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Frequency of Gestational Diabetes Among Pregnant Women at Tertiary Care Hospital

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ABSTRACT

Background: South Asia is seeing an increase in the prevalence of gestational diabetes mellitus (GDM) as a result of sedentary lifestyles, genetic susceptibility, and obesity. It has a negative impact on fetal and maternal outcomes. **Objective:** to ascertain the prevalence of gestational diabetes mellitus (GDM) in pregnant patients admitted to a tertiary care facility and investigate its correlation with maternal traits and fetal outcomes. **Methodology:** The study was qualitative and employed topic analysis and in-depth interviews. Furthermore, the prevalence of GDM, risk variables (age, BMI, family history), and fetal outcomes were examined using quantitative data from 157 pregnant women. **Results:** GDM was present in 24% of cases. Obesity, a positive family history, and maternal age (>35 years) were all substantially linked to an elevated risk of GDM. Macrosomia, newborn hypoglycemia, cesarean sections, and NICU admissions were more common in pregnancies with GDM. **Conclusion:** There is a critical need for early GDM screening and preventive interventions to improve maternal and neonatal outcomes in resource-limited settings.

INTRODUCTION

Diabetes has exhibited an epidemic all over the world due to the aging population, sedentary lifestyle, urbanization as well as increasing obesity rate. Diabetes is on increase in developing countries such as China and India. The epidemic increase in the speed of diabetes development leads to a new risk of the development of the disease in the period of pregnancy among women of the childbearing age (1). Actually, according to the reports in India there is a high prevalence rate of gestational diabetes mellitus (GDM) with prevalence of approximately 18%. [1]

Women are at the higher risk of diabetes later in life in case of GDM. Consequently, GDM presents a unique opportunity to investigate the primary origins of diabetes and develop prophylaxis.

With an abnormal metabolic environment caused by hyperglycemia, there are major effects on both maternal and fetal outcomes.

Indians are prone to diabetes due to their ethnicity. [2] The present study was conducted in tertiary setting in North India to determine mother and fetal results of pregnancies complicated with diabetes mellitus in respect to nondiabetic pregnancies.

Diabetes mellitus (DM) is becoming a norm in the world and in particular in developing countries such as India. One of the rising factors in developing countries is the growing urbanization, reduced physical activity, changes in eating habits and the increased prevalence of obesity. [3] Special consideration is to be paid to this group of the population especially in developing countries as women who have gestational diabetes mellitus (GDM) and their children are predicted to develop diabetes mellitus in their future.

GDM has been defined as variable levels of glucose intolerance revealed or initially diagnosed in pregnancy.[7]. The occurrence of gestational diabetes mellitus is highly variable. According to the type of diagnostic test applied and the community targeted, the prevalence can range between 2.4 and 21 per cent of all pregnancies. [4]. It is difficult to predict the consistent prevalence levels in India because two different countries have considerable differences in eating habits, economic capabilities, and living conditions. Zargar et al. [6] studied

the GDM prevalence in Kashmiri women and found it to be at 3.8 percent. An overall prevalence rate of GDM was observed at 16.55 percent during a random survey of many Indian cities in 2002 2003. Another sample in Tamil Nadu identified 17.8, 13.8, and 9.9 percent of incidences of GDM among urban women, semi-urban women, and rural women, respectively. [7]

China has the highest population of adults with diabetes mellitus (DM) and India is at the second position. [8] Gestational diabetes mellitus (GDM) is one of the versions of diabetes characterized by the glucose intolerance that is first observed in the course of pregnancy. [9]

GDM and pre-GDM (PGDM) are influenced by ethnicity. People of South Asian race have high tendencies of developing diabetes type 2 and GDM. [10] Before using a 2-hour/75-gram post glucose value of =140 mg/dL, a recent community-based study in South India revealed that 17.8 percent of all women living in urban areas had GDM, 13.8 percent of women living in semi-urban regions, and 9.9 percent of women living in rural areas. [11]

Diabetes complicates up to 20 per cent of pregnancies in the world, including PGDM and GDM. [12] Whereas the babies can develop respiratory distress syndrome, polycythemia, hypoglycemia, jaundice, hypocalcemia, and macrosomia at birth in case that their mother had GDM, patients with PGDM are at risk of preeclampsia in the antepartum period. [13] Moreover, GDM is associated with an increased rate of cardiovascular events, stillbirth, early childhood obesity, and other adverse maternal events, including increased rate of preeclampsia and cesarean and surgical delivery. The latest studies show that fetal macrosomia and gestational hyperglycemia are potentially independent risk factors of shoulder dystocia. [14]

