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ORIGINAL ARTICLE

Trying Modified Approaches to the Management of Pregnancy Induced Diabetes Mellitus (GDM) a Prospective Study

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ABSTRACT

Background: To investigate maternal and foetal outcomes in patients with gestational diabetes mellitus diagnosed according to the criteria of the International Association of Diabetes and Pregnancy Study Groups (IADPSG), but who were evaluated using a twenty-four hour seven-value sugar profile prior to the implementation of management. This study sought to examine maternal and fetal outcomes in patients with gestational diabetes mellitus.

Place of Study: Sialkot Medical College Sialkot

Duration of Study: JUNE 2021 TO JUNE2022

Methods: This prospective observational study was undertaken at the Sialkot Medical College Hospital over the course of one year. The hospital served as the study's location. Prior to starting any medication between 24 and 28 weeks of pregnancy, women diagnosed with GDM based on IADPSG criteria were needed to undertake a seven-value sugar profile within twenty-four hours. This criterion applied to women diagnosed with gestational diabetes between 24 and 28 weeks of pregnancy. The remaining patients were treated with medical nutrition therapy (MNT), which may or may not have been supplemented with medication depending on what was necessary to maintain their normal blood sugar levels. Documentation and analysis of maternal and fetal outcomes were conducted to assess whether or not the groups displayed differentiating characteristics.

Results: GDM was diagnosed in 198 out of a total of 1867 pregnant women, representing a 9.1% prevalence rate. In 81 patients, or 40.90% of the total, the 7-point blood glucose profile (ITT) was normal, and these individuals required no medical intervention other than watchful observation. Other patients received treatment; 89 (44.9% of patients) required only MNT control, while 19 (9.59%) received supplementary medication in the form of metformin and 9 (4.5%) required insulin. It was determined that there were no statistically significant differences between the treated and untreated groups in terms of maternal–fetal outcomes. Upon comparing treated and untreated groups, this was the result that was reached.

Conclusions: After an abnormal Oral Glucose Tolerance Test, the technique of evaluating patients with a seven-value, twenty-four-hour sugar profile limited the capacity of nearly one-third of women to get medication and treatment for GDM without compromising maternal–fetal outcomes. This was the case despite the absence of a link between an aberrant OGT and a diminished capacity to receive therapy and treatment for GDM.

Keywords: GDM IADPSG Maternal fetal outcomes

INTRODUCTION

Gestational diabetes mellitus, also known as GDM, is a disorder that progressively worsens until it reaches catastrophic levels. This illness is especially concerning because it affects both the mother and the unborn child. As a result of an increased risk of gestational hypertension,pre-eclampsia, caesarean section, and type 2 diabetes in mothers, as well as an increased risk of macrosomia, neonatal hypoglycemia, and type 2 diabetes later in life for the offspring of mothers with these conditions, it has an effect on both the short-term and long-term outcomes. The International Association of Diabetes and Pregnancy Study Groups' (IADPSG) current criteria have had a substantial impact on the dramatic increase in the prevalence of GDM. This has resulted in an increase in antenatal surveillance, ultrasonographic examinations, inductions, caesarean deliveries, and other surgical procedures. These procedures and others have all contributed to a substantial increase in the costs associated with receiving medical care. As a result, low- and middle-income nations, which account for ninety percent of all GDM cases, are a major cause for concern. Paradoxically, it is precisely these nations that must find ways to cut unnecessary healthcare spending while still making progress toward the Sustainable Development Goals. After analysing the data from the Hyperglycemia and Adverse Pregnancy Outcome (HAPO) study, IADPSG established the glucose levels at which the probability of birth weight, cord C-Peptide, and body weight reached 1.75 times the mean. The purpose of the study was to examine the connection between hyperglycemia and unfavourable pregnancy outcomes. These findings served as the foundation for establishing the IADPSG glucose cut-off levels. The necessity of inducing labour, the rate of caesarean sections, and hypertensive issues throughout pregnancy were ignored. All of these are important obstetric clinical outcomes. Perinatal effects such as hypoglycemia in newborns or admission to neonatal intensive care units were also not observed. During a prior examination on GDM, it was observed that patients were labelled as having GDM using the IADPSG cut–out, despite the Oral Glucose Tolerance Test (OGTT) deviation being small in some instances. This was discovered despite the fact that GDM had been investigated previously. This matter had been brought to the attention of everyone. As a result, it was decided to conduct a study to determine whether or not all patients with a disturbed OGTT require treatment. When we considered the limited resources available to us under the circumstances, we realised how important it was to resolve this issue. Regular monitoring of the patient's blood glucose levels using a glucometer is essential as part of the conventional treatment for GDM. The number of tests performed and the frequency with which they are performed are controversial; nonetheless, testing is often performed twice, once while the individual is fasting and once after they have eaten. Patients with diabetes who require insulin are encouraged to have no more than seven separate tests within twenty-four hours. Given that this test is suggested for the most severe results, the authors of this study determined that a seven-value, twenty-four-hour sugar profile should be performed prior to the initiation of medication. This conclusion was obtained because this testing is recommended for the most severe consequences. It was determined that it was preferable to err on the side of doing too much rather than not enough, as it was deemed preferable to err on the side of doing too much rather than not enough. This resulted in the conclusion that it is preferable to err on the side of doing too much as opposed to not enough. In the context of

