Original Article

Gestational Diabetes and the Preterm Births in Obese Women in Low Socioeconomic Group

Aisha Khatoon[1], Shabnam Nadeem[2], Muhammad Saad Usmani[3] and Alvia Saad[2]

ABSTRACT

Objective: To determine Gestational Diabetes and the Preterm births in obese women in low socioeconomic group.

Study Design: Prospective case control study.

Place and Duration of Study: This study was conducted in Obstetrics and Gynecology Department Unit III at Abbasi Shaheed hospital from January 2018 to December 2018.

Materials and Methods: Total 182 patients were included in study. The inclusion criteria involved women of reproductive age group i-e; 16- 45years, pregnant obese and non-obese females visiting outpatient department and also admitting in inpatient department due to complications, belonging to lower socioeconomic class. Pregnant females with comorbid like previously diagnosed diabetes mellitus, hypertension, end stage renal disease, bleeding disorders were not included in study.

Results: Out of 182 patients enrolled in the study the mean age of the patients was 32.7± 3.76 yrs. Most of the patients belong to age group 31-35yrs, n=84(46.2%). There were 91 women in both obese and non-obese groups. The average BMI of patients was 33.04mg/kg body weight. Out of 91 obese women, mostly women were in the range of mild obesity i.e.; n=64(35.2%) while 27(14.8%) were with moderate obesity. There was total n= 138 preterm births seen among women enrolled. The mean preterm births took place at 34weeks ±3.1 weeks. The preterm births when compared between obese and non-obese, increased number of preterm births were found with statistical correlation found. (p value-0.000). The mean of random blood sugars of patients was 279.4mg/dl± 37.02 mg/dl.

Conclusion: The obese women with gestational diabetes are at increased risk of preterm births. The increased incidence was seen among women of low socioeconomic class with non-adherence towards treatment due to unawareness, financial issues and casual attitude towards gestational diabetes.

Key Words: Preterm births, gestational diabetes

INTRODUCTION

Worldwide, incidence of overweight and Obesity incidence is increasing among women of reproductive age[1-5.] Around 38.4% women in reproductive age are overweight and 63.39% obese in Pakistan. In US, the incidence among obese 11-40% and in overweight 12-38% among pregnant women[1]. According to American Medical association, obesity and overweight are preventable causes of mortality.

[1.] Department of Obstet and Gynae, Sobraj Maternity Hospital Karachi.

[2.] Department of Obstet and Gynae, Abbasi Shaheed Hospital, Karachi.

[3.] Department of Anatomy, Liaquat College of Medicine &Dentistry, Karachi.

Correspondence: Dr. Alvia Saad, Registrar, Abbasi Shaheed Hospital, Karachi.
Contact No: 0331-2471903
Email: alviasaad @gmail.com

Preterm births itself is one the most common cause of neonatal morbidity and mortality and also later in life childhood morbidity [1].

In Pakistan, studies have shown 20.4% incidence of gestational diabetes in women had pre-pregnancy obesity[6]. Various studies had also shown that there is increased risk of preterm births, cesarean sections, macrosomic babies also large for gestational age babies in overweight as well as obese women[4-8]. A large population based study by Su et al in 2019 has shown increased risk of preterm births and other pregnancy related complications in women with pre-pregnancy weight [4]. Another study by Anwar et al has shown incidence of 22.7%-31.8% preterm births in women with gestational diabetes[11].

Lower socioeconomic population in Pakistan constitutes around 17.2% [9]. The social norms, dietary habits, unawareness towards outcomes of gestational diabetes and preterm births, no adherence to treatments, lack of knowledge, fear of antidiabetic medications affecting births are the common observations among pregnant women [10].

The aim of the study was to determine the frequency of preterm births in patients with gestational diabetes in

obese and non-obese lower socioeconomic class visiting hospital in order to know the impact of morbidity due to it and its influence on society reduce the increasing maternal and neonatal health burden of society.

