

Research Article

**Analysis of gestational diabetes and its related factors in Pakistani
local female population**

**Kashif Aziz Ahmad¹, Faseeha Mariam²
and Muhammad Abdullah Ahmad³**

¹Assistant Professor of Medicine, Medical Unit-3, PGMI, LGH.

²Islamic International Medical College, Rawalpindi

³MO at THQ hospital, Chishtian

Corresponding Author: Dr Kashif Aziz Ahmad, Assistant Professor of Medicine, Medical Unit-3, PGMI. Lahore General Hospital. **Email:** drkashifaziz@yahoo.com

[Received: 09/12/2018; Accepted: 01/02/2019; Published: 02/02/2019]

ABSTRACT

Introduction: Gestational Diabetes is defined as onset of glucose intolerance at varying degree or first diagnosed during pregnancy. GDM has a potential risk to the mother as well as the fetus. Obesity has been designated as one of the most important global health threats worldwide, and its prevalence has been increasing among women of reproductive age. **Objectives of the study:** The main objective of the study is to analyze the gestational weight gain among women with gestational diabetes mellitus in local population of Pakistan. **Material and methods:** This cross sectional study was conducted at General Hospital, Lahore during March 2018 to November 2018. The data was collected from 293 female patients according to the ethical committee of hospital. We designed a study to associate maternal BMI and GWG with pregnancy outcomes in local women of Pakistan with GDM. Demographic profile (name, age, contact no.) was taken. History of related risk factors Physical Examination and investigation included obstetric ultrasound and blood samples were obtained from each subject to know about their clinical parameters like Fasting blood sugar level, random blood sugar level for Screening and diagnosis, HBA1C, Glucose tolerance test of patients was above the normal range. **Results:** According to the pre-pregnancy BMI, 96 women (11.5%) were underweight, 558 (67.1%) were of normal weight, 134 (16.1%) were overweight and 44 (5.3%) were obese (Table 1). The level of glycated hemoglobin was significantly higher in the overweight and obese groups than in normal weight and underweight groups ($P < 0.05$). In addition, birth weight was significantly higher in overweight or obese women than in underweight women ($P < 0.05$). There were no significant differences between the four pre-pregnancy BMI categories in maternal age, parity, height and gestational weeks. **Conclusion:** It is reasoned that high pre-pregnancy BMI and unnecessary GWG are related with higher frequencies of LGA, and in addition other unfavorable results in Pakistani ladies with GDM.

Keywords: Gestational, Diabetes, Pregnant, Women

INTRODUCTION

Gestational Diabetes is defined as onset of glucose intolerance at varying degree or first diagnosed during pregnancy. GDM has a potential risk to the mother as well as the fetus. Obesity has been designated as one of the most important global

health threats worldwide, and its prevalence has been increasing among women of reproductive age¹. The global prevalence of diabetes is 16.9% and 80% of them live in low and middle-income countries. It is estimated that 382 million people

have diabetes and the number will rise to 592 million by 2035 in less than 25 years. It is miserable that around 175 million people with diabetes are not diagnosed. Every six seconds a person dies from diabetes². In 2013, 5.1 million died due to diabetes. Pregnant ladies constitute a critical subpopulation with a hoisted danger of obesity because of over the top weight pick up. It has been demonstrated that maternal obesity and inordinate gestational weight pick up (GWG) are related with unfriendly obstetric and neonatal results including unconstrained fetus removal³, gestational diabetes mellitus (GDM), cesarean conveyance, preeclampsia, neonatal macrosomia, and agent and soporific entanglements⁴.

Pregnancy is a normal phenomenon, there are many hormones act during pregnancy. Insulin resistance begins in mid of second trimester and continues to third trimester as well⁵. Insulin resistance is due to placental hormones; though β cells of pancreas increases the production of insulin to cope with the insulin resistance during pregnancy, the changes in the circulating glucose level during pregnancy is low in divergence to extreme changes in insulin sensitivity⁶.

