EXTENDED ABSTRACT

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The Frequency of Gestational Diabetes Mellitus among Pregnant Mothers Admitted in Gynecology/Obstetrics Wards of Sheikh Zayed Medical College/Hospital, Rahim Yar Khan

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Keywords: Gestational Diabetes Mellitus, Frequency, Pregnant mothers.

ABSTRACT

Background: The gestational diabetes mellitus (GDM), defined as any degree of glucose intolerance with onset or first recognition during pregnancy, is poorly understood due to low socioeconomic dynamics among the pregnant mothers of Rahim Yar Khan. It results in many maternal and fetal complications.

Introduction: Gestational Diabetes Mellitus (GDM) refers to any degree of glucose intolerance with the onset of first recognition during pregnancy. Gestational Diabetes Mellitus poses a threat to the adverse maternal & prenatal outcomes as a result of maternal hyperglycaemia. Women with GDM have a high risk of progression to type 2 Diabetes Mellitus.[1]

Gestational diabetes begins during pregnancy & disappears after delivery. Although a history of sugar is included in risk factors, this is not a reliable indicator of development of gestational diabetes during pregnancy. Women older than 25 years are at a greater risk than young individuals and risk increases if someone has previous history of gestational diabetes. The Prevalence of gestational diabetes mellitus is known to vary widely depending on the region.[2]

Worldwide Prevalence: The prevalence of Gestational Diabetes Mellitus, by using the WHO 1999 criteria, ranges between 1-14% in different population[2]. The global prevalence of hyperglycemia in pregnant women (20-49 years) is 16.9%.[3]

In Developed countries; According to the American diabetes association, 14% of the pregnancies were turned complicated due to gestational diabetes mellitus. It stood to be a potential reason for maternal mortality rate.3,4 According to one study conducted on Turkish population, the risk of Gestational Diabetes Mellitus was found to be 22.3% in Turkish pregnant women.[5]

In Developing and Asian countries; the prevalence of Gestational Diabetes Mellitus in Asia was found to be 21.1% according to WHO 2013 Criteria.[6] According to one study conducted in Dhaka Medical College/Hospital Bangladesh, the prevalence of Gestational Diabetes Mellitus was found to be 7.5%.[7] According to a study conducted in antenatal Rothak India, Gestational Diabetes Mellitus was diagnosed in 7.1% pregnant women.[8] It was found that Asian, Americans and Indians are at a high risk of developing Gestational Diabetes Mellitus during pregnancy which is resolved in 90% cases after pregnancy. Every 3rd woman in North India is Gestational Diabetic. In Pakistan, the prevalence of Gestational Diabetes Mellitus was found to be 13.9% in 2015.

According to WHO, the prevalence of Gestational Diabetes Mellitus among rural population is 31.9% and in urban areas is 38.8%. The prevalence of Gestational Diabetes Mellitus among literate population is 34.2% and among illiterate population is 36.3%. There is slightly higher prevalence of gestational diabetes mellitus among the non-vegetarian due to the variation in body composition including muscle mass, genetic differences in insulin secretion and distribution & range of plasma glucose levels in two groups.

Diabetes Mellitus:

"A group of disorders sharing the common underlying feature of hyperglycemia. Hyperglycemia results from defect in insulin secretion, Insulin action or most commonly both."

OR

"A disorder that affects the body's ability to produce or use insulin"

Classification of Diabetes Mellitus:

1. Type I diabetes – B-cell destruction.
2. Type II diabetes- B-cell dysfunction + insulin resistance
3. Genetic defects in insulin action-receptor mutation.
4. Exocrine pancreatic defects-chronic pancreatitis, Neoplasia
5. Endocrinopathies – Cushing syndrome, glucagonoma.
6. Infection- CMV, congenital rubella.
7. Drugs induced – Glucocorticoids.
8. Genetic syndromes associated with diabetes – Down syndrome, Klinefelter syndrome, Turner Syndrome.
9. Gestational Diabetes mellitus- Diabetes associated with pregnancy.

Gestational Diabetes Mellitus: "Gestational diabetes is a

condition in which a woman develops high blood sugar level during pregnancy without having diabetes mellitus."[10]

OR

"Gestational Diabetes Mellitus is a metabolic disorder defined as glucose intolerance with the onset of first recognition during pregnancy."