MATERIALS AND METHODS

This was a prospective case-control study conducted in Abbasi Shaheed hospital for a period of one year from January 2018 to December 2018 in Obstetrics and Gynecology Unit III from patients meeting inclusion criteria. The Ethical consent was taken from Ethical review committee of the hospital. The inclusion criteria involved women of reproductive age group i-e; 16-45years, pregnant obese and non-obese females visiting outpatient department and also admitting in inpatient department due to complications. Patients belonging to lower socioeconomic class was included in study with salary income below 15k. Pregnant females with comorbid like previously diagnosed diabetes mellitus, hypertension, end stage renal disease, bleeding disorders, overweight pregnant women were not included in study. The sampling technique used was probability consecutive type with sample size of 182 patients keeping prevalence of 22.7% and margin of error of 9%[11]. Gestational diabetes was labelled by oral glucose tolerance test with fasting glucose 105 mg/dl, after1 hour 190 mg/dl, after 2 hours 165 mg/dl and after 3 hours 145 mg/dl. Preterm birth was defined as birth of child below 37weeks of gestation. According to WHO classification, preterm births were divided into extreme preterm births <28weeks, very preterm 28-32weeks, moderate to late preterm 32- 37weeks.Informed consent was taken from the patient and two groups were made by lottery method. Group 1 was patients who were obese labelled after checking body mass index greater than 30kg/m2. While group 2 included all normal weight patients. Detailed history regarding preconception weight and height, previous illnesses for exclusion or previous history of gestational diabetes was recorded in data. Patients were followed throughout pregnancy for pregnancy related complications i-e; preterm births.

The statistical analysis was performed by using SPSS.20. Mean +/- SD were calculated from age of patient, and duration of gestational diabetes mellitus and gestational hypertension. Stratification was done regarding to preterm births with obesity and normal weight patients. Chi square test was applied keeping p value <0.05 to be significant.

RESULTS

Out of 182 patients enrolled in the study the mean age of the patients was 32.7± 3.76yrs. Most of the patients belong to age group 31-35yrs, n=84(46.2%), while the rest 25-30yrs, n= 50(27.5%)and 36-40yrs, n=48(26.4%) (table 1). There were 91 women in both obese and non-

obese groups. Most of the women were of age group 31-35yrs n=84, with frequency higher in both obese and non-obese women, but this was statistically not significant with no correlation was found. (p value-0.157). (table 2). The average BMI of patients was 33.04mg/kg body weight. Out of 91 obese women, mostly women werein the range ofmild obesity i.e.; n=64(35.2%)while 27(14.8%) were with moderate obesity (table 1).There was total n= 138 preterm births seen among women enrolled (figure 1). The mean preterm births took place at 34weeks ±3.1 weeks.The preterm births when compared between obese and non-obese, increased number of preterm births were found with statistical correlation found. (p value-0.000). Mostly there were very preterm births then moderate to late preterm. Extreme preterm births were more frequently observed among women with higher sugar levels and non-compliance to medications. Patents who were diagnosed with gestational diabetes were followed with advise for strict glycemic control but most of the women did not take medicines properly due to lack of availability due to financial constraints in almost all the patients n=120 while some took strict control of blood sugars. The mean of random blood sugars of patients was 279.4mg/dl± 37.02 mg/dl. The complications occurred in patients who were not vigilant in their glycemic control and therefore presented with preterm births. Around 95 patients underwent cesarean sections with n=55 patients from group 1 obese patients and remaining n=40 from group 2 i-e; non obese.

No maternal or neonatal mortality was noted with no patient presented with any emergency condition with very high blood sugars.

Table No.1: Demographic factors

Demographic factors	Mean ±SD
Age in years	32.7± 3.76
Gestational diabetes (Blood sugars)	279.41±37.02
Preterm births in weeks	34.12±3.158
Obese women Mild obesity Moderate obesity	91(50%) 64 (35.2%) 27(14.8%)

Table No.2: Variables

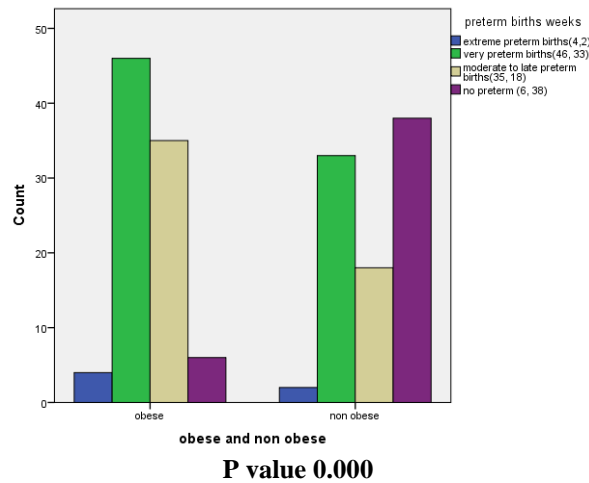| Variables	Obese N=91	Non obese N=91	P value
Age in years			
25-30yrs	25	25	
31-35yrs	44	40	0.770
36-40yrs	22	26	
Gestational random blood sugars range			
200-250mg/dl	12	35	
251-300mg/dl	48	36	0.000
301- 350mg/dl	31	20	

