Prevalence of Gestational Diabetes Mellitus: A Study in A Tertiary Care Hospital in Bangladesh

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Abstract

Introduction: *Gestational diabetes mellitus (GDM), which is defined as diabetes diagnosed in the second and third trimesters of pregnancy, has emerged as a global public health concern. It has been associated with short-term and long-term adverse health outcomes for both mothers and their newborns. Women with GDM are known to have decreased quality of life and increased risks of cesarean section, gestational hypertension, preeclampsia, and type 2 diabetes. This study aimed to analyze the prevalence of gestational diabetes mellitus in Bangladesh.*

Methods: *This cross-sectional study was conducted at the Department of Obstetrics & Gynecology in Uttara Adhunik Medical College & Hospital, Dhaka, Bangladesh for 6 months; from January 2022- June 2022. A total of 100 subjects were included in this study and among them, 50 were diagnosed to have GDM. Informed written consent was taken from the study subjects. A pretested interviewer-administered questionnaire was used to obtain information related to sociodemographic status, level of education, types of profession, and medical history Data processing and analysis were done by using SPSS version 17.*

Result*: Most subjects (35, 70.0%) belonged to the <25 years age group followed by (15, 30.0%) ≥25 years age group. Among the respondents, most (30,60.0%) reside in rural areas of Bangladesh followed by (20, 40.0%) in urban areas. Regarding socioeconomic status, most of the subjects (25, 50.0%) came from a low socioeconomic condition, followed by (20, 40.0%) from middle socioeconomic status, and only 5 (10.0%) patients came from a high socioeconomic condition. Among all pregnant women, 30.0% had primary education or below that level, while 20.0% in pregnant with GDM, most of the patients (45.0%) had secondary education among all the study subjects whereas 20 (40.0%) patients had secondary education in pregnant with GDM group. Most of the subjects were unemployed in both groups estimated at 68.0% and 70.0% in all pregnant women and pregnant with GDM group respectively. Most of the pregnant women (34, 68.0%) developed GDM in their first trimester, followed by 10 (20.0%) patients in the 3rd trimester and 6 (12.0%) in the 2nd trimester. 92.0% of subjects developed hypertension but not GDM, whereas, 46.0% of pregnant women presented with GDM and hypertension.*

Conclusion: *This present study demonstrated that the national prevalence of GDM in Bangladesh is very high, which warrants the immediate attention of policymakers, health practitioners, public health researchers, and the community. Context-specific and properly tailored interventions are needed for the prevention and early diagnosis of GDM.*

Keywords: *Gestational Diabetes Mellitus (GDM), Hypertension, Trimesters*

I. INTRODUCTION

The global prevalence of GDM varies widely, from 1% to 28%, depending on population characteristics (e.g., maternal age, socioeconomic status, race/ethnicity, or body composition), screening methods, and diagnostic criteria. In addition, as with the common form of type 2 diabetes, GDM can also be influenced by genetic factors, which may differently affect disease prevalence among populations. In babies, GDM is associated with

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macrosomia or larger-than-normal gestational-aged infants, neonatal hypoglycemia, and type 2 diabetes mellitus later in life. As such, it is important to understand the burden of GDM in various parts of the world to provide country-specific information to help inform policy and planning. [1] A rapid increase in the prevalence of gestational diabetes mellitus (GDM) has been associated with various factors such as urbanization, lifestyle changes, adverse hyperglycemic intrauterine environment, and the resulting epigenetic changes. [2] Gestational diabetes mellitus (GDM) is defined as the onset or first recognition of abnormal glucose tolerance during pregnancy. This disease is one of the major public health concerns in Southeast Asia (SEA). The prevalence of GDM among women 20–49 years of age in SEA is higher (25%) compared to North America and the Caribbean Regions (10.4%). Furthermore, women born in SEA had higher rates of GDM than women from the same ethnic background born in other countries. [3] GDM has important health complications for both mother and child and is increasing all over the world. Although prevalence estimates for GDM are not new in developed and many developing countries, data are lacking for many low-income countries like Bangladesh. [4] GDM accounts for 90% of all cases of diabetes in pregnancy. Unrecognized and untreated GDM leads to serious health problems for mothers and their children. Bangladesh's demographic profile for 2014 shows a high birth rate (21.61 births/1,000 population in 2014 est.) and an increased prevalence of multiparty (2.45 children born/woman in 2014 est.) [4]. Not only that, infant mortality (45.67 deaths/1,000 live births), frequency of congenital malformations (2-4%), and low birth weight (40%) appear to be widely prevalent [5-9] in Bangladesh. Increased morbidity and mortality among mothers and newborns in Bangladesh may, in part, be because of the increased prevalence of diabetes including GDM. Like other SEA countries, the prevalence of GDM has also been progressively increasing in Bangladesh. Some population-based studies conducted in Bangladesh at different time points have revealed an increasing trend of GDM prevalence ranging from 6% to 14% based on using different diagnostic criteria. [5][6] The prevalence of GDM in rural Bangladesh is comparable with any other population with a higher prevalence of GDM. Increased morbidity and mortality among mothers and newborns in Bangladesh may, in part, be because of the increased prevalence of GDM. [7][8] This study aimed to analyze the prevalence of gestational diabetes mellitus in Bangladesh.

