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Review Article

Screening for Gestational Diabetes Mellitus and its Prevalence in Bangladesh

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Abstract

Gestational diabetes mellitus (GDM) has shown different important health complications for mothers and children across the globe. Establishing the prevalence of GDM in many communities is no longer new, especially in developed nations. However, there is still a lack of knowledge regarding prevalence in many developing nations due to a lack of data. **Objective:** This study aims to evaluate the prevalence of gestational diabetes mellitus and how knowledge level influences the risk in Bangladesh. **Research Design and Methods:** This involves a comprehensive literature search of different studies across databases such as PubMed/MEDLINE, Scopus, Google-scholar, Frontiers, and PLOS One, national journal databases for those published up to September 2022. In addition, different combinations of search tags and keywords were also used, such as prevalence, gestational diabetes mellitus, Bangladesh, and screening to retrieve articles in English investigating the majority of the Gestational diabetes mellitus. Sixteen publications relating to the research questions were collected and reviewed. Data on gestational diabetes and its prevalence were collected. **Conclusion:** This review study has shown gestational diabetes to be of higher prevalence in Bangladesh, especially among old pregnant women. However, women's knowledge level is average regardless of literacy level or social class. Therefore, there is a need for further research in the field. Policymakers also need to develop new policies for preventing and managing the condition among those at high risk.

Keywords: Gestational Diabetes; GDM prevalence; GDM in Bangladesh; GDM screening

Introduction

Gestational diabetes mellitus (GDM) is a non-communicable disease characterized by glucose intolerance that has its onset during pregnancy or is first recognized during that period. Women diagnosed with such type of diabetes are usually at risk of having raised blood pressure. That further leads to preeclampsia or eclampsia during their pregnancy. Apart from such, later in life, they are likely to develop type 2 diabetes or cardiovascular disease. In addition, their babies are at risk of several complications known as macrosomia, reduced blood sugar, problems with their breathing, and type 2 diabetes can be developed later in life. The actual cause of GDM is yet to be uncovered, but it is known to be multifactorial. Several risk factors have been identified, including obesity, family history of diabetes, breathing disorders, hypothyroidism, or polycystic ovary syndrome.

Several bodies of data are gradually emerging, and more research is becoming common to provide more understanding and knowledge on the field. The prevalences, characteristics, features of the conditions, and various consequences are becoming more apparent to researchers and patients. People now understand what type of threat(s) gestational diabetes mellitus could be to pregnant women and children across different regions worldwide.

Researchers in Bangladesh are now working harder and conducting several studies to understand the differences, especially in terms of the prevalence and the risk factors, which is considered essential since no definite etiological factor has been uncovered. For this study, the goal is to understand those factors that could be linked with the prevalence and how the lack of education or knowledge level places people in Bangladesh at a greater risk of a high prevalence of gestational diabetes. Understanding those relationships plays an essential role in diagnosis and management. Reading the articles allows us to critically review and understand the available scientific evidence collected from clinical studies or other sources. Based on the objective of this study and the nature of the condition being reviewed, it is essential to understand the relationship between the prevalence and those risk factors or how those complications affect the child.

Challenges many researchers usually faces relates to having unified diagnostic criteria for evaluating Gestational diabetes mellitus. The main reasons for this are based on the different diagnostic criteria used by countries or bodies worldwide. There is a WHO criterion, there International Association of Diabetes and Pregnancy Study Groups (IADPSG) criteria. The IADPSG remains the most widely used screening method or criteria worldwide. However, only a few studies have reported the prevalence in Bangladesh and relied on the WHO criteria for the screening [1].

Recent studies on factors relative to the frequency or prevalence of gestational diabetes mellitus in Bangladesh are alarming [2]. Those studies have shown this to be far higher than what was previously reported, which highlighted the prevalence to be around 10-13% then, especially for those reported in the rural area [3], but the prevalence stands to have abnormal glucose tolerance of around 40% and Gestation diabetes mellitus around 30% in Bangladesh using the WHO 1999 criteria [2]. However, some studies reviewed used the old 1999 WHO criteria, while very few used the most recent WHO 2013 criteria [1]. The positive side of the reviewed studies is the ability of some of the studies to report the factors that were noted to be associated with the development and occurrence of gestational diabetes mellitus in Bangladesh, such as age, high body mass index, family history of DM, high parities, patients social class or income level, high blood pressure, total year of school and history of ANC [1]. Regardless, none of the studies has conducted studies where the study is being adjusted for the covariates or provides adequate information that will be needed for the adjusted models. At the same time, they report the risk factors for gestational diabetes mellitus [1].

Diabetes and Pregnancy

There are changes in the lifestyle of Bangladesh people. This is one of those significant factors affecting the rate of diabetes during pregnancy. Many women are found to start experiencing insulin sensitivity at the mid-pregnancy stage. That sensitivity then begins to decline progressively and subsequently worsen for the rest of the pregnancy, which is usually why it worsens in the late third trimester [3]; however, this usually disappears instantly post-delivery [3]. In that study, it was indicated that 15% of pregnant women are usually diagnosed with GDM in Bangladesh; among those diagnosed, 60% usually results in permanent diabetes within ten years [3]. Based on the study, many are usually not diagnosed, and most become untreated, increasing the risk of a child with different forms of congenital malformations. Therefore, women's lifestyle in Bangladesh has been linked with the high prevalence of diabetes among women in the country compared to men.

