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Review Article

Ante Natal Screening of Hyperglycemia: Situation analysis in Bangladesh

MST. TAJMIRA SULTANA[1], DINA LAYLA HOSSAIN[2], SANZIDA MAHMUD[3], TABASSUM PARVEEN[4], NAHREEN AKTER[5]

Abstract:

Hyperglycemia in pregnancy or Diabetic disorder is a state of glucose intolerance during pregnancy, carrying various adverse outcomes for mother and fetus. As it is a common disorder and appropriate measures can completely nullify its adverse effects so various international organizations formulated screening and management protocols. Bangladesh is a South Asian country with high predisposition of this disease, so universal screening in first contact with pregnant woman by appropriate protocol along with precise interpretation and interventions are desirable. But we found that obstetricians and some other physicians sometimes remain reluctant on this task. Report shows that 44.4% of physicians prefer blood sugar screening at 1st antenatal care and only 16.3% advice IADPSG, WHO and ACOG standard 3 samples OGTT for screening. More than 80% use HbA1c for blood sugar monitoring and 40% use it for diagnosis of glucose intolerance which is an unreliable method, specially during pregnancy and adverse outcomes remain unprotected for a large number of patient. So, we should find out our pitfalls in this regard for a healthy nation at present and future.

Key word: *Ante natal Screening, Hyperglycemia, Bangladesh*

Introduction:

Glucose intolerance during pregnancy is the commonest endocrine complication during pregnancy. Its incidence varies according to area and ethnicity. In 2019, the International Diabetes Federation (IDF) estimated that globally 16% of live births were affected with hyperglycemia in pregnancy and in whom 84%were reported as GDM[1]. The most recent meta-analysis by Saeedi et al. (2021) reported the global prevalence of GDM was 14.7% based on the International Association of Diabetes and Pregnancy Study Groups (IADPSG) criteria, the most accepted screening method worldwide[2]. South East Asia is one of the high prevalence territories for diabetic disorders. Genetic predisposition to metabolic syndrome among Asians predisposes our women to develop GDM and also its complications[3]. The most recent study showed that the overall weighted prevalence of GDM in Bangladesh was 35% (95/272)[4].

Hyperglycemia in pregnancy is associated with a number of adverse maternal and fetal outcomes. The adverse maternal complications include hypertension, preeclampsia, urinary tract infection, polyhydramnios, preterm Premature rupture of membrane secondary to infection, preterm labour, increased operative intervention etc[3,5,6,7].Gestational diabetes increases a woman's lifetime risk of chronic diseases, including T2DM, metabolic syndrome, and cardiovascular disease[8]. In the fetus and neonates it is associated with macrosomia, congenital anomalies, metabolic abnormalities, RDS and subsequent childhood and

1. Assistant Professor, Feto-Maternal Medicine, Dhaka Medical college, Bangladesh
2. Consultant, Obs and Gynae, Dhaka Medical college, Bangladesh
3. Assistant professor, Feto-Maternal medicine, Sher-E-Bangla Medical College, Barishal
4. Professor and Chairman, Feto- Maternal Medicine, BSMMU, Dhaka, Bangladesh
5. Professor, Feto- Maternal Medicine, BSMMU, Dhaka, Bangladesh

Address of Correspondence: Dr. Mst. Tajmira Sultana, Assistant professor, Feto-Maternal medicine, Dhaka Medical college, Bangladesh ORCID ID - http://orcid.org/0000-0003-4715-1167 Email: dr.tajmirasultana@gmail.com Tel No: +8801819345085

adolescent obesity [3,7].But timely and accurate treatment of maternal hyperglycemia reduces the risk almost to the similar level seen in women without GDM[9]. So it is important to diagnose early and treat promptly to prevent complications[3].

