

A Study on Prevalence of Gestational Diabetes in Urban Field Practice Area of Tertiary Health-Care Center of Hyderabad

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Abstract

Introduction: Abnormal sugar levels which were detected 1st time during pregnancy are called gestational diabetes mellitus (GDM). According to the WHO, diabetes mellitus during pregnancy should be diagnosed if one or more of the following criteria are met: Fasting plasma glucose 7.0 mmol/L (126 mg/dL), 2-h plasma glucose 11.1 mmol/L (200 mg/dL) following a 75 g oral glucose load, and random plasma glucose 11.1 mmol/L (200 mg/dL) in the presence of diabetes symptoms. GDM had become global burden and leading cause of morbidity and mortality among mothers and infants contributing to infant mortality rate (IMR) and maternal mortality rate (MMR) worldwide.

Materials and Methods: A community-based cross-sectional study was conducted among pregnant women and sample size of 500 was attained by visiting the Anganwadi centers in urban slums under filed practice area of Osmania medical college, pregnant women of ≥ 20 weeks of gestational age were included in the study and data were collected using questionnaire, and GDM was diagnosed based on 2013 WHO publication of diagnostic criteria and classification of hyperglycemia first detected in pregnancy.

Results: A total of 500 pregnant women were included in this study, mean age of study population = 24.26 ± 3 years, mean age of marriage = 21.5 ± 2.747 years, mean gestational age in weeks = 28.38 ± 4.522 , average weight gain among total population = 6.04 ± 1.848 , and prevalence of the GDM was 19% ($n = 95$).

Conclusion: The present study documented prevalence of 19% of GDM which has to be addressed to overcome the complication associated with it and also to decelerate the trends of IMR and MMR.

Key words: >20 weeks, Gestational diabetes mellitus, Urban slums

INTRODUCTION

Abnormal sugar levels which were detected 1st time during pregnancy are called gestational diabetes mellitus (GDM). According to the WHO, diabetes mellitus during pregnancy should be diagnosed if one or more of the following criteria are met: fasting plasma glucose 7.0 mmol/L (126 mg/dL),

2-h plasma glucose 11.1 mmol/L (200 mg/dL) following a 75 g oral glucose load, and random plasma glucose 11.1 mmol/L (200 mg/dL) in the presence of diabetes symptoms.^[1] GDM had become global burden and leading cause of morbidity and mortality among mothers and infants contributing to infant mortality rate (IMR) and maternal mortality rate (MMR) worldwide.^[2-7]

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Impact of Diabetes Mellitus on Mother and Neonate

GDM not only triggers the immediate outcomes among pregnant mothers such as preeclampsia, macrosomia, stillbirths and atonic uterus and neonatal outcome, hypoglycemia, and respiratory distress. GDM further increases the risk of development of type-II diabetes mellitus not only among mothers after deliver but also

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among babies. A meta-analysis study done by Bellamy *et al.* concluded that there is a higher risk of type-II diabetes among women with GDM with a relative risk 7.43, 95% confidence interval 4.79–11.51.^[8,9]

Global Scenario and Indian Scenario

According to international diabetes federation 2019 report, there are about 20 million of live births had some form of hyperglycemia during pregnancy, of which 84% of hyperglycemia was due GDM, one out of six births are affected by GDM globally, low- and middle-income countries have wider had higher episodes of hyperglycemia during pregnancy.^[10]

The prevalence of gestational diabetes in India had varied from state to state ranging from 3.8% in Kashmir,^[11] 9.5% in Western India,^[12] 17.9% in Tamil Nadu,^[13] in Punjab, it was 35%,^[14] in Lucknow, it was 41%.^[15]

Risk Factors of GDM

GDM is mostly associated with maternal obesity, lack of physical activity, family history of gestational diabetes, previous history of GDM, previously delivered baby weight more than or equal to 4 kgs, polycystic ovarian syndrome, etc., which are some of the risk factors for GDM.