Factors such as urbanization, sedentary lifestyles, and eating habits were noted; hence, the prevalence rate identified in the country was almost as twice what was seen in the villages. Apart from the child's resultant complications for untreated gestational diabetes mellitus, some other relative issues are usually associated with those diagnosed with the condition. For instance, women with such usually have miscarriages, prolonged labor pain, macrosomia, shoulder dystocia, stillbirth, or neonatal death.

In Bangladesh, publications relating to prevalence are limited. One of the commonest of those publications is that by Jesmin et al. (2014), which focused on evaluating the prevalence of gestational diabetes mellitus in Bangladesh. The cross-sectional study uses WHO and new ADA criteria to define GDM. According to the study, the WHO criteria used the fasting plasma glucose of 7.0mmol/L or 2 hours with 7.8mmol/L and the ADA criteria with fasting plasma glucose of 5.3 mmol/L or 2-hour with 8.6mmol/L [4]. Based on the requirements set to be used, all pregnant women enrolled for the study were first screened for gestational diabetes mellitus using this 1-hour 50g OGCT, performed first in the morning immediately after the overnight fast [4]. According to the findings from the results, the prevalence of GDM was noted to be 9.7% based on the WHO screening criteria. In contrast, the new ADA screening criteria found the majority to be 12.9% of the study population.

According to the study, noted observations were related to those risk factors, which include age, urbanization, and health status, which can be summarized as gestational diabetes mellitus is seen more in older pregnant women, those that were highly educated, with higher household income, family history, health statuses such as having diabetes or those with higher parity among those living in Bangladesh [4].

Several factors have been linked with this high prevalence rate of GDM in Bangladesh. Some have been attributed to the poor knowledge of the disorder, which many consider high in the country. Regardless, studies evaluating the level of expertise in the country are scanty. For instance, in a study by Bhowmik et

al. (2018) to evaluate the knowledge level of gestational diabetes mellitus among the people of Bangladesh, out of the participants, only 26.3% had good knowledge regarding GDM while 63.1% had an average knowledge level about gestational diabetes and 10.6% had poor knowledge respectively [5]. This is one of the first studies that evaluated the level of knowledge.

Regarding the caregivers' knowledge, too, knowledge is still considered inadequate [6]. Therefore, the researcher recommends that caregivers and recipients undergo appropriate training to help improve their understanding of gestational diabetes mellitus prevalence and management in Bangladesh [5]. Another study also reviewed the knowledge and practice of GDM management guidelines in Bangladesh to understand better what they are doing right or wrong in managing those already diagnosed with the condition or pregnant but yet to be diagnosed [6]. However, more researchers focus on the caregivers, the nurses who work majorly at teaching hospitals. Therefore, the cross-sectional was conducted using three different hospitals [6]. Findings revealed a tremendous knowledge and practice gap in understanding and managing gestational diabetes mellitus among the nurses studied in the capital city of Bangladesh [6].

Sayeed et al. (2005), in a population-based study in Bangladesh, explored the reasons for increased infant mortality in Bangladesh, but the prevalence of diabetes in pregnancy is still unknown [7]. To uncover those limitations, the current prevalence of diabetes and hypertension in pregnancy in those rural areas of the country is being studied to provide a better understanding [7]. The researchers studied ten villages regardless of the demography and marital status of the participants. Compared to Jasmin et al. (2014), WHO researchers used screening criteria to diagnose the patients [4, 7]. Study findings show an overall prevalence rate of 95% CI for diabetes, 6.8% for FBG, and 8.2% and 2hBG, respectively. It was also found that gestational diabetes mellitus is higher in those women with a history of stillbirth (15.4 vs 6.0%) and neonatal death (11.8 vs 6.2%) compared with those without hence showing an existing positive relationship between the variables [7]. According to the researchers, gestational diabetes mellitus in Bangladesh is thus high in rural communities compared with other population groups; hence, the increased prevalence of gestational diabetes mellitus could contribute to increased morbidity and mortality in women and newborns [7].

Jesmin et al. (2011), in an early prospective study, examined the predisposing factors for GDM in Bangladesh [8]. The reviewed and properly investigated factors include preeclampsia and the associated complications, especially in pregnant women with diabetes [8]. In addition, the researchers also reviewed the impact of preeclampsia on the infants born to the mothers. Based on the study, a higher prevalence of diabetes in pregnant women contributes to preterm delivery (<37 Weeks gestation), Caesarean sections rate high, and accidental hemorrhage [8]. In addition, higher rates of those complications are linked with the increased incidence of IUD and prematurity for the baby [8].