Effects of treatment of Hyperglycemia on pregnancy

A meta analysis on Effect of screening and management of diabetes during pregnancy on stillbirths shows that preconception care of diabetes versus none was associated with a reduction in perinatal mortality (RR=0.29, 95% CI 0.14 -0.60). Intensive management of gestational diabetes during pregnancy versus conventional management was associated with a non-significant reduction in the risk of stillbirths (RR 0.20; 95% CI: 0.03-1.10). Optimal control of serum blood glucose versus sub-optimal control was associated with a significant reduction in the risk of perinatal mortality (RR=0.40, 95% CI 0.25- 0.63), but not stillbirths (RR=0.51, 95% CI 0.14-1.88)[5].

Treatment of gestational diabetes was associated with decreased risk of primary cesarean deliveries (RR 0.70 [95% CI, 0.54-0.91] ARD 5.3%) and preterm deliveries, although findings for the latter are not statistically significant (RR, 0.75 [95% CI 0.56-1.01]; ARD, 2.3%). For fetal/neonatal outcomes, treatment of gestational diabetes was associated with reduced risk of shoulder dystocia (RR, 0.42 [95% CI, 0.23-0.77]; ARD, 1.3%), macrosomia (RR, 0.53 [95% CI, 0.41-0.68]; ARD, 8.9%), LGA infants (RR, 0.56 [95% CI, 0.47-0.66]; ARD, 8.4%), birth injury (eg, fracture or nerve palsies) (odds ratio, 0.33 [95% CI, 0.11-0.99]; ARD, 0.2%), and NICU admissions (RR, 0.73 [95% CI, 0.53-0.99]; ARD, 2%)[10,11].

Timing of Diagnosis of Hyperglycemia during pregnancy

In India glucose intolerance in pregnancy is diagnosed 16.3% at or before 16 weeks of gestation, 22.4% between 17-23 weeks and 61.3% after 23 weeks of gestation (Rani). In Bangladesh though the majority of patients (43.6%) were diagnosed in their third trimester, 37.7% were in their second trimester, and a considerable percentage (18.6%) were in their first trimester[4].The recommendations given by International Association of Diabetes and Pregnancy Study Group (IADPSG) which was endorsed by WHO (2013) and American Diabetes Association (ADA) based on Hyperglycemia and Adverse Pregnancy Outcome (HAPO) study is to do on the first prenatal visit, in all women[12-16].

Current strategy for diagnosis of Hyperglycemia in pregnancy

The use of IADPSG resulted in increased prevalence of GDM rate 35.5% versus 10.6% with other methods with significant improvement in pregnancy outcome and also cost-effectiveness[17]. IADPSG criteria for diagnosis of Hyperglycemia in pregnancy was based on HAPO study and has given below for recalling. The values are from an OGTT done in the fasting state using 75g of glucose.

Table-I[12]

Threshold values for diagnosis of GDM or overt diabetes in pregnancy

To diagnose GDM and cumulative proportion of HAPO cohort equaling or exceeding those thresholds

Glucose measure	Glucose concentration threshold*		Above threshold (%)
	mmol/l	mg/dl	Cumulative
FPG	5.1	92	8.3
1-h plasma glucose	10.0	180	14.0
2-h plasma glucose	8.5	153	16.1†

To diagnose overt diabetes in pregnancy

Measure of glycemia	Consensus threshold
FPG‡	≥7.0 mmol/l (126 mg/dl)
A1C‡	≥6.5% (DCCT/UKPDS standardized)
Random plasma glucose	≥11.1 mmol/l (200 mg/dl) + confirmation§

*One or more of these values from a 75-g OGTT must be equaled or exceeded for the diagnosis of GDM.

†In addition, 1.7% of participants in the initial cohort were unblinded because of FPG >5.8 mmol/l (105 mg/dl) or 2-h OGTT values >11.1 mmol/l (200 mg/dl), bringing the total to 17.8%.

‡One of these must be met to identify the patient as having overt diabetes in pregnancy.

§If a random plasma glucose is the initial measure, the tentative diagnosis of overt diabetes in pregnancy should be confirmed by FPG or A1C using a DCCT/UKPDS-standardized assay.

If results are not diagnostic of overt DM and fasting plasma glucose ≥92 mg/dl diagnosis of GDM is made. If fasting glucose is < 92mg/dl at the first antenatal visit a 2-hour 75g OGTT should be repeated at 24-28 weeks.

