

Gestational Diabetes Mellitus and Asymptomatic Urinary Tract Infection among the Pregnant Mother

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Abstract

Introduction: Gestational diabetes mellitus (GDM) is a condition that occurs during pregnancy and is characterized by glucose intolerance. It can have severe adverse effects on fetal and neonatal outcomes. The study aimed to investigate the relationship between GDM and asymptomatic urinary tract infections among pregnant mothers. GDM affects 3-10% of pregnancies and UTIs are common in pregnant women, with around 8.3 million cases reported every year.

Aim of the study: The aim of the study was to investigate the gestational diabetes mellitus and asymptomatic urinary tract infection among pregnant mothers

Methods: This was a cross-sectional, descriptive study conducted in the Department of Public Health of Varendra University over a period of 4 months from May to August 2018. The study population consisted of all pregnant mothers with gestational diabetes mellitus in Chapai Nawabganj during the study period. A purposive sampling technique was used to select a sample size of 119 participants.

Results: The study examined gestational diabetes mellitus (GDM) and asymptomatic urinary tract infection (UTI) among pregnant mothers. The sample consisted of 119 respondents, the majority of whom were under 25 years old, had a monthly family income of up to Taka 15,000, and were either students or housewives. The majority of respondents (66.3%) had 5-12 weeks of GDM, with a mean duration of 11.12 ± 22.69 weeks. The majority of respondents had good sanitation and hygienic food habits and did not have any complications or history of urine retention during pregnancy. However, the majority of respondents (69.7%) did not know about their UTI status, and the relationship between the duration of GDM and UTI was found to be not statistically significant ($p > 0.05$).

Conclusion: In conclusion, the study found high incidence of GDM among young pregnant mothers with good living conditions and healthy habits. Most of the respondents did not have any history of urine retention, systemic diseases, or complications during pregnancy. However, majority of them were unaware of their asymptomatic urinary tract infection, with only 2.5% having UTI. This study highlights the importance of early detection and management of asymptomatic urinary tract infection during pregnancy to prevent complications.

Keywords: Gestational, Diabetes, Asymptomatic, UTI, Pregnant

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I. Introduction

Gestational diabetes mellitus (GDM) has been known for over a century to have severe adverse effects on fetal and neonatal outcomes. The term "gestational diabetes" was first used in the 1950s to refer to a temporary illness that had a negative impact on fetal outcomes but resolved itself after delivery. The contemporary definition of GDM, which is glucose intolerance with beginning or first recognition during pregnancy [1], was applied to cut-off points in the 1980s, which were adjusted to modern methods for monitoring glucose. Any level of glucose intolerance with onset or initial detection during pregnancy is referred to as GDM [2]. There are two subtypes of gestational diabetes: Type A1 and Type A2 [3]. Type A1 has abnormal oral glucose tolerance test (OGTT) results but normal blood glucose levels during fasting and 2 hours after meals, and diet modification is sufficient to control glucose levels. Type A2 has abnormal OGTT results plus abnormal glucose levels during fasting and/or after meals, and additional therapy with insulin or other medications is necessary. Having fasting hyperglycemia (>105 mg/dl or >5.8 mmol/L) may increase the risk of intrauterine fetal death in the final 4 to 8 weeks of pregnancy. The risk of fetal macrosomia is raised by GDM of any severity, even if uncomplicated GDM with less severe fasting hyperglycemia has not been linked to an increase in perinatal death. GDM may also be complicated by neonatal hypoglycemia, jaundice, polycythemia, and hypocalcemia. The majority of GDM-affected women do not have symptoms, although some may develop