research, this testing procedure provided as an alternative to the administered traditional therapy.

METHODS

This pilot study was a prospective observational study conducted for a full year. Randomly selected patients getting prenatal treatment at our institution's antenatal clinic were invited to participate in the study.Between 24 and 28 weeks of pregnancy, they were administered a 75-gram oral glucose tolerance test (OGTT). Individuals were diagnosed with GDM if their fasting blood sugar levels were below 92 mg/dL, their one-hour blood sugar levels were between 180 and 153 mg/dL, and their two-hour blood sugar levels were below 153 mg/dL. Patients whose fasting and two-hour OGTT results were greater than 126 mg/dl and 200 mg/dl, respectively, were not permitted to participate in the study because their diabetes was considered to be overt.

After receiving a diagnosis of gestational diabetes mellitus (GDM) and an abnormal OGTT, these women were subsequently hospitalised to the hospital for twenty-four hours. During this time, participants were subjected to a seven-value glucose profile that comprised fasting, pre- and post-meal testing (for breakfast, lunch, and dinner), as well as a test at 2:00 a.m. utilising capillary blood samples using a glucometer. They were also urged to consume water throughout the course of the procedure.According to the American Diabetes Association (ADA) and the American College of Obstetricians and Gynecologists, patients were regarded to have euglycemic blood glucose levels if their fasting and 2 hour post-prandial blood glucose values were below 95 mg/dl and 120 mg/dl, respectively. In addition, patients were regarded to have euglycemic blood glucose levels if their fasting and two-hour post-prandial blood glucose levels were less than 140 mg/dL. (ACOG). Due to the level of complexity involved, it was impossible to do such extensive testing in the comfort of one's own home. This method of recording seven-value glucose profiles is comparable to the method used to monitor GDM patients who are required to take medication. No changes were made to the patient's regular diet during their hospitalization. The 24-hour seven glucose value profile was used to classify patients into four distinct groups. One of these categories signified the sort of intervention employed with each specific patient. Patients with normal glucose profiles who did not begin any treatment, including dietary changes, comprised group 1, whereas group 2 consisted merely of medical nutrition therapy (MNT), group 3 consisted of oral hypoglycemic drugs like metformin, and group 4 consisted of insulin. Patients in Group 1 had normal glucose profiles and were not given any treatment, including dietary changes. In addition to the use of MNT in both groups 3 and 4, pharmacotherapy was employed in both groups 3 and 4. The nutritionist at the hospital began by providing nutritional counselling to the patients over the course of two weeks. After that, only patients whose blood glucose levels were outside of the normal range as shown by tests were given medication. After reviewing the BS portfolio once more, the therapy category underwent adjustments. During the analysis, the active category distribution at the moment of delivery was utilised.Patients in groups 1 and 2 who did not receive therapy, as well as those in group 3 who did receive MNT, were monitored fortnightly for fasting and postprandial blood glucose levels. Patients in groups 3 and 4 who were prescribed medication were subjected to a stricter monitoring routine consisting of several (at least four) capillary glucose tests performed at least twice per week. After completing the necessary training, this was done at home using a glucometer, an abbreviation for "self-monitoring of blood glucose" (SMBG). The post-meal evaluations were completed two hours after the substantial meal had been consumed.The goal was to reach fasting blood glucose levels of less than 95 mg/dl and two-hour post-meal blood glucose levels of less than 120 mg/dl, respectively. In addition to having their sugar levels monitored, patients were often examined in the prenatal clinic every two to three weeks for clinical evaluations. Between 34 and 36 weeks of gestation, the majority of patients underwent at least one sonographic examination to document their biometry, growth, and development. These examinations were conducted between weeks 34 and 36 of pregnancy.After monitoring each patient up until the time of birth, the maternal and foetal outcomes of each individual were evaluated. Documented maternal outcome factors were polyhydramnios, pregnancy-induced hypertension (PIH), inducement of labour (IOL), and caesarean section or operative vaginal birth. Foetal outcome indicators included birth weight, macrosomia, foetal growth restriction (FGR), the Apgar score at birth, admission to neonatal intensive care unit (NICU), and the occurrence of any other infant morbidity.The major purpose of the study was to imitate the conventional treatment of type 2 diabetes with MNT, OHA, and insulin in three traditional groups. In addition, the secondary purpose of the study was to identify any variations in the outcomes of one group that did not receive any intervention**.**