Gestational Diabetes Mellitus can be defined by fasting plasma glucose > 7mmol/L (126 mg/dl) OR 2-hour plasma glucose level after a 75g OGTT (oral glucose tolerance test) > 7.8mmol/L (140mg/dl).[9]

Gestational Diabetes Mellitus is a condition in which a woman without diabetes develops high blood sugar level during pregnancy. The hallmark of Gestational Diabetes Mellitus is increased insulin resistance pregnancy hormones and other factors are thought to interfere with action of insulin as it binds to the insulin receptors. It is especially common during the 3rd trimester of pregnancy, and generally resolves once the baby is born but can cause complications during pregnancy and birth. Gestational diabetes mellitus is a well-established risk factor of adverse infant health outcomes, including fatal macrosomia, birth trauma, neonatal hypoglycemia and fetal death.

Complications in pregnancy14:

1. Eclampsia
2. Pre- eclampsia
3. PIH (pregnancy induced hypertension)
4. GDM (gestational diabetes mellitus)
5. Rupture of membrane (premature)
6. Polyhydramnios, oligohydramnios
7. Anemia's or bleeding disorders

Women at risk of Gestational Diabetes Mellitus 15:

1. Obese
2. Older age
3. Having family history of diabetes
4. Members of ethnic group with high prevalence of diabetes.

Effects of diabetes on pregnancy16:

1. Increased risk of miscarriage
2. Risk of congenital malformation
3. Risk of macrosomia
4. Increased risk of pre-eclampsia
5. Increased risk of stillbirth
6. Increased risk of infection
7. Increased operative delivery rate

Maternal and fetal complications of gestational diabetes16:

1. Congenital abnormalities- 3-fold increased risk of cardiac and neural tube defects.
2. Fetal macrosomia
3. Accelerated growth patterns
4. Late stillbirth
5. Polyhydramnios
6. Risk of pre-eclampsia
7. Diabetic retinopathy
8. Increased incidence of infections
9. Severe hyperglycemia or hypoglycemia.
10. Diabetes keto-acidosis
11. Risk of increased operative delivery.

Risk factors of Gestational Diabetes Mellitus 13:

1. Older age
2. Pre-pregnancy obesity
3. Past history of Gestational Diabetes Mellitus
4. Excessive weight gain in pregnancy
5. General low level of healthy physical activity
6. Unhealthiest diet
7. Low B12 or folate-imbalance
8. Increased pollution
9. Family history of diabetes
10. Illiteracy

1. Older age:

1% Gestational Diabetes Mellitus in < 20 years of age

13% Gestational Diabetes Mellitus in >44 years of age

One study, conducted in Lahore, constituted 135 subjects among whom only one had Gestational Diabetes Mellitus, which means the incidence of Gestational Diabetes Mellitus was observed to be < 1%, whereas in other study, incidence of Gestational Diabetes Mellitus among 124 studied women was 14.51% in which Gestational Diabetes Mellitus was seen in 6.45% among older.

2. Pre-pregnancy obesity: According to a study conducted in Lahore, the risk of Gestational Diabetes Mellitus was found to be 6.45% in non-obese women and 22.5% in obese women. Thus, it is observed that just like diabetes mellitus, Gestational

Diabetes Mellitus is also associated with obesity and these are greater chances of developing Gestational Diabetes Mellitus is obese women.

3. Past history of GDM: Past history of the Gestational Diabetes Mellitus increased the risk of developing Gestational Diabetes Mellitus in subsequent pregnancies and also increased the chance of developing type II diabetes mellitus even after termination of pregnancy.

4. Excessive weight gain in pregnancy:

Excessive weight gain during pregnancy increases the chances of developing gestational diabetes mellitus due to the increased insulin resistance. It leads to hyperglycemia, a hallmark of diabetes.

5. General low level of healthy physical activity: General Low level of healthy physical inactivity or activity has an association with diabetes. The difference of physical activity leads to a clear-cut difference of developing Gestational Diabetes Mellitus in rural and urban population. These are more chances of developing Gestational Diabetes Mellitus in people who lead a physically inactive life. Sedentary lifestyle chances the risk of developing obesity and also of risk of Diabetes mellitus.

6. Unhealthy Diet: Unhealthy diet and bad dietary habits have a direct influence on developing Gestational diabetes mellitus. As GDM has slightly higher prevalence among Non-vegetarian.

7. Low B12 or foliate imbalance: Low B12 or folate imbalance as well as Gestational Diabetes Mellitus have risk of developing neural tube defects. Low Vit. B12 and high folate level is associated with increased BMI and increased the risk of developing GDM during pregnancy and later diabetes.