Aim

This study was the prevalence of gestational diabetes in urban field practice area of tertiary health-care center of Hyderabad.

Objectives

The objectives of this study were as follows:

1. To estimate the prevalence of GDM.
2. To study the sociodemographic factors of study population and associated risk factor of GDM.

MATERIALS AND METHODS

Study area: Urban field practice area of Osmania medical college.

Study design: Cross-sectional study.

Study units: Pregnant mothers.

Sampling technique: Convenient sampling technique was followed.

Sample size: Using 4 pq/L2, considering the prevalence of $P = 17.8\%$ from Seshiah *et al.* study,^[16] with allowable relative error of 20% and $L = 3.56$, sample size of $n = 443.5$ is attained and considering the non-responsive rate of 10%, sample size of 487.5 is attained which is rounded up to $n = 500$.

Study period: Three months (October to December 2017).

Inclusion Criteria

Pregnant women of ≥ 20 weeks of gestational age and who gave consent to participate in the study were included in the study.

Exclusion Criteria

The following criteria were excluded from the study:

1. Pregnant women who did not give consent to participate in the study.
2. Pregnant women < 20 weeks of gestation, and established diabetes mellitus (Type II), pregnant women with chronic illness.
3. Pregnant women with other medical complications.

Data Collection

Data were collected from all the pregnant women of gestational age ≥ 20 weeks of gestational age who were visiting primary health-care center (PHC) of Harazpenta, Hyderabad, for regular antenatal check-ups, questionnaire was used for collecting data, random blood sugars (RBS) testing was done to all pregnant women of ≥ 20 weeks of gestation, pregnant women with RBS of > 146 mg/dl were advised for fasting blood sugars (FBS), and data were collected accordingly, data were analyzed using Microsoft Excel 2010 version and open Epi version 3.3.0.

Need for the Study

Gestational diabetes is most important risk factor which contributes to IMR and MMR. Addressing this condition during pregnancy can reduce the morbidity and mortality pattern among pregnant women and newborns, due to varied knowledge gap into the existing topic, and as very limited number of studies were done on GDM.

RESULTS

The present study was conducted among $n = 500$ pregnant women who were residing in the urban slums, of which $n = 95$ (19%) were diagnosed with GDM. The prevalence of GDM among pregnant women was $P = 19\%$.

- Among study population 63% were Hindus, 29.2% Muslims, and 7.8% others.
- Mean age of study population = 24.26 ± 3 years.
- Mean age of marriage = 21.5 ± 2.747 years.
- Mean gestational age in weeks = 28.38 ± 4.522 .
- Mean body mass index (BMI) = 23.19 ± 3.24 .
- Average weight gain among total population = 6.04 ± 1.848 .

The prevalence of GDM was more among study population belonging to middle class according to socioeconomic class with a prevalence of 11.8% followed by upper middle class

accounting for 5% and lower middle class accounted for 2.2% [Tables 1 and 2] [Figure 1].

Table 1: The distribution of study population based on sociodemographic variable and percentage of GDM among study population

Variable	Total n=500 (%)	GDM n=95 (%)
Age (years)		
16–20	66 (13.2)	8 (8.4)
21–25	252 (50.4)	18 (18.95)
26–30	165 (33)	58 (61.05)
>31	17 (3.4)	11 (11.57)
Socioeconomic class-based on BG Prasad classification		
Upper class	9 (1.8)	-
Upper middle class	125 (25)	25 (26.31)
Middle class	308 (61.6)	59 (62.10)
Lower middle class	54 (10.8)	11 (11.578)
Lower class	4 (0.8)	-
Distribution based on body mass index (based pre-pregnancy weight in kg)		
<18.55	20 (4)	4 (4.21)
18.55–24.9	298 (59.6)	22 (23.157)
25–29.9	165 (33)	58 (61.05)
>30	17 (3.4)	11 (11.578)
Parity		
Primiparity	360 (72)	59 (62.105)
Multiparity	140 (28)	36 (37.895)
Type of marriage		
Consanguineous	69 (13.8)	14 (14.736)
Non-consanguineous	431 (86.2)	81 (85.26)