Target population for screening

In risk based screening, GDM was found to be detected in 1.45% of women but universal screening showed 2.7% of GDM in the same population showing that risk based screening has missed about half of the GDM cases. Based on these facts there is a need for universal screening especially in South east Asians countries as they have high prevalence of Type II DM and genetic predisposition [3].

Current status of screening of Hyperglycemia in Bangladesh

Screening of Hyperglycemia in pregnancy in Bangladesh is advancing day by day but we have go fur more. Study reported that knowledge about GDM among physicians in Bangladesh is inadequate. Only 52.8% of the physicians had good knowledge about GDM [18]. Diabetic Association of Bangladesh (BADAS) conducted a survey on physicians of Bangladesh to obtain information on existing practices in diagnosing and managing GDM among physicians working in 30 leading centers in eight administrative divisions providing diabetes care in Bangladesh. They showed that 14.7% of Hyperglycemic patients during pregnancy were treated by gynecologists and rest by diabetologist, endocrinologists and medicine specialists. Among them only 44.4% of the physicians preferred blood sugar screening at first antenatal care (ANC) visit, 40.5% preferred 24–28 weeks to screen GDM and a very few (6.3%) prefer it both in 1st ANC and if normal then again at 24-28 weeks though 8.8% has no idea about timing of blood glucose screening[9]. Regarding screening method only 16.3% chose three samples OGTT, 55.2% of the physicians preferred two samples oral glucose tolerance test (OGTT), 13.9% use 50 g glucose challenge test followed by 2 h OGTT, 8.3% fasting blood glucose (FBG), and 6.3% rely on random blood glucose (RBG) for screening of GDM. Among the physicians World Health Organization (WHO 2013) guideline was followed by only 34.5% which also corresponds with IADPSG. More than 80% of our physicians recommended HbA1c for monitoring glycemic control, and about 40% also used HbA1c for diagnosing GDM though HbA1c is not recommended routinely for diagnosis and monitoring of GDM due to shortened life span of the erythrocyte during pregnancy[9,19].

Discussion:

The prevalence of GDM is rising in the South East Asia region due to multiple factors like increasing age to become pregnant, Altered food habit, sedentary life style of pregnant ladies etc. So universal screening is an essential tool for this high risk ethnic population to ensure that no case of GDM or pre existing diabetes is missed out. In this regard, physicians of all level should follow the standard screening protocol for diabetes (as only 44.4% in the present survey do it in first trimester)by a three sample OGTT test (Only 16.3% in current survey)[9]. Alarmingly, 8.8% of survey participants did not think of any specific time to be considered for GDM screening and 6.3% rely on RBG (Random Blood Glucose) to diagnose GDM and DM[9]. Delay in screening until the second trimester may increase the risk of fetus as well as mother who have pre existing (pregestational) diabetes. It become more deleterious for a population such as Bangladesh, where the background prevalence of T2DM is high and more than 50% of the people with T2DM remain undiagnosed [1]. Ideally, all pregnant women should be screened in their first trimester, as was recommended in the guidelines by Bangladesh, India, Pakistan and America [16,20,21]. On the other hand appropriate interpretation of blood sugar level is another challenge for identifying GDM and DM during pregnancy. Unfortunately we get no study on this regard but our day to day experience revealed that though a considerable number of physician advice 2 or 3 sample OGTT but there is a huge lack in proper interpretation. Most of the physicians do not follow the IADPSG determined blood sugar levels to label their patients as GDM or overt DM and ultimately fail to apply appropriate management protocol. The net effects become null and void despite of a rigorous OGTT test by patient.

Conclusion:

What is needed is a correct diagnosis, at earliest time and prompt treatment to prevent adverse maternal and perinatal outcome as well as development of future diabetes both in mother and child. So it is time to make promise to our nation like the famous poet Robert Frost…..

The woods are lovely, dark and deep,
But I have promises to keep,
And miles to go before I sleep,
And miles to go before I sleep.

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1. Compiling information, literature review and write up the article
2. Giving Idea and inspiration
3. Providing current protocols
4. Providing inspiration and direction
5. Providing mental support

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