

Review Article

Gestational Diabetes Mellitus – Global and Bangladesh Perspectives

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Gestational Diabetes Mellitus (GDM) is common, with a rising prevalence, and is associated with higher maternal and neonatal morbidity. It carries additional long-term health consequences for the mother and her offspring. Diagnosis and appropriate treatment of the condition decreases morbidities for the mother and baby in the index pregnancy. Although, substantial work has been done on this topic still there is a need to develop universal guidelines regarding diagnosis, management and prevention of GDM to ameliorate the development of morbidities and mortalities in mother and children.

Keywords: Gestational diabetes mellitus; Bangladesh**Introduction**

Diabetes is now a global epidemic. In 2015, an estimated 415 million people, corresponding 1 in 11 worlds' adult population had diabetes. The number is expected to grow to 642 million by 2040, corresponding to 1 in 10 adult populations [1]. South East Asia (SEA) is emerging as the epicentre of diabetes epidemic. The region contains most of the populous countries in the world, with most pronounced demographic, epidemiologic, and socio-economic changes in recent times.

In 2015, Internal Diabetes Federation (IDF) estimated that 7.1 million (8.3%) people in Bangladesh had diabetes. This explosion in diabetes prevalence has already placed Bangladesh among the top ten countries in terms of the number of people living with diabetes. By 2040, the number of the diabetic population is expected to grow to 13.6 million [1]. Several small-scale populations based studies conducted in Bangladesh at different time points have revealed an increasing trend of diabetes prevalence in both rural and urban communities [2].

In addition to Type 1 and Type 2 Diabetes (T2DM), the condition of Gestational Diabetes Mellitus (GDM) which is defined as degree of glucose intolerance with onset or first recognised during pregnancy [3] also constitutes a cause of major public health concern in both developed and developing countries. According to IDF 2015 report, 20.9 million (16.2%) live births were affected by hyperglycemia in pregnancy and an estimated 85.1% of those cases were due to gestational diabetes [1]. About 87 percent of cases of hyperglycemia in pregnancy were in low and middle-income countries [1]. 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 demographic profile 2014 shows high birth rate (21.61 births/1,000 population in 2014 est.) and increased prevalence of multiparity (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%) appears to be widely prevalent [5-9] in Bangladesh. Increased morbidity and mortality among mothers and new-borns

in Bangladesh may, in part, be because of 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 [10,11]. Higher prevalence was observed in the higher age group, higher gravidity, higher BMI, and those with hypertension and family history of diabetes. The history of abortion, neonatal death and stillbirth were found higher among GDM mothers than non-GDM mothers. One unpublished data in Bangladesh has found a high prevalence of GDM in the first trimester (15%) of pregnancy in our population. This is the highest prevalence of GDM in 1st trimester reported from Asian Indian population so far. Unfortunately, unplanned pregnancies occur in about two-thirds of women with diabetes [12], precluding adequate preconception care and leading to a persistent excess of malformations in their infants. Hospital based studies have found that ante-partum and intra-partum complications are more common among pregnant diabetic women. Ninety percent (90%) women delivered by Caesarean Section (CS) because of post CS, repeat CS, breech presentation, pre-eclampsia, fetal distress and obstructed labour. Maternal mortality was 1.44% and foetal perinatal mortality was 8.62% [13]. Low socio-economic condition, social discrimination, lack of adequate nutritional knowledge, myths and misbeliefs related to diabetes with pregnancy and lack of knowledge related to proper pregnancy planning and care were the possible barriers to effective pregnancy outcomes for women with diabetes [13].

It is well known that women with undiagnosed or poorly managed GDM as well as their infants are at increased risk of developing T2DM and other cardio metabolic diseases including obesity, hypertension and coronary artery diseases [14,15]. Based on the physiological mechanisms, screening of GDM has been advocated between 24-28 weeks. However, this has a potential to miss many cases of diabetes predating pregnancy and early onset GDM. By knowing the insulin insensitivity at the beginning of pregnancy, strategies should be devised to aim for the early normalization of the intrauterine metabolic

environment at a critical period for foetal metabolic imprinting. Evidences also show that in modern era achieving healthy maternal and child outcomes are possible in all pregnancies if proper plans and the up-to-date management facilities including preconception care, antenatal care and regular check-ups throughout pregnancy are in place. International Diabetes Federation has given particular importance on “Life Circle” approach for prevention and care of diabetes—a continuum beginning from preconception, pregnancy, infancy and childhood to adult life in an integrated manner. But still a care gap exists between “desired” and “real” prepregnancy care. The suggested reasons for this gap include socioeconomic deprivation, ethnic differences in the risks and lack of competencies within the health system, use of the health care system, or difficulties with health literacy. These findings should be given particular importance to develop capacity in terms of human resources, well formulated policies, standardized protocols, and culturally sensitive awareness/advocacy campaigns to initiate screening program before and during antenatal period and also to prevent GDM.

A recent systematic review showed that the incidence of diabetes among women with a history of GDM ranges from 3% to 65%, because of differences in criteria used to define diabetes, the duration of the follow-up period, and ethnicity [16]. The strength of the association between GDM and T2DM, and the knowledge that many of the risk factors are the same (ie, a family history of diabetes, high body-mass index, age, and Asian or black ethnic origin), suggest that the two disorders might have an overlapping cause [16]. Results of candidate gene studies give support to this hypothesis [17,18]. Irrespective of the precise biological link between these two disorders, the development of GDM might help to identify women at high risk of developing T2DM.