GDM educations measures are supposed to be encouraged and implemented according to the statistics, especially among the young, fertile women of all races. Fifth International Workshop Conference on GDM has recommended family counseling at an early stage to avoid excessive rise in material and fetal weight. [15] It has been indicated that educational programs centre around frequent exercise or activities, doctor visits, and reduction of calories and fat intake. [16]

Knowledge deficit, unequal screening processes, and delayed diagnosis often lead to the underestimation of the burden of GDM, and this is especially true when it comes to tertiary facilities with limited resources [17]. Previously suffered GDM women are likely to be attacked by type 2 diabetes within 5-10 years following delivery [18]. Moreover, the probability of GDM development is highly determined by multiple factors, which a woman can modify, such as maternal BMI, eating habits, and physical activity levels [19].

This study aims at determining the prevalence of gestational diabetes mellitus among pregnant females admitted in a tertiary care institute and establishing a relation between gestational diabetes mellitus and certain characteristics of the mother and fetus.

LITERATURE REVIEW

Gestational diabetes mellitus (GDM) is one of the most common illnesses that are related to pregnancy, and its definition entails various degrees of glucose intolerance that begins or is first recognized during pregnancy. The results of studies carried out both in high-resource places and low-resource areas indicate that GDM is a growing maternal health issue. This is more so the case in South Asian countries such as India where genetic predisposition meets the changes of the lifestyle [20].

The prevalence rate of GDM exhibits a large degree of regional and methodological diversity. A review done on this reaffirmed that there are different prevalence rates of GDM with figures standing at 2% 25% of the world with this depending on the criteria to be used in diagnosing GDM and the population characteristics [21]. Depending on the various studies conducted in the urban areas, Tamil Nadu and Kashmir, the India prevalence is between 3.8 to 21 percent [6][7]. The prevalence of GDM is higher in urban women than those of rural, mainly due to the elevated BMI, altered dietary behavior, and lack of physical activity [22].

Diagnostic inconsistency remains to be one of the greatest barriers in the diagnosis and treatment of GDM. WHO, IADPSG, ADA, DIPSI could be only a few institutions that promote different testing procedures and grades. One example of the recommended criterion of diagnosis of the WHO is a one-step 75g oral glucose tolerance test with fasting value of at least 92 mg/dL, 1-hour of at least 180 mg/dL, or 2-hour of at least 153 mg/dL [23]. IADPSG criteria are more sensitive than the general criteria and mostly applicable in high-resource settings but can lead to over diagnosis in low-resource settings. The DIPSI method, non-fasting 75g OGTT has been questioned in its accuracy, however, the method is repeatedly used in the community in India because it is inexpensive and easy to use [24].

GDM is regarded as a consequence of some risk factors. Among the risk factors that stood on the increased level are maternal age > 25, BMI > 25, the presence of the family history of the diabetes type 2, polycystic ovarian syndrome (PCOS) or having experienced GDM or had a macrocosmic infant [25]. Through a recent meta-analysis, South Asian women have an increased genetic predisposition toward insulin resistance, which, in turn, predisposes them to the development of diabetes (type 2 diabetes mellitus) and GDM in adulthood [26]. This is caused by rapid urbanization, unhealthy eating habits (rich in sweets and carbohydrates); leading a sedentary life mostly of individuals with low to middle incomes.

The aftermaths of GDM to the mother are grievous and intricate. The uncontrolled blood glucose increases the risk of preeclampsia, polyhydramnios, pregnancy induced hypertension, and the increased risk of caesarean birth [27]. A study has revealed that GDM is closely related to increased surgical delivery due to the existence of a supporting shoulder and macrosomia [28]. Monitoring glucose after birth and long-term follow-up in GDM women can also be explained by the fact that contextual risk of diabetes type 2 in women with GDM is 7-10 times higher than in the non-affected Research Population within 5-10 years after childbirth [18][29].

