 women were included in their study. Their results showed that 5.9% of obese women developed preeclampsia with and an adjusted Odds Ratio of 2.59 and a P value of 0.001.

However they had defined Pre-eclampsia as a blood pressure of ≥ 170/100 mmhg with proteinuria which is different from our definition of preeclampsia<sup>20</sup>.

In a population based cohort study conducted by Baeten et al. in the United States from 1992-1996 and studied the complications of pregnancy, including pre-eclampsia. 159072 nulliparous women were included. Out of these 9817 had a BMI of ≥ 30. They reported that 1321 of the obese women(n=9817) developed pre-eclampsia with a frequency of 13.2% and an adjusted Odd ratio of 3.3.<sup>10</sup>

A british population based study conducted by Sebire et al. included 287213 pregnancies out of which 31276 (10.9%) were obese. The study reported an adverse effect of obesity with pre-eclampsia with Odd ratio of 2.14. Similarly Thadhani et al. reported

an increased prevalence of pre-eclampsia associated with obesity with an Odds ratio of 2.1.<sup>21,22</sup>

456,668 deliveries were included in a study by Lisonkova et al. in 2013 in Washington. The data of women who were diagnosed with pre-eclampsia were retrieved from their hospital records and studied the risk factors and outcomes associated with the disease. They categorized pre-eclampsia as early onset and late onset with 34 weeks gestational age as cut off. They reported a stronger association between maternal obesity and the risk of earlyonset pre-eclampsia than for late onset pre-eclampsia with adjusted hazard ratio of 2.10 and 1.17 respectively.<sup>13</sup>

Yazdani et al conducted a study in Iran in 2008 -2009 and studied the effect of maternal BMI and the pregnancy and neonatal outcome. They showed that an women with an increased BMI had a higher incidence of developing preeclampsia with 12.2% of the women with a BMI of 30-34.9 kg/m<sup>2</sup> developing the disease.<sup>23</sup>

In Pakistan, Parveen et al conducted a descriptive study in 2011-2012 in Multan. They included 106 women, of which 23.8% developed preeclampsia.<sup>14</sup> Similarly, Asim et al. conducted a study in Karachi in 2008. They studied the effect of obesity on pregnancy induced hypertension and reported that obese women were twice more likely to develop pregnancy induced hypertension with 33.5% of women developing the disease. However pre-eclampsia was not included in the study. Our study had similar results to the study conducted in Pakistan previously. However international literature showed lower frequency of pre-eclampsia in their obese population but reported a higher prevalence as compared to the non-obese women. The limitation of this study was that the number of subjects was limited to a single hospital and cannot represent the whole country population. Population based studies should be done to identify the complications of obesity so that antenatal complications can anticipated.

## CONCLUSION

Obesity has significant relationship with preeclampsia. Pakistan being a developing country, this will have a significant impact on the healthcare system. There should be a target to address obesity in adolescence and pre-conception counseling.

## REFERENCES

1. Segula D. Complications of obesity in adults: a short review of the literature. *Malawi Med J.* 2014;26(1):20-4.
2. Safary M. Prevalence of preeclampsia and its correlation to maternal and fetal complications in women referred to emam sajjad hospital of yasuj. *Armaghan danesh.* 2001;6(24):1.
3. Goda A, Masuyama T. Obesity and Overweight in Asian People. *Circ J.* 2016;80(12):2425-6.
4. WHO. Prevalence of obesity among adults 2016.
5. Yogev Y, Catalano PM. Pregnancy and obesity. *Obstetrics and gynecology clinics of North America.* 2009 Jun;36(2):285-300.
6. Yu C, Teoh T, Robinson S. Review article: Obesity in pregnancy. *BJOG.* 2006;113(10):1117-25.
7. Poorolajal J, Jenabi E. The association between body mass index and preeclampsia: a meta-analysis. *J Maternal-Fetal Neonat Med.* 2016;29(22):3670-6.
8. WHO. WHO Recommendations for prevention and treatment of preeclampsia and eclampsia 2011.
9. Mol BWJ, Roberts CT, Thangaratnam S, Magee LA, de Groot CJM, Hofmeyr GJ. Pre-eclampsia. *The Lancet.* 2016
10. Baeten JM, Bukusi EA, Lambe M. Pregnancy complications and outcomes among overweight and obese nulliparous women. *American journal of public health.* 2001;91(3):436-40.
11. Sebire NJ, Jolly M, Harris JP, Wadsworth J, Joffe M, Beard RW, et al. Maternal obesity and pregnancy outcome: a study of 287 213 pregnancies in London. *Int J Obesity.* 2001;25(8):1175-82.
12. Kumari A. Pregnancy outcome in women with morbid obesity. *Int J Gynecol Obstet.* 2001;73(2):101-7.
13. Lisonkova S, Joseph K. Incidence of preeclampsia: risk factors and outcomes associated with early-versus late-onset disease. *Am J Obstet Gynecol.* 2013;209(6):544.
14. Parveen S MS, Bashir SG. Frequency of Pre-Eclampsia in Obese Patients. *JMHS.* 2017;11(1):426-8.

15. Durst JK, Tuuli MG, Stout MJ, Macones GA, Cahill AG. Degree of obesity at delivery and risk of preeclampsia with severe features. *Am J Obstet Gynecol.* 2016;214(5):651.
16. Marchi J, Berg M, Dencker A, Olander E, Begley C. Risks associated with obesity in pregnancy, for the mother and baby: a systematic review of reviews. *Obesity Reviews.* 2015;16(8):621-38.
17. Mission JF, Marshall NE, Caughey AB. Pregnancy risks associated with obesity. *Obstetrics and gynecology clinics of North America.* 2015 Jun;42(2):335-53.
18. O'Brien TE, Ray JG, Chan WS. Maternal body mass index and the risk of preeclampsia: a systematic overview. *Epidemiology.* 2003;14(3):368-74.
19. Alexandra P, Vassilios B, Alexandra V, George K, Vassiliki L, Chryssa B. Population-based trends of pregnancy outcome in obese mothers: what has changed over 15 years. *Obesity.* 2011 Sep;19(9):1861-5.
20. Sebire NJ, Jolly M, Harris JP, Wadsworth J, Joffe M, Beard RW, et al. Maternal obesity and pregnancy outcome: a study of 287,213 pregnancies in London. *Int J Obesity Relat Metab Disord.* 2001;25(8):1175-82.
21. Thadhani R, Stampfer MJ, Hunter DJ, Manson JE, Solomon CG, Curhan GC. High body mass index and hypercholesterolemia: risk of hypertensive disorders of pregnancy. *Obstetrics and gynecology.* 1999;94(4):543-50.
22. Yazdani S, Yosofniyapasha Y, Nasab BH, Mojaveri MH, Bouzari Z. Effect of maternal body mass index on pregnancy outcome and newborn weight. *BMC Research Notes.* 2012;5(1):34.
23. Asim SS, Naeem H. Pregnancy with obesity -a risk factor for PIH. *J Liaquat Uni Med Health Sci.* 2010;9:125-9.