

Treatment of Gestational Diabetes through Indian Diet: A Systematic Review

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Abstract—Gestational diabetes is formally defined as "any degree of glucose intolerance with onset or first recognition during pregnancy". A woman is diagnosed with gestational diabetes when glucose intolerance continues beyond 24–28 weeks of gestation. Insulin resistance during pregnancy stems from a variety of factors, including alterations in growth hormone and cortisol secretion, human placental lactogen secretion, and insulinase secretion, estrogen and progesterone also contribute to a disruption of the glucose insulin balance. The prevalence of gestational diabetes has been reported to range from 3.8% in Kashmir, to 6.2% in Mysore, 9.5% in Western India and 17.9% in Tamil Nadu. In more recent studies, using different criteria, prevalence rates as high as 35% from Punjab and 41% from Lucknow have been reported. It is estimated that about 4 million women are affected by GDM in India, at any given time point. Treatment of GDM results in a statistically significant decrease in the incidence of preeclampsia, shoulder dystocia, and macrosomia. Initial management includes glucose monitoring and lifestyle modifications. If glucose levels remain above target values, pharmacologic therapy with metformin, glyburide, or insulin should begin. aerobic exercise and resistance training clearly improve glycemic control in patients with diabetes. Exercise for 30 minutes most days of the week is a reasonable goal for most patients with GDM. GDM is a problem that affects a significant number of women during pregnancy. GDM can have lasting health impacts on both the mother and the fetus. In order to circumscribe and minimize potential complications to both mother and child, screening, diagnosis, and management of hyperglycemia are necessary.

Keywords: Gestational diabetes, Insulin, hyperglycemia, Glucose intolerance, Life style modification.

1. INTRODUCTION-

Pregnancy confers a state of insulin resistance and hyperinsulinemia that may predispose some women to develop diabetes. Gestational diabetes is formally defined as "any degree of glucose intolerance with onset or first recognition during pregnancy". A woman is diagnosed with gestational diabetes when glucose intolerance continues beyond 24–28 weeks of gestation. Gestational diabetes mellitus (GDM) occurs when a woman's pancreatic function is not sufficient to overcome the diabetogenic environment of pregnancy. Babies born to mothers with poorly treated gestational diabetes are at increased risk of being too large, having low blood sugar after birth, and jaundice. If untreated, it can also result in a

stillbirth. Long term, children are at higher risk of being overweight and developing type 2 diabetes.

2. PATHOPHYSIOLOGY-

Insulin resistance during pregnancy stems from a variety of factors, including alterations in growth hormone and cortisol secretion (insulin antagonists), human placental lactogen secretion (which is produced by the placenta and affects fatty acids and glucose metabolism, promotes lipolysis, and decreases glucose uptake), and insulinase secretion (which is produced by the placenta and facilitates metabolism of insulin). In addition, estrogen and progesterone also contribute to a disruption of the glucose insulin balance. As a result, glucose remains in the bloodstream, where glucose levels rise. More insulin is needed to overcome this resistance; about 1.5–2.5 times more insulin is produced than in a normal pregnancy. Increased maternal adipose deposition, decreased exercise, and increased caloric intake also contribute to this state of relative glucose intolerance.

3. PREVALENCE-

Diabetes is a major public health problem in India with prevalence rates reported to be between 4.6% and 14% in urban areas, and 1.7% and 13.2% in rural areas. India has an estimated 62 million people with Type 2 diabetes mellitus (DM); this number is expected to go up to 79.4 million by 2025. Not surprisingly, in parallel with the increase in diabetes prevalence, there seems to be an increasing prevalence of gestational DM (GDM), that is, diabetes diagnosed during pregnancy. The prevalence of gestational diabetes has been reported to range from 3.8% in Kashmir, to 6.2% in Mysore, 9.5% in Western India and 17.9% in Tamil Nadu. In more recent studies, using different criteria, prevalence rates as high as 35% from Punjab and 41% from Lucknow have been reported. It is estimated that about 4 million women are affected by GDM in India, at any given time point.

4. RISK FACTOR FOR GESTATIONAL DIABETES MELLITUS-

Several risk factors are associated with the development of GDM. The most common risk factors include a history of macrosomia (birth weight > 4000 g), being a member of an ethnic group with a higher rate of type II diabetes (as mentioned above), polycystic ovarian syndrome, essential hypertension or pregnancy-related hypertension, history of spontaneous abortions and unexplained stillbirths, strong family history of diabetes (especially in first-degree relatives), obesity (pregnancy weight > 110% of ideal body weight or body mass index [BMI] > 30), age older than 25 years, persistent glucosuria, and a history of GDM in a previous pregnancy.