impaired vision, increased thirst, increased urination, lethargy, nausea, and vomiting [4]. Depending on the demographic being examined, GDM affects 3–10% of pregnancies. GDM complicates about 7% of all pregnancies, leading to more than 200,000 cases per year in the United States alone. Currently, 6 million people may have diabetes but have not yet been diagnosed, making up 21 million people (7% of the population) [5,6]. In the US, diabetes complicates 3–10% of pregnancies, with 90% of these cases being GDM and 8% being pre-existing insulin-resistant diabetes. In the United States, the prevalence of insulin-resistant diabetes is sharply growing, most likely as a result of increased obesity rates and racial and cultural diversity changes. In the US, 1 in 2,014 pregnant women get GDM per year, or approximately 135,000. Urinary tract infections (UTIs) with no symptoms are also typical in pregnant women. The kidneys, ureters, bladder, and urethra make up the urinary tract. A UTI is an infection brought on by pathogenic organisms like bacteria, fungus, or parasites in any of the urinary tract's structural components. Urethritis, cystitis, and pyelonephritis are a few examples of UTIs [7]. UTIs are a common problem in pregnant women, with around 8.3 million pregnancy cases reported every year. This is because the uterus sits directly on top of the bladder, and as the uterus grows, its increased weight can block the drainage of urine from the bladder, causing infection. The most common organisms that cause UTIs are *E. coli* (80%), *Staphylococcus aureus*, and *Staphylococcus saprophyticus* [8]. This study was performed to investigate gestational diabetes mellitus and its relationship with asymptomatic urinary tract infections among pregnant mothers.

II. Methods

This was a cross-sectional, descriptive study conducted in the Department of Public Health of Varendra University over a period of 4 months from May to August 2018. The study population consisted of all pregnant mothers with gestational diabetes mellitus in Chapai Nawabganj during the study period. A purposive sampling technique was used to select a sample size of 119 participants. Data was collected using a partially structured questionnaire, which was pre-tested and administered through face-to-face interviews. The data collected was analyzed using descriptive statistics, including frequency distributions and percentages for categorical variables and measures of central tendency and dispersion for continuous variables. Inferential statistics were used to determine the associations between different variables using chi-square tests and logistic regression. The data was analyzed using the Statistical Package for Social Sciences (SPSS) version 22.0.

Inclusion criteria:

- Pregnant mothers with gestational diabetes mellitus

Exclusion criteria:

- Participants who were unwilling to participate in the study.

III. Results

Table 1: Distribution of the respondents by Age, Income, and Occupation (n=119)

Age		
Age in group	Number of patients	Percentage
<25 years	62	52.1
25 - 29 years	31	26.1
30+ years	26	21.8
Monthly Family Income		
Monthly family income	Number of patients	Percentage
Up to Taka 15000	36	30.3
Taka 15001 - 30000	78	65.5
Taka >30000	5	4.2
Occupation		
Occupation	Number of patients	Percentage
Student	30	25.2
Housewife	69	58.0
Official Job	17	14.3
Business	3	2.5

This table provides information on the distribution of respondents by age, income, and occupation. It shows that the majority of respondents (52.1%) were under 25 years old, 26.1% were between 25 and 29 years old, and 21.8% were 30 years or older. In terms of monthly family income, 30.3% of respondents had an income

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of up to Taka 15,000, 65.5% had an income between Taka 15,001 and 30,000, and only 4.2% had an income greater than Taka 30,000. In terms of occupation, 25.2% of respondents were students, 58.0% were housewives, 14.3% had official jobs, and 2.5% were in business.

Table 02: Distribution of the respondents by the duration of GDM (n=83)

Duration of GDM	Respondents	
	No.	%
Up to 4 weeks	18	21.7
5 - 12 weeks	55	66.3
>12 weeks	10	12.0
Total	83	100.0

$$X \pm SD = 11.12 \pm 22.69 \text{ weeks}$$

From the table, it was found that 66.3% of the respondents had 5-12 weeks of GDM, 21.7% had up to 4 weeks and 12.0% had > 12 weeks of GDM. The mean duration of GDM was 11.12 ± 22.69 weeks.

