



Lifestyle Interventions in Gestational Diabetes Mellitus: A Review

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Abstract:

Diabetes is characterized by hyperglycemia resulting from defects either in insulin secretion or insulin action. Various pathogenic processes involved in the development of diabetes such as autoimmune destruction of the pancreatic β -cells with consequent insulin deficiency that result in resistance to insulin action. Gestational diabetes Mellitus (GDM) refers to any degree of glucose intolerance with onset or first recognition during pregnancy. This review highlights that nutritional management and lifestyle interventions should be offer to women with a history of GDM along with pharmacological treatment.

Key words: Hyperglycemia, Insulin, GDM, Lifestyle interventions.

Introduction

Diabetes is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion and insulin action or both. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction, and failure of different organs, especially the eyes, kidneys, nerves, heart, and blood vessels.¹

The majority of cases fall into two broad categories type 1 diabetes, the cause is an absolute deficiency of insulin secretion. Individuals at increased risk of developing this type of diabetes can often be identified by serological evidence of an autoimmune pathologic process occurring in the pancreatic islets and by genetic markers. In type 2 diabetes, the cause is a combination of resistance to insulin action and an inadequate compensatory insulin secretory response.²

The severity of symptoms is depends on due the type and duration of diabetes. Some of the diabetes patients are asymptomatic especially those with type 2 diabetes during the early years of the disease, others with marked hyperglycemia and especially in children with absolute insulin deficiency may suffer from polyuria, polydipsia, polyphagia, weight loss, and blurred vision.³ When DM is not properly controlled, this condition can result in severely increased glucose levels (hyperglycemia) and consequent increase in the risk of atherosclerosis and cardiovascular diseases.⁴ Other complications that arise as a result of uncontrolled DM could include retinopathy, nephropathy and neuropathy.⁵

Gestational Diabetes Mellitus:

Gestational Diabetes Mellitus may be defined as “any degree of glucose intolerance with onset or first recognition during pregnancy” whereas pre-gestational diabetes comprises of type 1 and type 2 diabetes occurring prior to pregnancy.⁶ GDM is one of the most common medical complications in pregnancy and affects an estimated 14% of pregnancies, or one in every seven births globally.⁷ Several risk factors have been implicated in the development of GDM.

Common risk factors:

These are maternal age, obesity, family history of T2DM and a previous history of GDM. In addition, other risk factors include previous history of a macrosomic baby, previous adverse pregnancy outcome, glycosuria, polyhydramnios or large foetus in present pregnancy.⁸ Increased maternal weight is the most commonly evaluated reversible risk factor. In a case-control study, women who presented an increasing weight at a rate of 2.3-10.0 kg/year had a 2.5-times increased risk for GDM⁹. Some medications may also affect glucose intolerance increasing the risk for GDM.¹⁰

Dietary risk factors:

Several cross-sectional and retrospective studies have shown that consumption of macronutrient constituents of the diet during pregnancy may predict development of GDM.¹¹ In another study evaluating the effect of lifestyle behavior in white women, revealed a significant correlation of high consumption of saturated fat consumption and risk of GDM, whereas high consumption of polyunsaturated fat was associated with decreased risk for GDM.¹² Other types of diet that influence the risk of GDM include high glycemic load and a low cereal-fiber diet.¹³

Treatment:

The mainstay of GDM treatment is dietary and lifestyle advice, which includes medical nutrition therapy, weight management, and physical activity.¹⁴ Women monitor their fasting and post meal glucose levels and adjust their individual diet and lifestyle to meet their glycemic targets. This pragmatic approach achieves the glycemic targets in approximately two-thirds of women with GDM.¹⁵ It is also unknown whether the dietary interventions for achieving maternal glycaemia are also effective for reducing excessive fetal growth and adiposity.¹⁶

Lifestyle Interventions in GDM:

Lifestyle Intervention includes nutritional therapy, physical activity, and weight management.

Nutritional Therapy:

Patients with gestational diabetes should receive nutritional counseling by a registered dietitian upon diagnosis and be placed on an appropriate diet.¹⁷

Nutrition therapy provide adequate nutrition to promote fetal and maternal well-being while achieving normoglycemia with absence of ketosis and providing adequate energy levels for appropriate weight gain in pregnancy.¹⁸ The food plan should be based on a nutrition assessment with guidance from the Dietary Reference Intakes for all pregnant women (minimum of 175 grams of carbohydrate, 71 grams of protein, and 28 grams of fiber).¹⁹

A typical meal plan for women with gestational diabetes mellitus includes three small- to moderate-sized meals and two to four snacks. For women who are of normal BMI (BMI of 18.5 to 24.9 kg/m²) during pregnancy, a reasonable caloric intake is 30 kcal/kg/day; for women who are overweight (BMI 25.0 to 29.9 kg/m²). No increase in calories is recommended for the first trimester, an additional 340 kcal/day is recommended during the second trimester, and an additional 452 kcal/day is recommended during the third trimester.²⁰

Once the caloric needs are calculated, carbohydrate intake needs to be determined. The total amount of carbohydrate, the distribution of carbohydrate over meals and snacks, and the type of carbohydrate can be manipulated to blunt postprandial hyperglycemia.²¹ However; reducing carbohydrates to decrease postprandial glucose levels may lead to higher consumption of fat, which may have adverse effects on maternal insulin resistance and fetal body composition.²²

Weight Management:

After prescribing the diet, it is important to pay attention to subsequent changes in weight. Women with gestational diabetes mellitus showed that those with appropriate weight gain had optimal outcomes, while excessive weight gain was associated with a significantly increased risk of having a large for gestational age infant, preterm birth, and cesarean delivery.²³ Suboptimal weight gain increased the likelihood of avoiding medical therapy of gestational diabetes and decreased the likelihood of having a large for gestational age neonate.²⁴

Exercise:

Exercise that increases muscle mass appears to improve glycemic control, primarily from increased tissue sensitivity to insulin. As a result, both fasting and postprandial blood glucose concentrations can be reduced.²⁵

Glucose Monitoring: The optimal approach to glucose monitoring has not been determined. When initially diagnosed with gestational diabetes mellitus, measure their blood glucose concentration at least four times daily (fasting and one or two hours after the first bite of each meal). Multiple daily measurements allow recognition of women who should begin an anti-hyperglycemic agent.²⁶ For women with gestational diabetes mellitus, measuring blood glucose on awakening (before eating) and after meals throughout pregnancy because fasting and pre-prandial glucose levels alone may not predict the need for insulin therapy. Continuous glucose monitoring may lead to better outcomes than frequent self-monitoring of blood glucose (SMBG).²⁷

Summary and Conclusion: GDM has been linked to many short-term and long-term health problems for the mother and baby. Women with GDM have an increased risk of developing high blood pressure during pregnancy and the babies are more likely to be large when born. This can be linked to babies having birth trauma and the need for giving birth by caesarean mode. It is concluding that lifestyle interventions include components such as dietary advice; physical activity, education, and self-monitoring of blood glucose. These interventions should be initiated and gestational weight gain should be controlled from early pregnancy that will help women to maintain their blood glucose levels within a target range. We summarize that future research could focus on specific interventions that will control the high glucose level and improve health outcomes for the mother and baby without pharmacological treatment.

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