

Gestational Hyperglycemia, its implications and values

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ABSTRACT

Background: In Pakistan, high rates of gestational diabetes among pregnant women are associated with high rates of infant and mother death. The importance of government and business sector research on GDM management cannot be overstated. T

Method: From March 2018 to January 2020, a total of 50 Private and Public hospitals of Punjab were studied in a prospective manner. 1500 pregnant women were checked throughout pregnancy

Results: Study showed that GDM was discovered in 96 pregnant women. OGTT was performed more frequently in private hospitals than in public hospitals, and pregnant women were tested more frequently in public hospitals than in private hospitals. GDM management necessitates the use of more than just a community health center.

Conclusion: There the government should make it a priority to aggressively involve public health facilities in the care of gestational diabetes in pregnant mothers.

Keywords: Gestational Diabetes Mellitus, Management, Diabetes Mellitus

INTRODUCTION

The American Diabetes Association (ADA) defines gestational diabetes mellitus as glucose intolerance that occurs throughout pregnancy. GDM is believed to affect 7% of pregnancies in rich countries such as the United States, increasing the risk of maternal and fetal problems during pregnancy. Incidence of diabetes is anticipated to rise by 50% over the next 20 years. The number of persons in Pakistan who have low glucose tolerance and are at risk of acquiring diabetes is significant, and this number is growing.

In Pakistan, the frequency of GDM is about same to the prevalence of IGT. It's discovered that the incidence of GDM and IGT was similar among Pakistani pregnant women. Punjab, Pakistan's most populated province has a moderate maternal death rate and high infant mortality rate, both higher than the national average. Many issues, such as a scarcity of human resources, inadequate health infrastructure, and underutilization of resources, exist in Punjab, where as Pakistan's birth 27.4 per 1,000 and 25.6 per 1000 per each year in Punjab. These issues are exacerbated by the lack of technical expertise resource workers and qualified health care professionals in the province. More than 70% of all births take place in Public sector. Due to the fact that 70% of GDM cases occur in public Hospital, it is critical to priorities screening and to increase capacity for GDM diagnosis and treatment. It is necessary to enhance the health system. According to the findings of a European study, excellent postpartum follow-up program for women with GDM can aid in the detection and management of diabetes at an early stage. Women who had GDM in the past and acquire IGT are already a part of the health-care system; as a result, the health-care system's participation in the follow-up of GDM cases is crucial. Treatment for gestational diabetes can enhance maternal and perinatal health. It is critical to do research on the role of Hospital and screening centers in the provision of GDM services. To lower the prevalence of GDM in Punjab, a comprehensive assessment of health facilities and community centers is required to upgrade. This study also varies from others in that it examines a diverse population of pregnant women in both health-care facilities and community-based settings for gestational diabetes. It was determined that GDM management in public hospitals and screening centers was effective in the current study. GDM testing is available through a private health-care system. In this paper, we took a prospective approach to the problem. When pregnant

women were checked for oral health disorders between the 24th and 28th weeks of pregnancy in Punjab, a total of 1500 women were examined.

Mechanism of glucose regulation during normal pregnancy:

Early pregnancy has been shown to lower fasting blood glucose levels. During pregnancy, insulin sensitivity diminishes, reaching 50% to 60% of pre-pregnancy levels by 34–36 weeks of pregnancy. Insulin resistance causes insulin levels to rise while fasting. The alterations in maternal body fat mass have an influence on insulin sensitivity. During pregnancy, the amount of glucose produced by the liver rises, suggesting insulin deficiency. Despite the fact that fasting insulin levels had increased, endogenous glucose production remained unusually high near the end of pregnancy. Through the course of pregnancy, it was insulin-sensitive.

Mother's insulin sensitivity increases dramatically within days after birth due to the effect of placental hormones on her physiological state throughout pregnancy. The hormones hPL, progesterone, and oestrogen have all been linked to metabolic changes in nursing mothers. It increases the levels of prolactin and progesterone. The lipolytic effect of hPL diverts maternal metabolism away from glucose utilisation, which is beneficial to the fetus. The increase in free fatty acids during pregnancy, as well as in non-pregnant individuals, has the potential to alter insulin sensitivity in both groups. However, hPL has no effect on the insulin sensitivity of the mother. Increased levels of pro-inflammatory circulating molecules such as TNF alpha may also contribute to the development of pregnancy-associated insulin resistance (TNF). Insulin resistance is determined by the amount of TNF in the placenta throughout pregnancy.