P value 0.000

Figure No.1: Preterm birth with Obese vs non-obese

DISCUSSION

Preterm births are the common cause of morbidity and mortality especially among neonates. In Pakistan, preterm birth 4.9%-11.2% according to estimates of study in 2014 [13-16]. While the gestational diabetes was reported to be 20.4% in obese antenatal women as concluded by study by Syed in 2014[6]. Our study has shown the incidence of 31.8% preterm births with an observation increasingly found in lower socioeconomic group. The women belonging to socioeconomic group were either had financial constraints, noncompliance of medications, unawareness of complications associated with gestational diabetes and their outcomes.

Obesity is the problem encountered worldwide[17-20]. Around 28.4%-34% women belonging to reproductive age group are suffering from obesity in US, according to 2010 estimates[14]. In our study, the mean age of the patients in obese and non-obese group was nearly same. However, the women in obesity group has age mostly in the range of 31-35yrs. The Center of Disease Control has identified morbid obesity i.e. 7.8% in this reproductive age group of population [14]. In our study the women, mild obesity 35.2%, moderate obesity 14.8%.The patients who were obese has higher incidence of preterm births compared to non-obese patients i-e; 20.8%:10.9%.

Mostly patients in reproductive age group also had raised random blood sugars diagnosed during pregnancy and on follow up too when treatment was advised, women did not show compliance to medicines and resulted in raised blood sugars and therefore leading to preterm births. These preterm births were higher in obese women compared to women who are not obese. This increased rate of preterm births seen in our study is most likely to two major risk factors i.e. obesity and gestational diabetes with non-adherence to treatment mostly due to financial constraints in lower socioeconomic class and other cause was non awareness regarding complications.

Among reproductive age group mostly women have problem of obesity and during pregnancy it leads to some health problems affecting both mother and child. There are different effects of obesity in pregnancy like during early gestation spontaneous abortions, congenital abnormalities, due to risk of insulin resistance, in late gestation fetal abnormalities, increased risk of cesarean sections, postoperative wound infections with delayed healing, thromboembolism, postpartum depression and other related illnesses[6, 11, 12]. However, in our study as patients had mostly mild to moderate obesity and were not strikingly very high; therefore, no other complication besides lower segment cesarean sections were slightly more in obese compared to non-obese but this result was no statistically significant.

In our study patients with preterm births did not had any previous illness, nulliparous women, belonging to lower socioeconomic class. The preterm births in our study among obese compared to non-obese women were n= 86 vs 53, with increased ratio seen among obese gestational diabetic's women compared to non-obese women. The results of our study therefore are consistent with Hanif et al has concluded in his study that preterm births early or late can be reduced by reduction in modifiable factors[12]. While Syed et al[6] has found 15.2% obesity in antenatal women enrolled in study, with gestational diabetes found in 20.4% cases, increased lower segment cesarean sections in 30.4% cases, pre-eclampsia 4.8%, pregnancy induced hypertension in 17.2% of women.

CONCLUSION

The obese women with gestational diabetes are at increased risk of preterm births. The increased incidence was seen among women of low socioeconomic class with non-adherence towards treatment due to unawareness, financial issues and casual attitude towards gestational diabetes.

Author's Contribution:

Concept & Design of Study:	Aisha Khatoon
Drafting:	Shabnam Nadeem
Data Analysis:	Muhammad Saad Usmani, Alvia Saad
Revisiting Critically:	Aisha Khatoon, Shabnam Nadeem
Final Approval of version:	Aisha Khatoon

Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. McDonald SD, Han Z, Mulla S, Beyene J. Knowledge Synthesis Group. Overweight and obesity in mothers and risk of preterm birth and

low birth weight infants: systematic review and meta-analyses. BMJ 2010;341:c3428.