To help ideal pregnancy results, the World Health Organization (WHO) prescribed that the Institute of Medicine (IOM) create rules for weight pick up amid pregnancy⁷. In any case, the IOM suggestions on gestational weight pick up depend on pre-pregnancy BMI without mulling over various race/ethnicity, age, or existing pregnancy inconveniences⁸. Ladies with GDM are at expanded danger of maternal and fetal intricacies including preeclampsia, preterm birth, cesarean segment and conveyance of huge for gestational age (LGA) newborn children. As obesity and GDM are much of the time comorbid conditions, obesity and over the top gestational weight pick up may intensify these dangers in GDM. Since fat is an endocrine organ and collaborates with diabetes, it is conceivable that the expanded amassing of fat differentially affects perinatal results for ladies with GDM⁹.

Background of the study

Global age-adjusted prevalence for GDM has been shown to increase over the time with decrease in physical activities, increase in BMI and other associated risk factors; however, variation in this prevalence is seen in different ethnic groups¹⁰. Among the Asian and Filipina women the prevalence of GDM is 9.9 and 8.5%, respectively in normal weighted women. Whilst among Hispanic, non-Hispanic white and African American women the prevalence of GDM has been observed as >8.0% at higher BMI¹¹.

Objectives of the study

The main objective of the study is to analyze the gestational weight gain among women with gestational diabetes mellitus in local population of Pakistan.

Material and methods

This cross sectional study was conducted at General Hospital, Lahore during March 2018 to November 2018. The data was collected from 293 female patients according to the ethical committee of hospital.

Data collection

We designed a study to associate maternal BMI and GWG with pregnancy outcomes in local women of Pakistan with GDM and examine whether these narrower pregnancy weight gain recommendations are predictive of adverse perinatal outcomes in Pakistani population. Demographic profile (name, age, contact no.) was taken. History of related risk factors Physical Examination and investigation included obstetric ultrasound and blood samples were obtained from each subject to know about their clinical parameters like Fasting blood sugar level, random blood sugar level for Screening and diagnosis, HBA1C, Glucose tolerance test of patients was above the normal range

Inclusion criteria

1. All pregnant female coming for their routine checkup between 24 to 28 weeks were included in our study.

Exclusion criteria

2. All those women who were suffering from any other disease were not selected for this study.
3. Subjects with history of abnormal glucose tolerance and known diabetes mellitus were excluded were excluded.

Statistical analysis

Student’s t-test was performed to evaluate the differences in roughness. Data was analyzed by SPSS version 16. The data of gestational diabetes, risk factors, BMI classification was presented in form frequency (%).

Association of gestational diabetes and risk factors were studied using chisquare test. Chi-square test was applied.

P-value < 0.05 was taken as significant.

RESULTS

According to the pre-pregnancy BMI, 96 women (11.5%) were underweight, 558 (67.1%) were of normal weight, 134 (16.1%) were overweight and 44 (5.3%) were obese (Table 1). The level of glycated hemoglobin was significantly higher in the overweight and obese groups than in normal weight and underweight groups ($P < 0.05$). In addition, birth weight was significantly higher in overweight or obese women than in underweight women ($P < 0.05$). There were no significant differences between the four pre-pregnancy BMI categories in maternal age, parity, height and gestational weeks (Table 1).

Tables 2 show frequency of patients diagnosed as gestational diabetes mellitus on the basis of GTT was 50 (26.3%). The frequency of patients having no gestational diabetes mellitus was 140 (73.7%). Cross tabulation with all risk factors is shown in table 02.