Increased insulin secretion is a side effect of diabetes. Postpartum, insulin secretion increases by approximately 300 percent, which is significant. According to current thinking, maternal hormones and insulin resistance are responsible for this insulin secretion adaptation. In the face of insulin resistance, the endogenous cell plasticity of the pregnant woman is essential for glucose homeostasis. It is possible that pancreatic beta cells will fail if insulin demand increases.

Etiology of gestational diabetes Type 2 diabetes: GDM commonly precedes T2D. GDM patients exhibited a seven-fold greater incidence of T2D compared to NGT patients. Longitudinal studies indicate that 25% of GDM patients acquire T2D. During and after pregnancy, GDM women develop insulin resistance. GDM has higher T2D risk genes. The HAPO research connected GCK and TCF7L2 gene variations to higher glucose levels during oral glucose tolerance tests in pregnant women.

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Type 1 diabetes: Pregnancy and diabetes GCK promoter polymorphism and HNF1 polymorphism have been associated to GDM. An autosomal dominant gene changing insulin production causes MODY type 1 diabetes. One of these is MODY 2, which appears to be related with GDM (approximately 10 percent). (about 10%). GCK gene mutations cause it. The greater incidence of MODY 2 in this investigation was attributable to pre-selection of women for genotyping. In the 75 g OGTT, they all showed abnormal fasting glucose and a modest 2-hour plasma glucose increase. Were there any T2D, GDM, or fasting hyperglycemia relatives? MODY 3 and 4 are quite uncommon in GDM. Type 1 diabetes is a chronic condition that affects the body's insulin production. GDM may be caused by auto-immune diabetes. T1D auto-immune markers are seen in 0.9% to 15% of women with gestational diabetes. It is difficult to predict type 1 diabetes in these women. In numerous trials, positive islet cell autoantibodies did not predict the development of diabetes in the future. More research is needed to determine whether or not antibodies are necessary in GDM. It was thought to be connected with miscarriage (foetal mortality, premature birth and macrosomia).

Race and ethnicity may have an impact on the start of GDM. Origin, particularly South Asian ethnicity, is a predictor of generalised anxiety disorder. GDM is caused by a combination of genetic and environmental factors. Diets that are heavy in fat and calories pose a non-genetic threat.

Obstetric problems in women with gestational diabetes: C-section is the most prevalent kind of maternal outcome. In addition to high blood pressure (140/90 mmHg or above), preeclampsia is characterized by proteinuria (0.3 g/24 h). GDM increases the risk of both severe and moderate preeclampsia by a factor of two. Gestational diabetes can result in hypocalcaemia, respiratory distress, stillbirth, and macrosomia in the fetus, among other complications. Additionally, undiagnosed pre-GDM might result in malformation in the fetus.

Keep in mind that O'Sullivan was the first to define GDM . Not in order to avert pregnancy complications, but rather in order to predict the mother's future risk of type 2 diabetes. Mothers with high blood sugar were more likely to have caesarean births, have vascular problems, have macrosomia, and have high insulin levels, according to the HAPO Study.

As previously stated, GDM is a risk factor for T2D, which is the most common type of diabetes. Later, insulin secretion insufficiency worsens, eventually leading to type 2 diabetes. insulin sensitivity in the post-GDM state Women from non-European countries had higher levels of insulin resistance and diabetes following GDM than women from European countries. In comparison to women of Arab heritage, women of Asian descent had increased insulin resistance. The GDM found a link between Asian race and diabetes, but not between Arab background and diabetes.

As a result of their mother's hyperglycemia, 20% of children aged 5–9 and 10% of children aged 10–16 had impaired glucose tolerance. We tested insulin sensitivity and secretion in adult children of both T1D parents (exposed) and T1D dads (controls) using T1D parents (exposed) and T1D fathers (controls) (controls). Individuals who are born to pregnant mothers who have T1D have poor glucose tolerance and insulin secretory response in adulthood. According to these data, prenatal exposure to a mother with type 1 diabetes is associated with multiorgan dysfunction.

MODY Two of the kids were born with greater birth weights, and one was born with macrosomia. According to adult research, a child with the GCK mutation is born smaller than a child who does not have the gene.