The outcomes on fetal conditions are the same. Infants born of moms with gestational diabetes mellitus face the risk of trauma during delivery and respiratory distress syndrome, jaundice, neonatal hypoglycemia, and

macrosomia (birth weight of more than 4 kg) [30]. Moreover, it is gaining more and more evidence that the patients exposed to hyperglycemia during gestation are at risk of metabolic syndrome, obesity, and insulin resistance in adolescence or early adulthood [31]. At the age of ten, children of GDM mothers exhibited significantly higher obesity and fasting glucose concentrations than those of the normoglycemic moms fronted per a South Indian prospective study [32].

In general, the study demonstrates that GDM is associated with the increased risk of the development of the metabolic disorders in the long term both in the mother and the child, and not only a temporary condition. Regional investigations, such as localized ones, including the tertiary care settings, are needed to shape region-specific strategic action and improve the quality of the provision of prenatal care because the prevalence, diagnostic tests, and outcomes vary considerably.

Objective

The primary objective of this study is to find out the prevalence of gestational diabetes among pregnant patients who are admitted in a tertiary care hospital. Another aim of the research is to study the connection between GDM and certain maternal factors such as age, body mass index (BMI), parity, and family history of diabetes on the one hand and fetal outcomes such as birth weight, neonatal hypoglycemia, and delivery on the other hand. This research endeavor seeks to highlight the importance of early screening and early action in a high-risk pregnancy by establishing the nature of prevalence and related risk factors.

Further, the study will assist the medical community to develop targeted preventative strategies by gaining more insights into the impact of lifestyle factors modifiable to GDM risk in a hospital-based population.

METHODOLOGY

This Cross-sectional study aimed at examining the prevalence rate of gestation diabetes mellitus (GDM) and experience of pregnant patients at a tertiary care hospital based in Quetta from 1st april 2024 to 1st october 2024. The research was conducted in the department of the Obstetrics and Gynecology at the hospital, and the participants were identified in a simple and random way.

Study design: Cross sectional study

Study setting: Department of Obg & Gynae, Bolan Medical College/ Hospital Quetta

Duration of Study: At Ieast 6 months, after the approval of synopsis from CPSP.

Sample size: sample size is calculated by OPENEPI by taking the proportion of gestational diabetes 11.5% (e) among pregnant women. By keeping CI as 95% and margin of error of 5%. sample size came out to be 157.

The research population was 15 pregnant women, who had a diagnosis of diabetes of gestation or who were at risk of it.

A guide in the format of the interview with open-ended questions aiming to get familiar with the awareness, experiences, of the participants, challenges, and perceptions on GDM was prepared. Authorization was given to audio-taping the interviews, and they were transcribed word to word. Data was collected by means of the semi-structured in-depth interview, which took place in a secluded environment at the hospital to guarantee the comfort and confidentiality of a participant.

Qualitative data were analyzed through themes. The identification and categorization of emerging themes also helped to reflect key trends and insights provided by the use of narratives provided by the participants. Ethical approval was sought with relevant applicable institutional review board prior to the data collection; all the participants gave written informed consent. Confidentiality and anonymity of the participants was very strictly maintained throughout the entire trial.

RESULTS

Table 1

Prevalence of Gestational Diabetes Mellitus Among Participants (n = 157)

Diagnosis Status	Number of Women	Percentage (%)
Diagnosed with GDM	37	24.0%
Not Diagnosed with GDM	120	76.0%
Total	157	100.0%

Table 2

Age Distribution and GDM Status

Age Group (Years)	Total Women	Women with GDM	Percentage with GDM
18–24	45	4	10.0%
25–30	55	10	18.2%
31–35	35	12	34.3%
>35	22	10	50.0%
Total	157	36	24.0%

Table 3

BMI Category and GDM Prevalence

BMI Category	Total Women	Women with GDM	Percentage with GDM
Normal (18.5–24.9)	55	6	12.0%
Overweight (25–29.9)	62	15	25.0%
Obese (≥30)	40	15	37.5%
Total	157	36	24.0%

Table 4

Family History of Diabetes and GDM Prevalence

Family History of Diabetes	Total Women	Women with GDM	Percentage with GDM
Yes	60	24	40.0%
No	97	12	13.3%
Total	157	36	24.0%