8. Increased Pollution: There is a direct relationship between air and other types of pollution to Gestational Diabetes Mellitus. The exposure to smoking people or polluted environment leads to development of Gestational Diabetes Mellitus in pregnant female. Exposure to pm 2.5 has direct relation to development & increased prevalence of Gestational Diabetes Mellitus.

9. Family history of diabetes: The family history of diabetes especially in first degree relatives with diabetes mellitus, there are more chances in female to develop Gestational diabetes because family history of diabetes gives a strong clue to development of Gestational Diabetes Mellitus as well as diabetes in other family members.

10. Literacy/Illiteracy: A qualified woman has more chances to save themselves from Gestational Diabetes Mellitus as compared to the non-qualified women, concluding that awareness and qualification play an important role to save a person from diabetes.

S/S of Gestational Diabetes Mellitus:

a) Polyuria
b) Polydipsia
c) Polyphagia
d) Weight loss
e) Osmotic diuresis & dehydration

Management in pregnancy:

a) Patient should be referred to specialist as early as diagnosed.
b) Renal and retinal screening
c) Fetal surveillance
d) Plan for delivery

Plan of Treatment:

a) Diet control
b) Insulin
c) Careful monitoring of glucose level
d) Plan of delivery & if macrosomia + pre-eclampsia then plans C- section at 38-39 weeks vaginal delivery.

OBJECTIVE

To determine the frequency and socio-demographic profile of pregnant mothers with gestational diabetes mellitus admitted in Gynecological/Obstetrics wards of Sheikh Zayed Medical College/Hospital Rahim Yar Khan.

The objectives of this study were to:

1. Determine the frequency of pregnant mothers with Gestational Diabetes Mellitus in Sheikh Zayed Medical College/Hospital, Rahim Yar Khan.
2. Determine the socio-demographic profile of pregnant mothers with Gestational Diabetes Mellitus.

METHODOLOGY

STUDY DESIGN: Cross sectional study. DURATION: The data was collected during the period from 30-01-2017 to 05-02-2017. SETTING: Data was collected from labor room and wards of gynecology of Sheikh Zayed Hospital Rahim Yar Khan.

▪ **Study Design:** Cross sectional study

▪ **Study Setting:** Labor room and wards of Gynecology and Obstetrics, Sheikh Zayed Medical College / Hospital Rahim Yar Khan.

▪ **Study Subject:** Pregnant mothers in labor room and Gynecology ward in Sheikh Zayed Hospital Rahim Yar Khan.

▪ **Sample Size:** 160 pregnant mothers were included in this study.

▪ **Sampling Technique:** Non-probability sampling by convenient sampling technique

▪ **Duration:** Data was collected in one week from 30th January to 06th February 2017.

▪ **Inclusion Criteria:**

− Pregnant mothers admitted for delivery

− Post-partum mothers within two hours after delivery

▪ **Exclusion Criteria:**

− Non-Co-operative patient

− Mothers giving incomplete data

− Mothers not giving informed/verbal consent

− Known diabetic cases

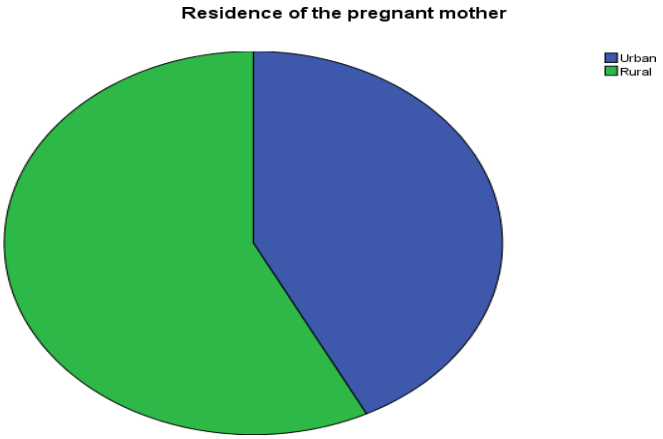
Data Collection: This study was conducted among the 160 pregnant mothers in labor room and gynecological wards of Sheikh Zayed Hospital Rahim Yar Khan, admitted during the study period. A predesigned questionnaire was filled by interviewing these mothers having variables of age, education,

residence, working status, BMI, family monthly income, total number of children, knowledge of Gestational diabetes mellitus and family history of GDM.