Women with previous GDM constitute an ideal group for the development, testing, and implementation of clinical strategies for primary diabetes program. Various Randomized Clinical Trial (RCT) have shown that both lifestyle and drug intervention strategies can prevent or delay the progression to T2DM in women with history of GDM. In the TRIPOD (Troglitazone in the Prevention of Diabetes) trial, treatment with Troglitazone reduced the incidence of T2DM by over 50% [19]. Subgroup analysis within Diabetes Prevention Program (DPP), in women with history of GDM demonstrated that intensive lifestyle intervention and metformin both reduced the risk of T2DM by 50% [20]. The interim report of 2 years of intervention from the Tianjin Gestational Diabetes Mellitus Prevention Program (TGDMP) clearly indicates that lifestyle intervention is feasible and effective in women with GDM [21]. To our knowledge, thus far no study has scientifically tested whether lifestyle management can prevent T2DM risk among women with GDM in a short period after delivery in South-Asian population.

Along with its usual care, Diabetic Association of Bangladesh has taken two innovative programs funded by World Diabetes Foundation for the better prevention and management of GDM in Bangladesh. The objectives of the project “Capacity Development for Combating GDM in Bangladesh” are to create (and periodically update) consensus documents for the prevention, detection, management and follow up of GDM; train 3456 health professionals including physicians, nutritionists, nurses and community mobilizer from both Government and NGO/other sectors for relevant GDM-

related activities; adapt/develop promotional/educational, training materials targeted to specific groups of health professionals and public taking into account of the local socioeconomic and cultural perspectives; and conduct awareness and advocacy campaigns to sensitize the general mass and policy makers about the risks of GDM as well as on the health and socioeconomic benefits of timely intervention. Second project is “pre-conception care and prevention of GDM through religious leaders”. Initially around 400 marriage registrars (Kazi) will be invited and trained on pre-conception care and its importance for prevention of GDM; Kazis will provide the basic information on pre-conception care and its importance to bride and bridegroom during wedding ceremonies; organize community awareness program (i.e. Television and Radio talk show, Newspaper articles) on pre-conception care with religious leaders; establish pre-conception care service in every diabetes centers/ hospitals of Diabetic Association of Bangladesh (BADAS) and establish referral system between community leaders and diabetes centers/ hospitals of BADAS [22].

The need for screening and diagnosing GDM to ensure appropriate management is widely recognized as highly important. Still there is no international consensus on how to do it. Before developing international consensus for prevention and management of GDM following areas are needed to be addressed:

Diagnosing GDM (One stage or 2 stage approach)

The optimal screening regimen for GDM remains controversial [23], with conflicting recommendations for universal and selective screening among various expert groups. There is utmost need for action to standardize GDM screening and diagnostic criteria. Should testing for GDM be a one-step (the 75g-Oral Glucose Tolerance Test, OGTT) or two-step (the 50g Glucose Challenge Test, GCT, followed by 75g-OGTT) procedure?

Management of GDM

Only 10% of women with gestational diabetes need pharmacological therapy. Although insulin is accepted as gold standard, a growing body of evidence now supports cautious use of metformin for gestational diabetes [24], under strict fetomaternal surveillance. Universal management guidelines are required for the GDM mothers with a special emphasis on undernourished mothers. Better understanding of mechanism that can lead to GDM should allow more rational development and administration of therapy during pregnancy.

The right test for diagnosing postpartum diabetes

Considerable work is needed to dissect the various mechanism underlying GDM and its evolution to diabetes after pregnancy. Guidelines from several medical organizations disagree about which glucose test should be used and when to assess glucose profile after delivery [23]. The HbA1c test can identify individuals at risk for future diabetes and diabetes complications. However, because HbA1c concentrations 6 weeks postpartum could be affected by perinatal hemoglobin shifts and prenatal treatments, the primary choice for post-partum glucose testing should be either FPG measurements or the OGTT.

GDM and under nutrition

The contribution of maternal diabetes to offspring obesity

and diabetes outside of the high-risk population remains sparsely investigated. Currently, it is largely ignored how maternal under nutrition interacts with maternal diabetes; which clinical features are present for GDM in maternal under nutrition; and whether the management of GDM and a micronutrient intervention in maternal under nutrition improves fetal development, maternal and child health and survival. In the face of this unprecedented health challenge, knowledge regarding the association of GDM and fetal and infant survival, as well as the adverse risks of GDM especially in undernourished mothers is urgently needed.

In conclusion, it is clear that a global pandemic of GDM has emerged and will continue to do so at a very fast rate. In the absence of effective and affordable (particularly for developing nations) interventions, the frequency will escalate worldwide, with the main impact being seen in developing nations and the disadvantaged minorities in developed nations. To minimize the occurrence of devastating malformations, standard care for all women at risk for GDM should include 1) prepregnancy counseling about the risks associated with unplanned pregnancies and poor metabolic control 2) Screening for diabetes before and during pregnancy which certainly initiate early steps in management 3) ensure pregnant women with GDM have access to the essential medications, self-management education and information they need to achieve optimal pregnancy outcomes 4) health care professionals including specialists and general physicians, nurses, midwives, even traditional birth attendants (specially in developing nations) should be trained in the identification, treatment, management and follow up of GDM. An urgent priority in health policy is needed both at global as well as national level to reverse these developments. The scientific community is aware of the importance of genetic predisposition, behavioral and environmental factors responsible for the unnecessary sufferings but we need to translate our knowledge into practice.

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