RESULT

A total of 1500 pregnant women were tested for gestational diabetes in both urban and rural areas. At 24-28 weeks of pregnancy, 96 pregnant women were tested for gestational diabetes at government-run DHQ, THQ, BHU, and private

hospitals. A total of 96 GDM women were treated and educated on how to prevent type 2 diabetes. Women at risk for gestational diabetes were also educated how to avoid diabetes in their families, which amounted to 1000 women. The Glucometer was used to measure glucose levels. A comparison of GDM screening in hospitals and the community. Table 1 show that the diagnostic effectiveness in public sector was comparable to that in private Hospitals

Table 1:

| No. & Prevalence of GDM (Public Sector) | No. & Prevalence of GDM (Private Sector) |
|---|--|
| 32% | 18% |

Table 2

| Variables | Post Prandial Blood Glucose Controlled <140mg% | Post Prandial 2 Blood Glucose not Control =>140mg% | P value |
|-----------------|--|--|---------|
| still birth | (0.9%) | (2.1%) | <0.0019 |
| Neonatal death | (0.4%) | (1.2%) | <0.038 |
| Perinatal death | (1.1%) | (4.1%) | <0.0001 |

In spite of having the most up-to-date technology, Private were less active in GDM screening than public hospital. Furthermore, most private Gynecologists are too preoccupied with generating money from C-sections to be active in GDM Screening programs.

DISCUSSION

When it comes to diagnosing gestational diabetes, rural and urban health centers beat community screening centers, who found that public Hospital are more effective in introducing GDM screening than private health facilities. While Basic health care Units (BHU) and secondary health care delivery hospitals (THQ) dominated our study, other government-run health facilities also prevailed, demonstrating the untapped potential of our public health system. A minor investment in public health care can have a significant impact on diabetes prevention and control, as well as on other health indices that may take longer to improve as a result of the expenditure. Despite Punjab having a large population of reproductive-age women, there appears to be a significant cohort of women in the province who have impaired glucose tolerance and hyperglycemia during pregnancy, particularly in urban areas. Women of reproductive age (18-46) had a higher risk of diabetes and pregnancy than the overall population. According to the findings of the study, between 1 and 8% of pregnant women acquire gestational diabetes. Globally, the prevalence of gestational diabetes has increased by 10–100% in the previous two decades. This has had an impact on Pakistan, as evidenced by comparable study. In major cities across Pakistan, the prevalence of diabetes

They were competent at identifying GDM, but not so good at providing follow-up blood glucose monitoring and counseling to those who had the condition. This has been validated by several research conducted all around the world. In order to ensure that women who have had GDM in the past are properly followed up, public health and primary care must collaborate to enhance identification and screening. Agrees with our conclusions. As the incidence of gestational diabetes rises in affluent countries such as the United States, early postpartum and long-term surveillance for T2DM become increasingly important. This is consistent with our findings. The public health care system must be improved in order to achieve successful GDM control. Only optimum, effective, and high-quality health care will allow GDM's full potential to be realized. This study investigated inconsistent HCP instructions and treatment processes in Pakistan's sluggish public health care system, which was found to be inefficient. Patients with GDM have a higher chance of developing GDM in subsequent pregnancies than other patients. Despite this, many pregnant women are ignorant of the long-term consequences of gestational diabetes on the development of Type 2 diabetes. This is what our investigation

discovered. An investigation discovered, to the surprise of many rural pregnant women in southern India, that health facilities must aggressively improve GDM knowledge among pregnant women. Women with GDM believed they were suffering from a temporary disease, while those who already had diabetes were concerned about getting type 2 diabetes in the future, according to yet another research. According to a recent study, the majority of women feel that treating borderline GDM is extremely important. Health care practitioners should assist pregnant women in managing gestational diabetes by addressing issues such as role expectations, cultural issues, and financial hurdles. As an alternative to selective screening, universal screening is an excellent choice since it has a high sensitivity but a poor specificity. By reducing maternal and neonatal morbidity, the management of GDM patients helps to save money for the public health system discovered. When it comes to preventing type II diabetes in children and mothers, women have recognized the importance of early diabetes identification throughout the pregnant period. GDM may be considered as a window of opportunity for reducing the occurrence of type 2 diabetes mellitus in future generations if it can be achieved. Gender-specific gestational diabetes management in public health settings increased public health. The OGTT enhanced prenatal care for this group of pregnant women who were previously unaware of gestational diabetes. The accuracy of GDM diagnosis in hospitals is higher than that of community screening centers. In comparison to screening centers, public Hospital is more adept at identifying gestational diabetes, making their participation essential. Another important step is the implementation of GDM screening in primary care clinics. Further investigation may provide light on how the OGTT and GDM data collected as part of our endeavor might benefit the Government Program.

