

Medical Nutrition Therapy for Patients with Gestational Diabetes Mellitus and Type 2 Diabetes Mellitus: New Perspectives

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ABSTRACT

The most prevalent metabolic and endocrine perinatal issue is gestational diabetes mellitus (GDM) and type 2 diabetes mellitus (T2DM), which is an increasing health problem worldwide. The first line of treatment for GDM and T2DM is nutritional therapy and physical activity. Nutrition therapy that successfully regulates maternal glycemia while boosting projected foetal growth has a wide range of principles. Meanwhile, nutritional supplements with established positive benefits can help patients improve their deficits and metabolic profiles. Both food treatment and medical diet therapy have been increasingly used in medical nutrition therapy in recent years, and the concepts of their clinical application are explained in this paper.

Keywords: Gestational diabetes mellitus; Type 2 diabetes mellitus; medical nutrition therapy; physical activity

1. Medical nutrition therapy of gestational diabetes mellitus

The meal plan should include enough calories and nutrients to suit the demands of the pregnant woman. Weight gain throughout pregnancy is predicted to be 300 to 400 grams per week, with a total weight rise of 10 to 12 kg by term. As a result, the

meal plan seeks to supply enough calories for the mother and foetus to maintain adequate nutrition while avoiding excessive weight gain and postprandial hyperglycemia [1,2]. Calorie requirements vary according to age, exercise, pre-pregnancy weight, and pregnancy stage. It is necessary to consume 30 to 40 kcal/kg ideal body weight, or a 300 kcal/day increase over the basal need. Obesity correction during pregnancy is not recommended. Admission is required for underweight patients, especially those in their third trimester, to guarantee enough nourishment and avoid low birth weight newborns [1].

Calorie counting is a part of medical nutrition therapy (MNT), and it is recommended that pregnant diabetic women distribute their calorie consumption sensibly, especially at breakfast. This entails dividing a typical breakfast into two equal parts and eating each half with a two-hour gap between them [2]. This prevents an unnecessarily high peak in plasma glucose levels after eating the entire breakfast at once. For example, if 4 idlis / chappathi / slices of bread (applies to all types of breakfast menu) are consumed for breakfast at 8 a.m. and two hours' plasma glucose at 10 a.m. is 140 mg, the same quantity divided into two equal portions, one at 8

a.m. and the remaining after 10 a.m., results in a 20-30 mg decrease in two hours post prandial plasma glucose at 10 a.m. Breakfast has a higher peaking of plasma glucose (owing to the Dawn phenomenon) than lunch or dinner, thus this suggestion is scientifically sound. Insulin secretion is also higher at breakfast than at lunch or dinner in a healthy person. 17 GDM moms have a shortage in first-phase insulin secretion, and the challenge of eating a large amount of food at once should be reduced to compensate for this insulin deficiency [1,2].

2. Medical nutrition therapy of type 2 diabetes mellitus

2.1. Dietary Recommendations:

1. Energy:

Maintain a healthy body weight in adults, as well as appropriate growth and development in children and adolescents, in order to fulfil the increased demands of pregnancy, nursing, and sickness recovery [1]. It is necessary to think about daily physical activity and exercise. ($\text{Height in cm} - 100) * 0.9 = \text{Ideal Body Weight (IBW)}$ A moderately active diabetic patient can receive approximately 25 kcal/kg ideal body weight each day. The daily calorie reduction should be moderate, with no more than 500 calories per day being lost [2].

2. Distribution of Calories:

a. Carbohydrates:

The evidence regarding an appropriate carbohydrate intake for adults with diabetes is ambiguous. As a result, shared goals for people with diabetes should be defined. The best guideline is to get 55-60% of your energy from carbohydrates [1]. Carbohydrates should have a variety of properties. Although different carbs produce distinct glycemic responses, total carbohydrate management is crucial from a therapeutic standpoint.

Carbohydrates from high-fiber foods, such as whole grains (unpolished cereals and millets), legumes, peas, beans, oats, barley, and some fruits with a low glycemic index and glycemic load, are

suggested. All diabetic patients should be urged to eat six modest meals each day. The food exchange system can be used to add diversity and personalization to a diet plan [2].

b. Fibre:

The general population's fibre recommendation is 40 grams per day (2000 Kcals). Traditional Indian diets are recommended [1], which contain full grains, entire pulses like grammes, soy, green leafy vegetables, and occasional fruits. Papaya, guava, apples, pears, oranges, and mosambi can all be consumed in moderation. Fruit juices should be avoided at all costs [2].

c. Proteins:

Proteins should account for 12-15 percent of total energy consumption in adults with diabetes, which is in line with general population recommendations. Proteins from legumes, soy, grains, and peas, as well as low-fat milk, low-fat curds, fish, and lean meats, are recommended. Foods like cereal and pulses (4:1 ratio) can be supplemented to boost protein quality while also increasing satiety. Idli, dosa, Missi roti, Khichdi, Dhokla, Khandvi, and so on are just a few examples [2].