Table 3: Distribution of the respondents by sanitation & hygienic food habit (n=119)

Sanitation & Hygienic Condition		
Sanitation	Number of Respondents	Percentage
Poor	8	6.7
Good But Unhygienic	33	27.7
Good And Hygienic	78	65.5
Major Meals Per Day		
Major Meals Per Day	Number Of Respondents	Percentage
2 Times	13	10.9
3 Times	104	87.4
4times	2	1.7
Amount Glass of Water		
Amount Of Glass Water Per Day	Number Of R Respondents	Percentage
3-6 Glasses	11	9.2
7-10 Glasses	101	84.9
11-13 Glasses	7	5.9
Micturition Per Day		
Frequency Of Micturition Per Day	Number Of R Respondents	Percentage
3-5 Times	24	20.2
6-8 Times	82	68.9
>9 Times	13	10.9

The table shows that the majority of respondents (65.5%) have good and hygienic sanitation conditions, 87.4% have 3 major meals per day, 84.9% have 7-10 glasses of water per day, and 68.9% have 6-8 micturition per day.

Table 4: Distribution of the respondents by physical activity during pregnancy(n=119)

Physical activity during pregnancy	Respondents	
	No.	%
Normal household work	103	86.6
Office work	13	10.9
Labor work	3	2.5

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It was found that most (86.6%) of the respondents had a history of normal household work as physical activity during pregnancy, 10.9% had physical activity at office work and 2.5% had a history of labor work

Table 5: Distribution of the respondents by complications during pregnancy (n=119)

Complications during pregnancy	Respondents	
	No.	%
Yes	12	10.1
No	107	89.9

It was found that most (89.9%) of the respondents did not have any complications during pregnancy and 10.1% had a history of complication

Table 6: Distribution of the respondents by H/O urine retention(n=119)

H/O urine retention	Respondents	
	No.	%
Yes	10	8.4
No	109	91.6

It was discovered that most (91.6%) of the respondents did not have a history of urine retention and 8.4% had a history of urinary retention.

Table 7: Distribution of the respondents by urinary tract infection(n=119)

Urinary tract infection	Respondents	
	No.	%
Yes	3	2.5
No	33	27.7
Don't .know	83	69.7

It was found that majorities (69.7%) of the respondents did not know about their urinarytract infection, 27.7% did not have any UTIs and 2.5% had UTIs.

Table 8: Relationship between duration of GDM and urinary tract infection (n=83)

Duration of GDM	Urinary tract infections			Total
	Yes	No	Don't know	
Up to 4 weeks	0 (0.0%)	2 (11.1%)	16 (88.9%)	18 (21.7%)
5 - 12 weeks	1 (1.8%)	16 (29.1%)	38 (69.1%)	55 (66.3%)
>12 weeks	1 (10.0%)	1 (10.0%)	8 (80.0%)	10 (12.0%)
Total	2 (2.4%)	19 (22.9%)	62 (74.7%)	83 (100.0%)

$\chi^2 = 6.4, df = 4, p > 0.05$

Among the GDM and urinary tract infection, 99.8% of the respondents who had a duration of GDM up to 4 weeks did not know about UTIs, 69.1% who had GDM for 5-12 weeks did not know about UTIs and 80.0% who had GDM for >12 weeks did not know about UTIs. The relationship between the duration of GDM and urinary tract infection was not found statistically significant ($p > 0.05$).

IV. Discussion

The study aimed to investigate gestational diabetes mellitus and its relationship with asymptomatic urinary tract infections among pregnant mothers residing in Chapai Nawabganj. A total of 119 respondents participated in the study, and the results revealed that the majority (52.1%) of the respondents were in the age