RESULTS

GDM was diagnosed in 198 out of a total of 1867 pregnant women, representing a 9.1% prevalence rate. In 81 patients, or 40.90% of the total, the 7-point blood glucose profile (ITT) was normal, and these individuals required no medical intervention other than watchful observation. Other patients received treatment; 89(44.9% of patients) required only MNT control, while 19(9.59%) received supplementary medication in the form of metformin and 9 (4.5%) required insulin. It was determined that there were no statistically significant differences between the treated and untreated groups in terms of maternal–fetal outcomes. Upon comparing treated and untreated groups, this was the result that was reached.

Table 1 Period of gestation at time of delivery

Parameter	Group 1(no treatment) N= 81 (%)	Group 2(MNT) N= 89 (%)	Group 3(OHA) N= 19 (%)	Group 4 (Insulin) N=9 (%)
< 37 weeks (n = 20)	8(9.8)	11 (12.2)	1 (5.0)	0 (0)
37–40 weeks (n = 139)	51(62.9)	61(68.5)	18(94.4)	9 (100)
> 40 weeks (n = 39)	22 (27.1)	17 (19.1)	0 (0)	0 (0)

Table 2 Mean birth weight & Apgar score of babies

Parameter	Group 1(no treatment) N= 81 (%)	Group 2(MNT) N= 89 (%)	Group 3(OHA) N= 19 (%)	Group 4 (Insulin) N=9 (%)
Mean Birth Weight of	3.01	2.98	2.96	3.07
Apgar Score < 7/10 (n = 12)	6 (7.4)	4 (4.4)	2 (10.5)	0 (0)
> 7/10 (n = 186)	75 (92.59)	85 (95.5)	17 (89.5)	9 (100)