Data Analysis: Data was entered and analyzed by using Computer program SPSS version 16. The frequencies and percentages were calculated on categorical variables i.e. education status, residence (Urban/Rural), Working status etc. Means and standard deviations were calculated on numerical variables i.e. Age, BMI, etc.

Results: The frequency of GDM in this study was significantly associated with reproductive age group 25-34 years (64%), Illiteracy in mothers (53.8%), from rural areas (>50%), housewives (83%), BMI (Mean = 22), Family Monthly Income (>10,000 Rs.), Average no. of children (2-3), Diagnosed with Gestational Diabetes Mellitus (15.6%), Family history of D.M (<50%).

Chart 3: Distribution of pregnant mothers according to their residence



This chart shows that most of the pregnant mothers were from rural areas

Statistics	Age of the Pregnant Mothers
Mean	27.54
Median	26.00
Mode	25
Std. Deviation	5.569

Table 1: Age distribution of the pregnant mothers

This table shows that the mean age among pregnant mothers was 27.54 years; mode was 25 years while the median was 26 years. Standard deviation was 5.569 years. The age range was 16-40 years.

Education status	Frequency	Percentage
Illiterate	86	53.8
Primary	16	10.0
Middle	12	7.5
Matric	20	12.5
Above matric	26	16.2
Total	**160**	**100.0**

Table 2: Distribution of pregnant mothers according to their education status

This table shows that 53.8% of pregnant mothers were illiterate.

Working status of the pregnant mother	Frequency	Percentage
House wife	133	83.1
Working	27	16.9
Total	**160**	**100.0**

Table 4: Distribution according to the working status of pregnant mothers

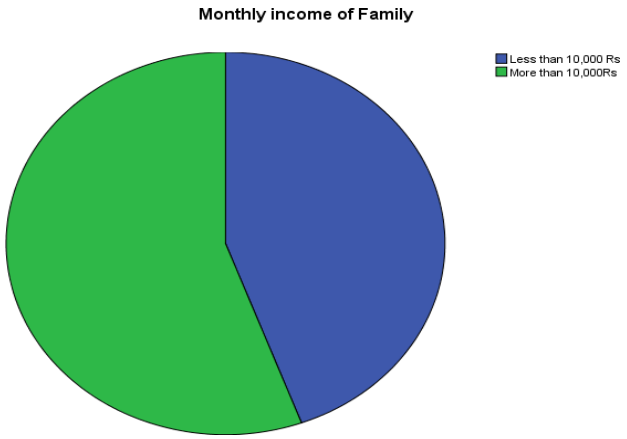
This table shows that 83.1 % pregnant mothers were house wives.

Statistics	BMI of pregnant mother
Mean	22.170
Median	21.500
Mode	25.0
Std. Deviation	3.9748

Table 5: Distribution of pregnant mothers according to their BMI

This table shows that the mean BMI of pregnant women was22.170, the median was 21.500, the mode was 25.0 and the standard deviation was 3.97.

Chart 6: Distribution of pregnant mothers according to their family monthly income

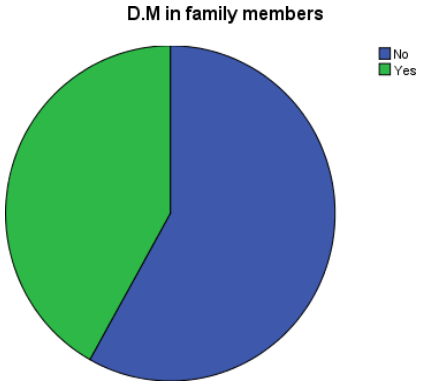


This chart shows that the family income of majority of pregnant mothers was more than 10,000 Rs.

Statistics	Total no of children
Mean	2.51
Median	2.00
Mode	3
Std. Deviation	1.984

Table 7: Distribution of pregnant mothers according to their number of children

This table shows that mean of total number of children was 2-3, median was 2.00 while mode was 3.The standard deviation was 1.984.



GDM diagnosed in pregnant mothers	Frequency	Percentage
No	135	84.4
Yes	25	15.6
Total	**160**	**100.0**

Table 8: Distribution of pregnant mothers who are diagnosed with GDM

This table shows that 15.6% of the pregnant mothers were diagnosed with GDM.

Age group (years)	Frequency	No. of Pregnant Mother diagnosed with GDM	Percentage
15-24	36	0	**0**
25-34	100	16	**64**
35-44	24	9	**36**
Total	**160**	**25**	**160**

Table 9: Age distribution of pregnant mothers diagnosed with Gestational diabetes

This table shows that Gestational diabetes was mostly diagnosed in reproductive age group (25-34 year of age) pregnant mothers.