The further understand the prevalence of gestational diabetes and associated risk factors in the country, another cross-sectional study involving pregnant mothers from a hospital in Barisal City, Bangladesh, was reviewed [9]. Of the interviewed mothers, only 5% are diagnosed with diabetes [9]. Of the 100 participants, 68% married at a younger age (21-25 yrs), while 58% are generally between 20-30 years of age (9). Factors like Muslim religion 88%, Jobless 78%, and patient with family history 15% [9]. According to the prevalence in this study, which is 5%, several other countries have prevalence rates that stand at similar rates, such as Iran (4.8%) and Turkmenistan (6.3%) [9]. However, this contrasts with what has been reviewed in previous studies such as Jesmin et al. [4] and some other studies. These huge variations in terms of the prevalence of GDM might be a result of the site of study. It is also essential to note that local and cultural contexts and factors such as urbanization, education, or anthropometry of mothers also contribute to GDM [9].

Screening Criteria of Choice and Controversy

Screening criteria of choice as always been a controversy globally. This has affected the outcome of research and influenced policymakers' decisions. This is because there are no generalized or accepted guidelines for screening and managing gestational diabetes mellitus worldwide, making it difficult to monitor the progress in terms of the accurate treatment or management of hyperglycemia in the affected women. Therefore, the quest for understanding the prevalence of the condition in the country is in line with the journey toward formulating a national guideline that will be implemented for the diagnosis and management of gestational diabetes mellitus.

Gestational diabetes mellitus in Bangladesh is currently a major public health concern [10]. This is attributed to the high rate of adverse pregnancy complications or outcomes which both mother and the baby experience. A study by Rahima, Sourav & Sujan (2022) is the most recent study investigating the prevalence of GDM in Bangladesh [10]. This study targets estimating the pooled prevalence of GDM in the country to assist public health policymakers in their decision process [10]. Findings by the researcher from the pooled estimated prevalence show that the prevalence rate is 13% with 95% CI in Bangladesh [10]. According to the researchers, the condition appears more in older pregnant women than younger women, which confirmed what other studies found. Furthermore, based on the result findings, overweight women or obese are also at the highest risk with the highest prevalence in those types of pregnant women [10].

According to the literature search, this remains the first study first to conduct an estimation of GDM in Bangladesh. Both WHO and ADA criteria were used for the diagnosis. The prevalence identified is 9.7% according to WHO and 12.9% according to ADA criteria. When compared to other publications from other nations such as South Asia [11], India, Sri Lanka, and Malaysia [12, 13] but when compared to others, it is lower than what is found in Qatar (16.3%) [14], higher than what we see in Iran and Turkmenistan 4.8% and 6.3% respectively [15]. This shows that the prevalence of GDM seems greater in developed nations when compared to developing countries. A careful look into this could help us make that deduction relative to the possibility of the cause, which could be due to time lag, environmental diversity, dietary habits, socio-behavioral factors, or urbanization.

In another more recent study, a systematic review and meta-analysis on the impact of the various diagnostic criteria for GDM, no definitive conclusion was made. The observation was that there are no universal gold standards for screening GDM; hence, making an accurate estimation of the prevalence will be difficult globally [16]. Those changes made to the diagnosis of GDM worldwide over the past quarter century were highlighted, especially concerning the increasing trend with obesity and diabetes. That was considered to cause some impact on the diagnosis resulting in a reduced threshold of the GDM, leading to increased incidence. The increased incidence will cause harm to pregnancy outcomes or health costs [16].

This review study has shown gestational diabetes to be of higher prevalence in Bangladesh. It has shown GDM to be significantly higher among older pregnant women or those with higher education, higher household income, high blood pressure, or higher parity. This indeed indicates a need for more research in the field. Findings from most of the studies have shown more consistent results with others, which had already shown higher prevalence with women of higher age. A further review indicates that older age is an independent risk factor for gestational diabetes mellitus regardless of race or ethnicity. Those women of higher standards or those with a family history of hypertension or diabetes have also shown high risks for GDM. One study shows that women with high parity, hypertension, or family history are at the highest risk and should be considered for compulsory screening if pregnant. Based on the studies, there is an indication of a need for more research in the field and the formulation of new policies essential for preventing and managing the condition among those at high risk.

One of the issues of the studies reviewed is that some only had their OGTT conducted on women with abnormal OGCT; hence those women with normal OGCT that may also have the GDM will be left out of their respective studies limiting the findings of the results or exaggerate the prevalence of the GDM in Bangladesh. Furthermore, many studies also have their subject limited because of the inability to attend the antenatal check-ups where the recruitment usually takes place hence creating a form of bias in the recruitment. Therefore, this may limit the usefulness of the outcome or may not allow it to be generalizable to all Bangladesh women.

Conclusion

This review study has shown gestational diabetes to be of higher prevalence in Bangladesh, especially among old pregnant women. However, women's knowledge level is average regardless of literacy level or social class. Therefore, there is a need for further research in the field. Policymakers also need to develop new policies for preventing and managing the condition among those at high risk.

Competing interests

We declare that we have no conflict of interest.

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