group of fewer than 25 years, with a mean age of 25.14 ± 4.82 years. In terms of the age distribution of the respondents, it was found that 26.1% were in the 25-29 years age group and 21.8% were 30+ years age group. In another study the mean age was 23.12 & 24.78 years.[9,10]Regarding the monthly family income of the respondents, it was observed that 65.5%, 30.3%, and 4.2% of the respondents had a monthly family income of Taka 15001-30000, up to Taka 15000, and Taka >30000, respectively. The mean monthly family income of the respondents was Taka 19354.256 ± 6522.63 .The study also found that most (66.3%) of the respondents had 5-12 weeks of GDM, 21.7% had up to 4 weeks, and 12.0% had more than 12 weeks of GDM. The mean duration of GDM was 11.12 ± 22.69 weeks. Epidemiological studies of risk factors for GDM are limited and are typically afflicted by confounding factors[7]. Despite these concerns, several risk factors for GDM emerge consistently. These include overweight/obesity, excessive gestational weight gain, a westernized diet, ethnicity, genetic polymorphisms, advanced maternal age, the intrauterine environment (low or high birthweight), a family and personal history of GDM, and other diseases of insulin resistance, such as polycystic ovarian syndrome (PCOS)[3, 11 to 18].The American Diabetes Association (ADA) formally classifies GDM as "diabetes first diagnosed in the second or third trimester of pregnancy that is not either preexisting type 1 or types 2 diabetes." [3]Most (58.0%) of the respondents were housewives, 25.2% were students, 14.3% were in official jobs, and 2.5% were in business. Most (65.5%) of the respondents had good and hygienic sanitation systems, 27.7% had good but unhygienic sanitation, and 6.7% had poor sanitation systems. Most (90.8%) of the respondents had a habit of eating homemade food, 8.4% ate at restaurants or fast food, and 0.8% had other food habits. It was revealed that most (87.4%) of the respondents had 3 times major meals, 10.9% had 2 times major meals, and 1.7% had 4 times major meals. Diets that are high in saturated fats, refined sugars, and red and processed meats are consistently associated with an increased risk of GDM,[18] while diets high in fiber, micronutrients, and polyunsaturated fats are consistently associated with a reduced risk of GDM.[2]It was established that the majority (84.9%) of the respondents drank 7-10 glasses of water per day, 9.2% drank 3-6 glasses of water, and 5.9% drank 11-13 glasses of water per day. It was recognized that the majority (68.9%) of the respondents had 6-8 times of micturition, 20.2% had 3-5 times, and 10.9% had more than 9 times of micturition. It was discovered that the majority (91.6%) of the respondents did not have a history of urine retention, and 8.4% had that history. During pregnancy, changes in the urinary tract predispose women to infection[10].It was found that the majority (86.6%) of the respondents had a history of normal household work as physical activity during pregnancy, 10.9% had physical activity at office work, and 2.5% had a history of labor work. It was found that most (89.9%) of the respondents did not have any complications during pregnancy, and 10.1% had a history of this complication. It was found that the majority (69.7%) of the respondents did not know about their urinary tract infection, 27.7% did not have any UTIs, and 2.5% had UTIs. In the postpartum period, changes in bladder sensitivity and bladder overdistention may predispose to UTIs [19].The relationship between the duration of GDM and urinary tract infection was not found statistically significant ($p > 0.05$). Pregnancy is a state of relative immunocompromised. This immunocompromised may be another cause for the increased frequency of UTIs seen in pregnancy[20].

Limitation of the study:

The limitations of this study include the small sample size of only 119 respondents and the fact that it only looked at asymptomatic urinary tract infections.

V. Conclusion

In conclusion, the study found high incidence of GDM among young pregnant mothers with good living conditions and healthy habits. Most of the respondents did not have any history of urine retention, systemic diseases, or complications during pregnancy. However, majority of them were unaware of their asymptomatic urinary tract infection, with only 2.5% having UTI. This study highlights the importance of early detection and management of asymptomatic urinary tract infection during pregnancy to prevent complications.

VI. Recommendations

The present study findings suggest several important recommendations for managing gestational diabetes mellitus. Firstly, it is crucial to regularly screen for asymptomatic UTIs in pregnant mothers with gestational diabetes mellitus. This is because UTIs can cause complications during pregnancy and regular screening can help detect and treat them early. Secondly, the use of nutrition counseling and physical activity as primary and major strategies for managing gestational diabetes mellitus is highly recommended. Maintaining a healthy diet and being physically active can help control blood sugar levels and prevent complications. If lifestyle modification alone fails to maintain normoglycemia, it is important to consider using oral anti-diabetic drugs (OADs) and insulin. These medications can help control blood sugar levels when lifestyle changes alone are not enough. Lastly, postpartum care should not be overlooked as it plays a critical role in the prevention of

future chronic non-communicable diseases. Postpartum care can help women with gestational diabetes mellitus manage their blood sugar levels and prevent the development of long-term health problems.

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