Chart 10: Distribution of pregnant mothers according to history of Diabetes Mellitus in family members of mothers

This chart shows that family history of Diabetes Mellitus was present in less than half of the pregnant mothers.

Age Interval (Years)	Frequency	Percentage
15-24	36	22.5
25-34	100	62.5
35-44	24	15.0
Total	**160**	**100.0**

Table 11: Age frequency of pregnant mothers with age range 16-40 years

This table shows that most of the pregnant mothers (62%) were with age interval 25-34 year.

DISCUSSION

This study demonstrates that increasing maternal age is an important risk factor for GDM in the obstetric population. Mean age of pregnant mothers was 27 years, which is in contrast to study conducted at Khyber teaching hospital Peshawar[17], more GDM cases were seen in women of age greater than 35 years. Other studies in Louisiana and Bakai universities also demonstrated the same result.[18,19]

Based on our result, Illiterate pregnant mothers are at risk of GDM (53.8%). In contrast to another study by Henderson, less educated women were having gestational diabetic during pregnancy.[20] This shows that our study explains the actual facts supported by other studies.

This Study shows strong association of pregnant mothers with GDM from rural areas. According to a study in Tanzania, prevalence of GDM is higher in urban areas.[21] The explanation behind our findings is that rural women are usually less educated or illiterate. This fact fits well in our study as we see higher prevalence of GDM was found in illiterate women.

In this study, most of pregnant mothers (83%) were house wives and the percentage of working mothers was 17%. Another study conducted in India, 78.4% study subjects were house wives.[22] This also favors our study result.

Our study showed that mean BMI of pregnant mothers was 22.170 with Standard deviation 3.97. Thus, those with higher BMI were at increased risk of GDM. This finding was consistent with another study on diabetic pregnancy done by Handerson.[20]

Most of pregnant mothers were with monthly income of greater than Rs.10,000 which differ from other studies which concluded that a low social class and poverty are being associated with increased risk of GDM.[23,24] This dissimilarity might have been arisen from selection of samples in respective studies also as we know that diabetes mellitus type 2 is more prevalent in high income group which might be the fact in our study that we found higher prevalence of GDM in high income group.

We have observed that prevalence of GDM increases with the increase of gravidity from prime to multi. This affirms the result of study conducted at Randhawa that frequency of GDM was higher (80%) in multiparous.[25] Possible explanation of this is that gravidity increases with increase in age. Increasing maternal age which might have influenced the relationship of gravidity with GDM in descriptive analysis.

In this study frequency of GDM is 25(15.6%) and of Non GDM is 135(84.4%) as compared to Bahawalpur study, where prevalence of GDM among 124 studied women was 14.51% in 2010.26 It is comparable to our study. It is worth mentioning that a study for Louisiana reported 29% incidence in GDM in 2009.[18] Our study showed similarities with the above mention studies. This study shows the less frequency of GDM.

According to our study, GDM was mostly diagnosed in pregnant mothers of reproductive age group (25-34 year) i.e. 64%. Another study at Khyber teaching hospital Peshawar showed more GDM cases in pregnant mothers of age greater than 35 years. [17]

This study showed that family history of Diabetes Mellitus was present in less than half of women with GDM. The study done at Bakai university showed larger number of patients with GDM were having family history of DM type 2.19 This dissimilarity might be because our chosen sample is mostly from rural areas which have lower frequency of DM.

The obesity was the risk factor for development of GDM as in Khyber teaching hospital Peshawar showed that overweight and obese women are more prone to develop GDM.[17] In Bahawalpur study also were large number of patients with GDM were obese i.e. 98.8% are prevalent with BMI of 30.5.26

CONCLUSION

This study concluded that more than one in every 10 pregnant mothers was having Gestational diabetes mellitus. Almost half of the pregnant mothers had the history of Diabetes mellitus. It is mainly due to low socio-economic status and Illiteracy.

It is suggested that all the pregnant mothers must be screened for Gestational diabetes mellitus during pregnancy. There must be health awareness among population.

It is concluded that the frequency of Gestational Diabetes Mellitus was high. Early detection, constant supervision, delivery with intensive intra-partum monitoring, facilities of expert neonatologists, proper health care education to pregnant mothers can result in good maternal and fetal outcomes without much morbidity.