5. TREATMENT OF GESTATIONAL DIABETES

Gestational diabetes mellitus (GDM) affects approximately 6% of pregnancies in the United States, and it is increasing in prevalence. Pregnant women without known diabetes mellitus should be screened for GDM after 24 weeks of gestation. Treatment of GDM results in a statistically significant decrease in the incidence of preeclampsia, shoulder dystocia, and macrosomia. Initial management includes glucose monitoring and lifestyle modifications. If glucose levels remain above target values, pharmacologic therapy with metformin, glyburide, or insulin should begin. Antenatal testing is customary for women requiring medications. Induction of labor should not occur before 39 weeks in women with GDM, unless glycemic control is poor or another indication for delivery is present. These patients should be screened six to 12 weeks postpartum for persistently abnormal glucose metabolism, and should undergo screening for diabetes every three years thereafter.

• GLUCOSE MONITORING

After receiving a diagnosis of GDM, patients should begin monitoring their blood glucose, initially with fasting levels and one- or two-hour postprandial levels. Fasting glucose levels should be less than or equal to 95 mg per dL (5.3 mmol per L), one-hour postprandial levels less than or equal to 140 mg per dL (7.8 mmol per L), and two-hour postprandial levels less than or equal to 120 mg per dL (6.7 mmol per L). No data suggest the superiority of one-hour vs. two-hour postprandial monitoring, so either is acceptable.

• LIFESTYLE CHANGES

Initial treatment for GDM involves diet and activity modification. No high-quality data exist on the optimal diet for women with GDM. Although the few trials evaluating the effects of exercise on women with GDM have yielded inconsistent results, aerobic exercise and resistance training clearly improve glycemic control in patients with diabetes. Exercise for 30 minutes most days of the week is a reasonable goal for most patients with GDM.

MANAGEMENT OF GDM THROUGH DIET

Attention to maternal weight gain is also important in minimizing the risk of fetal macrosomia. Maternal obesity, excess gestational weight gain, and GDM are independent and additive risk factors for macrosomia. For example, among women with obesity, GDM, and gestational weight gain greater than 40 lb (18.1 kg), the risk of fetal macrosomia is nearly 40%. That's because many women with gestational diabetes can manage their condition by following a healthy eating plan, monitoring their blood sugar, and exercising regularly. **Some guidelines are there-**

- Keeping blood sugar stable by eating healthy food and exercising makes it less likely that you'll need medication to control complication. It is recommend reducing the total amount of carbohydrates to about 40 percent of your daily calories. Try to eat carbohydrates that are high in fiber. Fibrous foods are harder to digest.
- Whole grains are high in fiber, so choosing brown rice and whole grain bread instead of refined versions (white bread and rice) Vegetables, beans, lentils, and chickpeas are also high in fiber and release sugar into your blood slowly.
- Avoid food and drinks that are high in added sugars, such as candy, cakes, and sodas. If you're craving something sweet, artificial sweeteners such as aspartame (NutraSweet and Equal) and sucralose (Splenda) are fine in moderation.
- Lean proteins should make up about 20 percent of what you eat each day. Fish, lean meat, and low-fat milk and dairy products are healthy protein choices. Having some protein at each meal can help balance blood sugar. All-natural peanut butter on whole wheat toast is another good option
- The remainder of your calories should come from healthy (unsaturated) fats, such as olive oil. That's about 40 percent of your daily calories.
- Avoid unhealthy (saturated) fats, such as butter, and trans (hydrogenated) fats, like those found in processed foods. Foods like all-natural peanut butter are high in healthy fat and a good source of protein, but check labels because peanut butter can have trans fat..
- Foods with a low glycemic index give a sustained release of energy. Because they take time to digest and turn to glucose gradually, foods low on the glycemic index are less likely to cause spikes in blood sugar and can help to control blood sugar levels.

Table: Glycemic index

| Low Glycemic Index foods include: | High Glycemic Index foods include: |
|---|---|
| <ul style="list-style-type: none"> • Most fruits, especially apples, oranges, pears, peaches, and mangoes | <ul style="list-style-type: none"> • fruit juice, soda |
| <ul style="list-style-type: none"> • vegetables, such as broccoli, green beans, peas, yams, lettuce, cabbage, and carrots, porridge, oat bran, muesli, and granola | <ul style="list-style-type: none"> • ready-to-eat cereal, pizza, white bread, short grain white rice |
| <ul style="list-style-type: none"> • legumes, such as beans, chickpeas, and lentils, oat-based cereals, such as porridge, oat bran, muesli, and granola | <ul style="list-style-type: none"> • russet potatoes, instant oats, macaroni cheese from mix, saltine crackers |

6. SUMMARY

GDM is a problem that affects a significant number of women during pregnancy. GDM can have lasting health impacts on both the mother and the fetus. In order to circumscribe and minimize potential complications to both mother and child, screening, diagnosis, and management of hyperglycemia are critical. There is still work to be done to gain a better sense of what screening protocols are most efficacious and cost effective, and when they should be administered. Future studies will provide guidance as to what the optimal management choices are.

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