Table 01: Gestational weight gains in pregnancy

Variables	Excessive GWG (N=293)		
	N (%)	AOR (95% CI)	P
Cesarean section ^a	177 (60.4)	1.60 (1.15–2.23)	0.005
PPH ^a	60 (20.5)	1.44 (0.94–2.19)	0.094
Preterm delivery ^b	6 (2.0)	0.63 (0.23–1.73)	0.369
PPROM ^b	51 (17.4)	1.01 (0.66–1.54)	0.965
GHT ^c	11 (3.8)	1.23 (0.50–2.98)	0.655
Macrosomia ^c	39 (13.3)	1.94 (1.11–3.38)	0.020
SGA ^b	7 (2.4)	0.78 (0.29–2.08)	0.615
LGA ^b	97 (33.1)	1.31 (0.92–1.85)	0.133

CI, confidence interval; GWG, gestational weight gain; PPH, postpartum hemorrhage; PPRM, preterm premature rupture of membranes; GHT, gestational hypertension; SGA, small for gestational age; LGA, large for gestational age. AORs are presented relative to the adequate GWG group.

Table 02: Analysis of GDM and all its related factors

		GDM of patients		P value
		Yes	No	
Age of Patient	<35	13	95	0.000
	>35	37	45	
Body Mass Index of Patient	Normal	8	88	0.000
	Over weight	42	52	
Polycystic Ovarian Syndrome	Yes	29	32	0.000
	No	21	106	
Previous History of GDM	Yes	22	6	0.000
	No	28	130	
Family History of Diabetes	Yes	34	29	0.000
	No	16	111	

DISCUSSION

In this study frequency of GDM is 50(26.3%) and of non GDM is 140 (73.3%) as compared to Bahawalpur study where prevalence of GDM among 124 studied women was 14.51% in 2010⁹. Maternal, perinatal and neonatal complications are strongly associated with GDM. The frequency of GDM in China has expanded since 2000 and this has turned into a critical open issue¹¹. This occurrence of GDM is like different investigations in Asian populations, yet higher than the rate of GDM in the United Kingdom (3.5%) and the United States (8.6%). Occurrence of GDM appears to rely upon variables, for example, ethnicity and geographical areas. In 2007 through 2008, about 60% of conceptive age American ladies were accounted for to be overweight or corpulent, with the predominance of overweight or obesity announced at around 21.4% in our investigation¹². In spite of the fact that the occurrence of obesity is bring down in Chinese and Asian ladies contrasted and different ethnicities, past investigations have demonstrated that Asians have a significantly higher danger of GDM, even at a low BMI¹³. Ladies with GDM are in danger of maternal and neonatal entanglements in pregnancy, and being overweight or fat with unreasonable gestational weight pick up seems to exacerbate this hazard. The principle discoveries of the present investigation are that, contrasted with ladies of ordinary weight, overweight and fat ladies with GDM had a higher frequency of cesarean segment, GHT, macrosomia and LGA, while underweight ladies had a lower occurrence of both macrosomia and LGA. Besides, contrasted and GWG inside the IOM proposals, over the top GWG expanded the frequency of cesarean area and newborn child macrosomia, while deficient GWG diminished the occurrence of LGA¹⁴. Albeit most examinations tending to the impacts of maternal BMI on unfriendly results incorporate ladies with GDM, a couple have detailed these relationship in overweight or hefty ladies with typical glucose resilience. Sparse

information exist that exhibit the collaboration between high maternal pre-pregnancy BMI, gestational weight pick up and perinatal results in ladies with GDM¹⁵.

Despite the fact that these outcomes can't be entirely clarified by the present investigation, they may feature a predisposition in the accentuation on administration of diabetes amid pregnancy among mind suppliers, where by the message identifying with weight administration is strengthened more energetically in corpulent instead of overweight ladies¹⁶.

CONCLUSION

It is reasoned that high pre-pregnancy BMI and unnecessary GWG are related with higher frequencies of LGA, and in addition other unfavorable results in Pakistani ladies with GDM.

Conflicts of Interest: None Declared.