DISCUSSION

GDM is a clinical condition associated with problems for both the mother and the fetus. These issues may be caused by GDM. In the past decade, there has been a significant increase in the number of people diagnosed with GDM. This development is primarily attributable to the recently introduced diagnostic criteria of the IADPSG, which are based on the study completed by HAPO. The presence of GDM has resulted in an increase in the overall number of interventions performed during a patient's pregnancy, including intrapartum interventions.As a result, the authors felt forced to conduct study into the subject of whether or not all individuals identified with GDM required treatment.They have questioned the usual approach of treatment and attempted to change it in an effort to reduce the number of cases in which additional medical care is unnecessary.Hyperglycemia and its effect on C-peptide-related, large for gestational age babies are in the limelight as the number of women with gestational diabetes mellitus continues to rise (GDM). It is paradoxical that Pakistan, which has traditionally been known for producing kids with low birth weights, is now at the forefront of having hyperglycemia and the resulting large-for-gestational-age newborns that result from it. Given that Pakistan has traditionally been known for having kids with low birth weights, it is amusing that the pendulum has swung in the opposite direction. There is no doubt that the average birth weight of babies in Pakistan has increased; nevertheless, this trend does not in any

way fit the requirements for being abnormal or macrosomic. The infants that had a low birth weight but underwent rapid weight growth after delivery, which has been associated with metabolic syndrome later in life, have posed the most metabolic worry. Due to the correlation between low birth weight and quick weight gain, this is the case. It was not possible to locate an Pakistani study addressing the issue of high cord C-peptide levels in either the general population or in infants born to GDM-affected mothers. The same was true for both groups.Due to the fact that hyperglycemia is directly responsible for unfavourable results, maintaining euglycemia is a crucial component of the therapy of GDM.Before commencing therapy, this line of reasoning prompted the administration of a glucose tolerance test over the course of twenty-four hours and seven distinct readings. After a normal profile has been established and euglycemia has been achieved, the therapy can be terminated. Moreover, if these individuals are considered as "normal," the subsequent battery of tests performed to monitor a "diabetic" patient during pregnancy may be judged unnecessary. This is because it is probable that these folks will not be diagnosed with diabetes.The clinical outcome data provide support for this management method because it was determined that there were no major or statistically significant differences between patients managed using this method and those managed using standard therapeutic interventions such as MNT or pharmacotherapy, as demonstrated by earlier data. This is because it was discovered that there were no significant differences between patients treated with this therapy and those treated with normal therapeutic methods.

It is obvious that hyperglycemia is not a problem because the number of frequent clinical problems in GDM patients who were treated without medication did not increase. This indicates that there is no cause for concern over hyperglycemia. In actuality, the bigger number of interventions performed in GDM cases is intended to allude to the increased number of inductions performed in the therapy group. The fact that only a tiny percentage of patients with abnormal OGTT results require pharmacological treatment suggests, as shown in Table 1, that the great majority of diabetes individuals exhibit only extremely mild signs of the disease.This technique resulted in a decrease in the overall prevalence of GDM in this group, from 9.1% to 6.11%. This reduction had no effect on the outcomes for either moms or children.This distinct and lower prevalence rate would have a substantial impact on health care expenditures and policy, and if confirmed by a bigger study, it would deserve acceptance. In addition, if it could be demonstrated that it is correct, it would demand confirmation by a bigger study. It is estimated that if as many as 39.1 percent of patients can be managed simply without sacrificing perinatal outcomes, this will have a substantial impact on the efficiency of resource utilisation. This advantage has a fair chance of turning in a substantial advantage.Why a patient with abnormal OGTT results can later have normal glucose levels is a question that requires an explanation and should be addressed. There may be something unique about the Pakistani race that causes a disproportionately large percentage of people to have abnormal OGTT results, yet these results only manifest as a high fasting blood sugar level. This phenomenon may be explained by the concept of the thrifty gene, but only if it can be extended to those who have been malnourished for an extended length of time. It is likely that the anxiety of the initial test will cause a brief bout of hyperglycemia, but if it does not recur, the individual will have a normal sugar profile thereafter.Since the Diabetes in Pregnancy Study Group of Pakistan criterion does not take fasting data into consideration, it is further asserted that these criteria may not be particularly helpful in the Pakistani context. This is because hyperglycemia during fasting is one of the most significant reasons in abnormal OGTT.The low repeatability of the OGTT has been highlighted previously, but in a different context. This talk occurred within a distinct setting. This was a further explanation for the incidence of initial aberrant OGTT findings that was proposed. OGTT is the abbreviation for oral glucose tolerance test. Due to the impossibility of conducting repeated tests on pregnant women in an ethically and practically acceptable manner, it is highly unlikely that such testing will ever occur. If a woman's glucose levels are normal, however, it is not against the rules of the scientific community to refrain from acting. These patients were also clinically evaluated for the likelihood of macrosomia or hydramnios, which are likely to occur if unrecognised hyperglycemia was present. This is due to the fact that both macrosomia and hydramnios are diseases associated with gestational diabetes. This was done because macrosomia and hydramnios are likely to occur if hyperglycemia is not considered, and because of this likelihood, this was carried out. On the other hand, there was no indication of this phenomenon in the clinical outcomes.Inaccuracies in the laboratory, which could be a significant concern about cut-off values for the OGTT, are yet another likely factor. Even laboratories that participate in external quality assurance programmes will consider population values typical if they fall within one standard deviation of the mean. Regarding glucose levels, a coefficient of error of 3% is typically accepted; consequently, the majority of biochemistry laboratories would consider a margin of error of 3% to be acceptable for a precise report. (Illustration:) In addition, the External Quality Assurance System (EQAS) criteria permit an error margin of this magnitude to exist in the results. However, specific cutoffs have been determined and will be implemented in accordance with the IADPSG's HAPO-based recommendations. The implementation of these proposals will adhere to HAPO.