GDM: Gestational diabetes mellitus

DISCUSSION

The present study was conducted among pregnant women with a gestational age of ≥ 20 weeks of gestation a total of $n = 500$ pregnant women were included in the study, the prevalence of GDM was $P = 19\%$ in our study which was as similar to Seshiah *et al.*,^[16] that is, $P = 17.8\%$. The prevalence of GDM was found to be more prevalent in urban slums and urban area compared to rural areas as concluded by Seshiah *et al.*^[16]

Our study showed that GDM was more prevalent among pregnant women who were < 24 years of age group compared to that of women of > 24 years of age which showed the associated based on age and GDM with

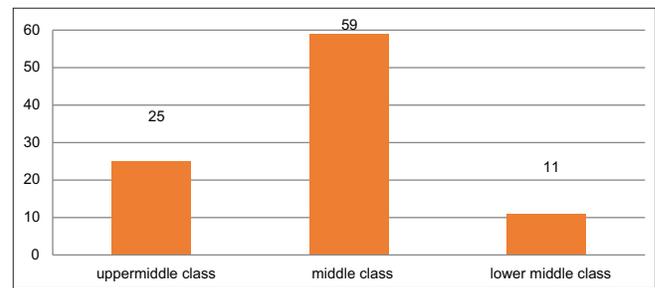


Figure 1: The distribution of study population based on socioeconomic class

Table 2: Association between risk factors and GDM

Variable	GDM+	GDM-	Total (n=500)	Chi-square P-value
Age in years				$\chi^2=43.16$
≤ 24	21	241	262	$P=0.0000$
> 24	74	164	238	df=1
Parity				$\chi^2=5.96$
Primiparous	59	301	360	$P=0.017$
Multiparous	36	104	140	df=1
Association between BMI				$\chi^2=77.1$
<18.55	4	16	20	$P=0.000001$
18.55–24.99	22	276	298	df=3
25–29.99	58	107	165	
≥ 30	11	6	17	
Association between family history of GDM				$\chi^2=169.7$
Present	49	11	60	$P=0.0000001$
Absent	46	394	440	df=1
History of consanguinity				$\chi^2=0.08$
Consanguineous	14	55	69	$P=0.78$
Non-consanguineous	81	350	431	df=1
Association between infertility treatment and GDM				$\chi^2=1.06$
Present	29	96	125	$P=0.78$
Absent	66	309	375	df=1

*There was a significant association between age, parity, family history of GDM, and BMI and there was no significant association between history of consanguinity and infertility treatment with gestational diabetes mellitus

GDM: Gestational diabetes mellitus, BMI: Body mass index

$P = 0.000$, there was also an association between parity and GDM, primiparous women are more susceptible to GDM compared to multiparous women with a $P = 0.017$, family history of GDM was also a risk factor for GDM with a significant $P = 0.000001$ which was similar to Geeti *et al.*^[14] who conducted study among 5100 pregnant women.

Limitation

1. The present study followed convenient sampling technique at the PHC level.
2. RBS and FBS were only considered for concluding the prevalence of GDM.

CONCLUSION

The present study documented the prevalence of 19% of GDM which has to be addressed to overcome the complication associated with GDM and also to decelerate the trends of IMR and MMR.

There was a statistically significant association that was found between age group ($P < 0.00$), parity (0.017), BMI ($P < 0.00$), and family history of GDM ($P < 0.00$). Statistical insignificance is seen among consanguineous and non-consanguineous ($P < 0.768$) type of marriage and among women who underwent infertility treatment and those who did not undergo treatment ($P < 0.167$).

Pre-conceptional counseling should be given to all women about risk factors of GDM in mother and outcome in the baby, universal screening of pregnant women should be done with FBS level. Educating adolescent girls and reproductive age group women the role of regular physical activity, dietary modifications and healthy lifestyle in preventing GDM.

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