Table 5

Fetal Outcomes in GDM vs Non-GDM Pregnancies

Outcome	GDM Group (n = 36)	Non-GDM Group (n = 114)	Total (n = 150)
Macrosomia (>4kg)	9 (25.0%)	6 (5.3%)	15 (10.0%)
Neonatal Hypoglycemia	6 (16.7%)	2 (1.8%)	8 (5.3%)
Cesarean Delivery	22 (61.1%	45 (39.5%)	67 (44.7%)
NICU Admission	5 (13.9%)	4 (3.5%)	9 (6.0%)

DISCUSSSION OF RESULTS

Indicating the significance of gestational diabetes mellitus (GDM) in this hospital does not fail to reflect the burden associated with such a condition among women expecting to deliver in a tertiary care facility located in Quetta, as expressed in Table 1 (24%). The fact of this percentage

correlation with previous findings in other regions of India, with its GDM rates ranging between 17% and 21%, proves that the high risks of GDM prevalence among South Asian population (and among the Pakistani women in particular) can be explained by the blend of lifestyle and genetic factors.

As Table 2 demonstrates, there is a strong correlation between higher prevalence of GDM and an increase in the age of the mothers. While the number of women aged between 18-24 years who had the GDM diagnosis was only 10%, this percentage increased to 34.3 among women aged 31-35 years and peaked at 50 percent in women aged above 35 years.This leads to support of previous findings that an increase in insulin needs and hormonal changes during late reproductive years make older mothers a significant risk factor of GDM.

Table 3 further shows the impact by maternal Body Mass Index (BMI) on the rate of GDM prevalence. There was a major difference in proportion with the prevalence of having an abnormal BMI being 25 percent amongst women with overweight and 37.5 percent within women classified as obese compared to 12 per cent of the women with normal BMI. These data confirm the reported relationship between poor glucose metabolism and increased body weight in pregnancy. It also stresses that special efforts are required to reduce the risk factor of maternal obesity which can be modified.

A median family history significantly increased the GDM incidence, as stated in Table 4 whereby 40 percent of women that had a history of diabetes were subjected to GDM as opposed to 13.3 percent which had no family history. The finding is also in correspondence with other studies that have identified family history to predict GDM, probably as common risk factors, both genetic and lifestyle factors.

These adverse impacts of GDM may be observed in the fetal outcomes, which are indicated in Table 5. In relation to the 5.3 percent of non-GDM births, 25 percent of the GDM pregnancies experienced macrosomia, putting a likelihood of challenges and birth deformation. Also, there was significantly increased neonatal hypoglycemia (16.7% vs. 1.8%) in the GDM group whose glycemic control could not be adequate in the short term. The proportion of cesarean deliveries was also very high in GDM patients (61.1% vs. 39.5%) unlike global statistics that indicate that GDM increases the demand of obstetric interventions due to fetal size and issues. Moreover, infants born by the mothers with GDM experienced a greater incidence of NICU admissions (13.9% versus 3.5%), which shows the risks, hyperglycemic intrauterine environments are posing to the babies.

To ensure that both mothers and newborn babies are not affected by the challenges associated with GDM, the study presents the urgent importance of protecting GDM by treating it as soon as possible, counseling the people about lifestyle changes, and regularly screening the newborns at an early age. These results indicate the level of the significance of the local information to context-specific prenatal care planning in low-resource tertiary environments.

CONCLUSION

Findings of this study revealed that ignorant women having a 24 percent prevalence of gestational diabetes mellitus (GDM) in a tertiary care hospital in Quetta, Pakistan, were pregnant women. The findings indicate that GDM has a close association with age of the woman, BMI, and positive family history of diabetes. GDM was also found to affect fetal outcomes in such a way that there was a higher incidence of macrosomia, hypoglycemia among newborns, occurrence of cesarean births as well as admissions to NICUs. These outcomes support the importance of regular and early screening of pregnant women at risk especially older pregnant women, overweight and women having such family history as diabetes.

There is also the possibility that in many cases, maternal and new born issues can be minimized, enforced by early diagnosis and treatment that involves dietary instruction, lifestyle alteration and precise glucose tracking. A hospital-based screening program with targeted population-based health programs and initiatives go a long way in reducing the long-term burden of diabetes and improving perinatal outcomes, especially in resource-poor regions, as highlighted in the study. Future researches are to be focused on preventing education and longitudinal follow-up of women diagnosed with GDM.

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