In addition to the fact that only a single aberrant value is required to make a diagnosis of GDM, this feature ensures that the number of cases will continue to climb. The proposed modification of management aims to reduce the number of intervention-required cases to a more manageable level.How much does an oversimplification of a cause-and-effect analysis contribute to the issue of a direct link between cord C-peptide and hyperglycemia, which was the basis for the findings of the HAPO study and, as a result, the basis for the calculation of IADPSG cut-offs? We would want to suggest that a number of additional components or new elements, some of which may be epigenetic, may be playing a significant role but are currently unknown.

In the past, the gender differences in cord C-peptide have been identified, but a different study on weight gain in obese pregnant women discovered that cord C-peptide and other foetal metabolic parameters were affected , despite the exclusion of GDM patients from the study. Both of these studies examined the relationship between obesity and the amount of weight gain that happens during pregnancy. This may suggest that there is a complex interaction between the multiple elements that influence metabolic changes in a newborn. This is one interpretation of the data that is feasible. In light of this, the significance of cord C-peptide measurements, which were one of the factors used to determine the HAPO outcomes and subsequent recommendations, should be questioned. This is due to the previously stated reason. Consequently, it is possible to conclude that the implementation of a strategy that documents euglycemia before initiating treatment, despite the fact that patients have had an abnormal OGTT, may be useful for distinguishing those cases of GDM that truly require interventions from those in which routine antenatal care is sufficient. This differentiation is conceivable because it is possible to document euglycemia in patients with an abnormal OGTT before commencing medication. It is possible to reach this objective by implementing a plan that demands documentation of euglycemia prior to therapy. Before this technology could be considered for usage outside of research laboratories, it would need to be verified through a sufficient number of randomised controlled trials with a sufficient number of people. Then it would be able to explore its applicability in different circumstances. If a patient's blood sugar levels are only slightly off, clinical judgement should be utilised as a complement to guide care decisions. This will help bridge the gap between our current position and our future position.

CONCLUSIONS

Prior to commencing any treatment interventions as part of the care strategy for patients whose OGTT results were abnormal, a 7-point blood glucose profile (ITT) should be used to evaluate the patients. This examination must be performed prior to initiating any additional therapeutic procedures. This modification can be implemented without danger. As a direct result, the total number of GDM cases will decrease by more than one-third.

However, it is reasonable to believe that these patients should be watched individually for the development of type 2 diabetes mellitus over a longer length of time as a distinct group. This line of thought stems from the fact that it is conceivable to view these patients as a distinct group. If this is the case, then it would be highly desirable to do the action in question.

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