2. Faucher MA, Hastings-Tolsma M, Song JJ, Willoughby DS, Bader SG. Gestational weight gain and preterm birth in obese women: a systematic review and meta-analysis [published correction appears in BJOG 2016;123(4): 648]. BJOG 2016;123(2):199-206.

3. Huang A, Ji Z, Zhao W, Hu H, Yang Q, Chen D. Rate of gestational weight gain and preterm birth in relation to pre-pregnancy body mass indices and trimester: a follow-up study in China. Reprod Health 2016;13(1):93.

4. Su XJ, Huang SJ, Li X, Du QL. Prepregnancy Overweight and Obesity Are Associated with an Increased Risk of Preterm Birth in Chinese Women. Obes Facts 2020;2:237-244.

5. Yousuf F, Naru T, Sheikh S. Effect of body mass index on outcome of labor induction. JPMA 2016;66(5):598-601.

6. Syed W. Obesity related maternal complications in pregnant women. Khyber Med Uni Med J 2014; 6(3):128-30.

7. Slack E, Best K.E, Rankin J. Hesleherst N. Maternal obesity classes, preterm and post-term birth: a retrospective analysis of 479,864 births in England. BMC Pregnancy Childbirth 2019;19:434.

8. Akbar N, Sarwar S, Sajjad M, Hayat M, Hassan A, Wasim A. The accuracy of clinical risk index for babies (CRIB-II) for predicting mortality of severely-ill preterm neonates. Annals Punjab Med Coll 2020;14(1):54-7.

9. Anwar Z, Anwar A, Nighat S, Saqib M, Anwar A, Alvi SH. Metformin versus insulin treatment in gestational diabetes mellitus: their effects on neonates and women in 24 months' follow-up. Pak J Med Health Sci 2019;13(4):1348-51.

10. "UNDP Reports Pakistan Poverty Declined to 17%, Under Musharraf". Pakistan Daily. 7 September 2009. Archived from the original on 26 July 2011. Retrieved 2012-03-12.

11. Haghdoost AA, Baneshi MR, Razzaghi A, Noori A. The impact of socio economic factors on the adherence of patients with Gestational Diabetes Mellitus to Medical Recommendations. Iran J Public Health 2019;48(9):1690-1696.

12. Hanif A, Ashraf T, Pervaiz MK, GÜler N. Maternal, fetal and neonatal risk factors for preterm birth in parity > 1. Pak Paed J 2019; 43(4):270-7.

13. Naz U. Comparison of obstetric outcome in terms of the risk of low birth weight, preterm delivery, cesarean section rate and anemia in primigravid adolescents and older primigravida. J Coll Physicians Surg Pak Feb 2014;24(2):131-4.

14. Catalano PM, Shankar K. Obesity and pregnancy: mechanisms of short term and long term adverse consequences for mother and child. BMJ 2017;356.

15. Pigatti Silva F, Souza RT, Cecatti JG, Tedesco R. et al. Role of Body Mass Index and gestational weight gain on preterm birth and adverse perinatal outcomes. Sci Rep 2019;9(1):13093. Published 2019 Goldstein RF, et al. Association of gestational weight gain with maternal and infant outcomes: a systematic review and meta-analysis. JAMA 2017;317:2207.

16. Kominiarek MA, et al. Association Between Gestational Weight Gain and Perinatal Outcomes. Obstet. Gynecol 2018;132:875–881.

17. Santos S, Voerman E, Amiano P, Barros, H, Beilin, LJ, Bergström A, et al. Impact of maternal body mass index and gestational weight gain on pregnancy complications: an individual participant data meta-analysis of European, North American, and Australian cohorts. BJOG 2019;126:984-995

18. Poston L, Caleyachetty R, Cnattingius S, Corvalan C, Uauy R, Herring S, et al. Preconceptional and maternal obesity: epidemiology and health consequences. Lancet Diabetes Endocrinol 2016;4:1025–36.

19. Aune D, Saugstad OD, Henriksen T, Tonstad S. Maternal body mass index and the risk of fetal death, stillbirth, and infant death: a systematic review and meta-analysis. JAMA 2014;311: 1536–46.

20. Marchi J, Berg M, Dencker A, Olander EK, Begley C. Risks associated with obesity in pregnancy, for the mother and baby: a systematic review of reviews. Obes Rev 2015;16:621–38.