II.   OBJECTIVE

General Objective
- To determine the prevalence of gestational diabetes mellitus (GDM).

Specific Objective
- To see the more common trimester to develop GDM in pregnant women.
- To assess the development of hypertension with GDM.
- To see the knowledge about GDM among the subjects.

III.   METHODS

This cross-sectional study was conducted at the Department of Obstetrics & Gynecology in Uttara Adhunik Medical College & Hospital, Dhaka, Bangladesh for 6 months; from January 2022- June 2022. A total of 100 subjects were included in this study and among them, 50 were diagnosed to have GDM. Informed written consent was taken from the study subjects. A pretested interviewer-administered questionnaire was used to obtain information related to sociodemographic status, level of education, types of profession, and medical history. Data processing and analysis were done by using SPSS version 17. The ethical Clearance Certificate was obtained from Bangladesh Medical College.

Inclusion Criteria
- Women aged 18 years or above.
- Patients who had given consent to participate in the study.
- Pregnant in any trimester.

Exclusion Criteria
- Patients who did not give consent to participate in the study.
- Patients with chronic diseases.

IV. RESULTS

Table 1: Demographic characteristics of pregnant women with GDM (n=50)

| Characteristics	N	%
Age group (years)		
<25	35	70.0
≥25	15	30.0
Residence		
Rural	30	60.0
Urban	20	40.0
Socioeconomic status		
Low	25	50.0
Middle	20	40.0
High	5	10.0

Most subjects (35, 70.0%) belonged to the <25 years age group followed by (15, 30.0%) ≥25 years age group. Among the respondents, most (30,60.0%) reside in rural areas of Bangladesh followed by (20, 40.0%) in urban areas. Regarding socioeconomic status, most of the subjects (25, 50.0%) came from a low socioeconomic condition, followed by (20, 40.0%) from middle socioeconomic status, and only 5 (10.0%) patients came from a high socioeconomic condition. [Table 1]

Table 2: Distribution of subjects according to education and occupation (N=100)

| Parameters	Among all pregnant women, N (%)	Pregnant women with GDM n, (%)
Education		
Primary or below	30 (30.0%)	10 (20.0%)
Secondary	45 (45.0%)	20 (40.0%)
Higher	15 (15.0%)	15 (30.0%)
Occupation		
Employed	32 (32.0%)	15 (30.0%)
Unemployed	68 (68.0%)	35 (70.0%)

Among all pregnant women, 30.0% had primary education or below that level, while 20.0% in pregnant with GDM, most of the patients (45.0%) had secondary education among all the study subjects whereas 20 (40.0%) patients had secondary education in pregnant with GDM group. Most of the subjects were unemployed in both groups estimated at 68.0% and 70.0% in all pregnant women and pregnant with GDM group respectively. [Table 2]

Figure 1: Distribution of study subjects according to development of hypertension (N=100)
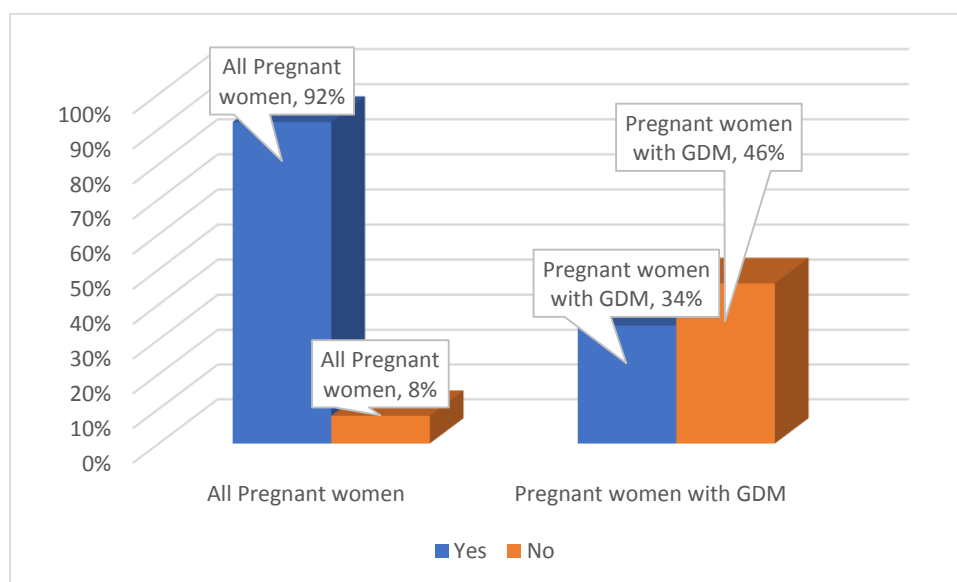
92.0% of subjects developed hypertension without having GDM, whereas, 46.0% of pregnant women presented with GDM and hypertension. [Figure 1]