CONCLUSION

Women should be encouraged to undertake lifestyle changes in order to lower their chance of developing diabetes by healthcare experts. In our investigation, we discovered that hospitals were experiencing comparable GDM management challenges. Women with gestational diabetes might benefit from a test at their first antenatal care visit. Our findings corroborate the American Diabetes Association's current recommendation that high-risk pregnant women be screened for diabetes at their first prenatal appointment.

REFERENCES

1. Metzger BE, Coustan DR, Committee O. Summary and recommendations of the fourth international workshop-conference on gestational diabetes mellitus. *Diabetes Care*. 1998;21:B161.
2. Wendland EM, Torloni MR, Falavigna M, Trujillo J, Dode MA, Campos MA, et al. Gestational diabetes and pregnancy outcomes-a systematic review of the World Health Organization (WHO) and the International Association of Diabetes in Pregnancy study groups (IADPSG) diagnostic criteria. *BMC Pregnancy Childbirth*. 2012;12(1):23.
3. Guariguata L, Linnenkamp U, Beagley J, Whiting D, Cho N. Global estimates of the prevalence of hyperglycaemia in pregnancy. *Diabetes Res Clin Pract*. 2014;103(2):176–85.
4. Gasim T. Gestational diabetes mellitus: maternal and perinatal outcomes in 220 Saudi women. *Oman Med J*. 2012;27(2):140.
5. Kanguru L, Bezawada N, Hussein J, Bell J. The burden of diabetes mellitus during pregnancy in low-and middle-income countries: a systematic review. *Glob Health Action*. 2014;7(1):23987.
6. Al-Hakeem MM. Pregnancy outcome of gestational diabetic mothers: experience in a tertiary center. *J Fam Commun Med*. 2006;13(2):55.
7. Group HSCR. Hyperglycemia and adverse pregnancy outcomes. *N Engl J Med*. 2008;358(19):1991–2002.
8. Carpenter MW. Gestational diabetes, pregnancy hypertension, and late vascular disease. *Diabetes Care*. 2007;30(Supplement 2):S246–S50.
9. Hillier TA, Pedula KL, Vesco KK, Schmidt MM, Mullen JA, LeBlanc ES, et al. Excess gestational weight gain: modifying fetal macrosomia risk associated with maternal glucose. *Obstet Gynecol*. 2008;112(5):1007–14.
10. Hauth J, Clifton R, Roberts J, Myatt L, Spong C, Leveno K, et al. Maternal insulin resistance and preeclampsia. *Obstet Anesth Dig*. 2012;32(1):42–3.
11. McIntyre HD. Hyperglycemia and adverse pregnancy outcome (HAPO) study: preeclampsia. *Am J Obstet Gynecol*. 2010;202(3):255–e1.
12. Dudley DJ. Diabetic-associated stillbirth: incidence, pathophysiology, and prevention. *Clin Perinatol*. 2007;34(4):611–26.
13. Pilliod RA, Page JM, Burwick RM, Kaimal AJ, Cheng YW, Caughey AB. The risk of fetal death in nonanomalous pregnancies affected by polyhydramnios. *Am J Obstet Gynecol*. 2015;213(3):410 e1– e6.
14. Kim C, Newton KM, Knopp RH. Gestational diabetes and the incidence of type 2 diabetes: a systematic review. *Diabetes Care*. 2002;25(10):1862–8.
15. Yogev Y, Xenakis EM, Langer O. The association between preeclampsia and the severity of gestational diabetes: the impact of glycemic control. *Am J Obstet Gynecol*. 2004;191(5):1655–60.
16. Marchetti D, Carrozzino D, Fraticelli F, Fulcheri M, Vitacolonna E. Quality of life in women with gestational diabetes mellitus: a systematic review. *J Diabetes Res*. 2017;2017:12. Article ID 7058082.