d. Fats:

For persons with diabetes, fats should account for 20-30% of total energy consumption. Because the evidence for an appropriate quantity of total fat consumption for people with diabetes is ambiguous, goals should be tailored to the individual. The quality of fat is just as essential as its quantity [2]. Glycemic management and CVD risk variables may be improved in patients with type 2 diabetes who consume MUFA-rich cooking oil and nuts in moderation. As a result, this can be advised as a viable option to a low-fat, high-carbohydrate diet. Oils high in MUFAs, such as mustard, rice bran, peanut (groundnut), and gingelly, are excellent choices. To keep the N6:N3 ratio between 5-10, oils high in n6 PUFA, such as safflower, sunflower, and cotton seed, should be blended with oils high in n3, such

as soy and mustard. It is suggested that you use mixed oils or alternate your oils [2,3].

3. Salt:

Recommendations for sodium intake for people with diabetes are the same as for the general population [1]. Added (iodized) salt should not exceed 5 grams per day. If you have hypertension or diabetes, you should limit your intake to less than 3 grammes per day. Sodium limitation is essential in hypertensive and edematous patients with nephropathy. Pickles, chutneys, packaged namkeens/savouries, and sauces are all examples of preserved and processed foods that should be avoided [2,3].

4. Alcohol:

Alcohol should be avoided whenever possible, but if consumed, it should be consumed in moderation. Alcohol should not be included in the meal plan if eaten. Alcohol does, however, give calories (7 kcal/ grams), which are termed "empty calories." Alcohol can cause hypoglycemia in people who are fasting. Alcohol can aggravate fatty liver disease, neuropathy, dyslipidemia, obesity, and blood glucose levels [2].

5. Sweeteners:

- **Nutritive Sweeteners:** Fructose, honey, corn syrup, molasses, fruit juice or fruit juice concentrates, dextrose, maltose, mannitol, sorbitol, and xylitol are all examples of these sugars. It's best to stay away from them all [2].
- **Non-nutritive Sweeteners:** The usage of aspartame, acesulfame K, stevia, sucralose, and saccharin is currently permitted. They should, however, be used in moderation and should be avoided during pregnancy [2].

2.2. Dietary changes in the presence of diabetic complications:

1. Nephropathy:

a. Protein: Protein intake for diabetic nephropathy patients should be 0.6 g/kg of

ideal body weight plus any considerable 24-hour urine protein loss. Protein consumption should not be less than 40 grams per day, though. Protein restriction should be suggested in collaboration with a nephrologist for patients with high creatinine levels [2].

b. Sodium: Depending on hydration status and serum sodium levels, it could range from 1000 mg to 2000 mg each day [2].

c. Potassium: Depending on the potassium levels in the blood and the type of diuretic used, potassium restriction may be necessary [2].

2. Cardiovascular Disease:

a. Maintaining a healthy weight and limiting salt intake: Fruits and vegetables should be consumed in plenty, with good quality fats consumed in moderation.

b. Dyslipidaemia: Foods high in saturated and trans fats, such as vanaspati, butter, ghee, margarine, coconut oil, red meats like sausages, ham, and bacon, whole milk, and its products, should be avoided [1,3]. It is recommended that you consume healthy oils and meals that are high in fibre. Flax seeds (10 g per day) can be included in a vegetarian's diet because both fish and flax seeds are high in omega-3 fatty acids, which are heart-healthy. Triglycerides will decrease if you limit your alcohol intake. Dietary management should be supplemented by a regular exercise and physical activity routine [2].

3. Sick Days

To ensure adequate calorie intake during a fever or other illness, the diabetic diet should be changed by modifying the consistency and texture of foods. Fluids and semi-solid meals, such as thin soups, milk, buttermilk, or fresh lime juice, should be encouraged [2].

a. Physical Activity and Exercise

Regular physical activity combined with controlled exercise is an important part of type 2 diabetes therapy. Before prescribing an activity regimen to diabetic individuals, a thorough examination should

be undertaken. The workout programme must be tailored to the individual's skill and capacity [2,3].

b. Benefits of exercise

Improves insulin sensitivity, lowers the risk of heart disease, high blood pressure, bone disorders, and unhealthy weight gain, reduces stress, anxiety, and depression, and boosts strength, metabolism, and digestion [2].

CONCLUSION

Finally, it can be concluded that GDM is a global health problem that is one of the most prevalent pregnancy problems and one of the leading causes of the global T2DM epidemic. Pregnancy is anticipated to be a key period for effective therapies and measures targeted at lowering T2DM rates. Obesity is the main contest in patient counselling and interventions throughout pregnancy, and nutritional control is the key treatment for GDM. Despite substantial research, this topic is still under active research, and more clinical research is needed to reduce maternal and foetal difficulties.

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