Figure 2: Distribution of subjects according to knowledge about GDM during pregnancy (N=100)
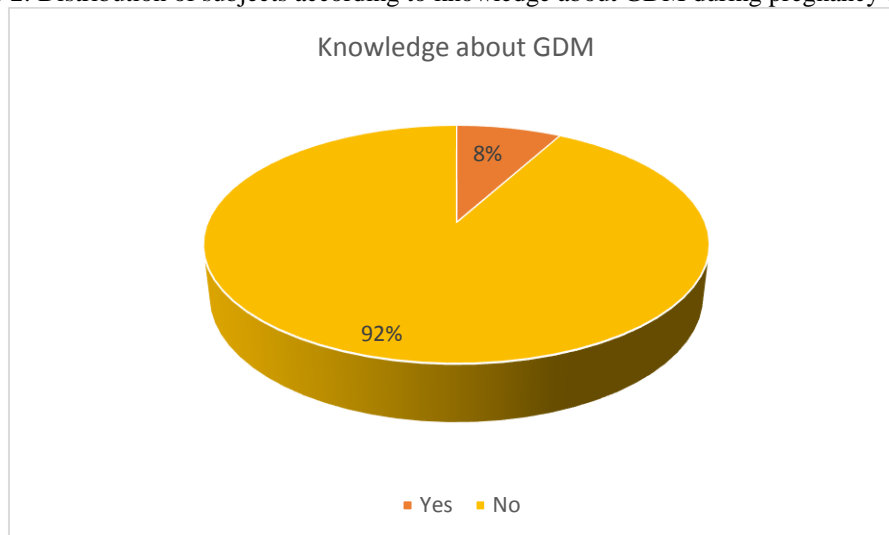
In this study, only 8.0% knew GDM. [Figure 2]

Table 3: Distribution of respondents according to trimester and development of GDM (n=50)

Trimesters	n	%
1st trimester	34	68.0%
2nd trimester	06	12.0%
3rd trimester	10	20.0%

Most of the pregnant women (34, 68.0%) developed GDM in their 1sr trimester, followed by 10 (20.0%) patients in the 3rd trimester and 6 (12.0%) in the 2nd trimester. [Table 3]

V. DISCUSSION

The mean age of our study population was 22 ± 4 years (mean $\pm$SD), with a median schooling of 7 years. Among the pregnant women, only 7.7% had a basic knowledge of GDM study. [9] According to another study, the prevalence of GDM in the urban Bangladeshi population is about 7.5%. [10] In this study, the prevalence of GDM was also high which was quite relatable. Most subjects (35, 70.0%) belonged to the <25 years age group followed by (15, 30.0%) ≥25 years age group. Among the respondents, most (30,60.0%) reside in rural areas of Bangladesh followed by (20, 40.0%) in urban areas. Regarding socioeconomic status, most of the subjects (25, 50.0%) came from a low socioeconomic condition, followed by (20, 40.0%) from middle socioeconomic status, and only 5 (10.0%) patients came from a high socioeconomic condition. Another meta-analysis included eight studies with a total of 6948 pregnant women participants. Six studies were conducted in an urban setting, one in a rural setting, and one in both settings. The pooled estimated prevalence of GDM in Bangladesh was 13% (95% CI: 7.0–21). [11] Most of the pregnant women (34, 68.0%) developed GDM in their 1sr trimester, followed by 10 (20.0%) patients in the 3rd trimester and 6 (12.0%) in the 2nd trimester. The majority of participants in another study were in their third trimester (43.6%), 37.7% were in their second trimester, and the rest (18.6%) were in their first trimester. Although less than 20% of pregnant women were in their first trimester, the diagnosis of GDM was almost 2–3 times higher among women in the first-trimester group, compared to those in the second and third-trimester groups ($p < 0.001$). A higher GDM prevalence was reported among women living in urban areas ($p < 0.001$) compared to those in rural areas, and those from the highest wealth index tended to suffer more from GDM in comparison to the other two wealth indexes ($p = 0.025$). [12] which were quite similar to the present study. In this study, only 8.0% knew GDM. Another study revealed that knowledge about GDM was poor among pregnant women. [13] The prevalence of GDM in rural Bangladesh is comparable with any other population with a higher prevalence of GDM. [14] Another study from Pakistan showed, a high frequency of GDM (11.8%) irrespective of risk factors, and in all trimesters of pregnancy emphasizing the need for universal screening in Pakistan. [15].

Limitations of The Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

VI. CONCLUSION

This present study demonstrated that prevalence of GDM in Bangladesh is very high, which warrants the immediate attention of policymakers, health practitioners, public health researchers, and the community. Context-specific and properly tailored interventions are needed for the prevention and early diagnosis of GDM.

VII. RECOMMENDATION

Early diagnosis of GDM can prevent many complications, therefore, administrators and policymakers in our country should consider increasing support for local researchers to produce substantial research which can be useful in creating evidence-based and locally applicable interventions for GDM.

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