Contribution of author

All the authors contributed equally. Dr. Kashif conceived of the presented idea and do all the lab work and carried out the experiment with other co-authors. Dr. Abdullah developed the theory and performed the computations. Dr. Faseeha and Dr. Abdullah developed the theoretical formalism, performed the analytic calculations and performed the numerical simulations. All the authors contributed to the final version of the manuscript.

REFERENCES

1. Gaillard, R. et al. Risk factors and outcomes of maternal obesity and excessive weight gain during pregnancy. *Obesity* 21, 1046–1055.
2. Haugen, M. et al. Associations of pre-pregnancy body mass index and gestational weight gain with pregnancy outcome and postpartum weight retention: a prospective observational cohort study. *BMC pregnancy and childbirth* 14, 201.

3. Gaillard, R. et al. Risk factors and outcomes of maternal obesity and excessive weight gain during pregnancy. *Acta Obstetrica Et Gynecologica Scandinavica* 92, 14–15 (2013).
4. Yang, J., Cummings, E. A., O'Connell, C. & Jangaard, K. Fetal and neonatal outcomes of diabetic pregnancies. *Obstetrics and Gynecology* 108, 644–650.
5. Owens, L. A. et al. ATLANTIC DIP: the impact of obesity on pregnancy outcome in glucose-tolerant women. *Diabetes care* 33, 577–579
6. Catalano, P. M. et al. The hyperglycemia and adverse pregnancy outcome study: associations of GDM and obesity with pregnancy outcomes. *Diabetes care* 35, 780–786
7. Zhang, F. et al. Increasing prevalence of gestational diabetes mellitus in Chinese women from 1999 to 2008. *Diabetic medicine: a journal of the British Diabetic Association* 28, 652–657
8. Wei, Y. M. & Yang, H. X. [Comparison of the diagnostic criteria for gestational diabetes mellitus in China]. *Zhonghua fu chan ke za zhi* 46, 578–581 (2011).
9. Kim, S. Y. et al. Racial/ethnic differences in the percentage of gestational diabetes mellitus cases attributable to overweight and obesity, Florida, 2004–2007. *Preventing chronic disease* 9, E88 (2012)
10. DeSisto, C. L., Kim, S. Y. & Sharma, A. J. Prevalence estimates of gestational diabetes mellitus in the United States, Pregnancy Risk Assessment Monitoring System (PRAMS), 2007–2010. *Preventing chronic disease*
11. Fisher, S. C., Kim, S. Y., Sharma, A. J., Rochat, R. & Morrow, B. Is obesity still increasing among pregnant women? Prepregnancy obesity trends in 20 states, 2003–2009. *Preventive medicine* 56, 372–378
12. Ota, E. et al. (2011). Maternal body mass index and gestational weight gain and their association with perinatal outcomes in Viet Nam. *Bulletin of the World Health Organization* 89, 127–136
13. Desquilbet, L. & Mariotti, F. (2010). Dose-response analyses using restricted cubic spline functions in public health research. *Statistics in medicine* 29, 1037–1057
14. Tobias DK, Zhang C, van Dam RM, Bowers K, Hu FB. Physical activity before and during pregnancy and risk of gestational diabetes mellitus: A meta-analysis. *Diabetes care* 2011;34:223-9.
15. Jawa A, Raza F, Qamar K, Jawad A, Akram J. Gestational diabetes mellitus is rare in primigravida Pakistani women. *Indian J Endocrinol Metab* 2011;15:191-3.
16. Ross G. Gestational diabetes. *Aust Fam physician* 2006;35:392-6.
17. Naheed F, Kammeruddin K, Hashmi HA, Narijo S. Frequency of Impaired Oral Glucose Tolerance Test in High Risk Pregnancies for Gestational Diabetes Mellitus. *J Coll Physician Surg Pak* 2008;18:82-5.
18. Getahun D, Fassett MJ, Jacobsen SJ. Gestational diabetes: risk of recurrence in subsequent pregnancies. *Am J Obstet Gynecol* 2010;203:467-72.