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Nutrition and Dietetics Concerning Diabetes Mellitus: Gestational Diabetes Mellitus

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A B S T R A C T

The Academy of Nutrition and Dietetics created the nutrition care approach and concept. Today, all across the world, dietitians and nutritionists utilize it after it matured and underwent changes. This post seeks to describe the dietetic and nutritional approach to treating gestational diabetes mellitus. The method is applicable in a variety of settings, including clinical dietetics and public health. Although the case studies in this article concentrate on the model and method used by dietitians in Pakistan, namely the model and procedure of the Pakistan Nutrition and Dietetic Society, they can also be utilized in conjunction with other models and procedures. The paradigm begins with identifying nutritional needs and progresses through six stages: assessment, diagnosis determination, planning for the nutrition and dietetic intervention, implementation, monitoring, and review of the intervention, and evaluation of the intervention. Dietitians and nutritionists struggle with preventing and lessening the effects of nutrition-related health disorders in particular people or groups of people. Dietitians and nutritionists need to move away from evidence-based practice that is based on experience to demonstrate quality and maximize nutritional results.

A R T I C L E   I N F O

1. INTRODUCTION

Assessment, a crucial step in the practice of dietetics and nutrition, is central to the process (Kamilah & Nandiyanto, 2024). To determine the nature and underlying causes of nutrition-related health issues that affect an individual, a group, or a community, the World Health Organization (WHO) describes the assessment as a systematic approach to obtaining and analyzing data (Frank, 2018). The evaluation and monitoring of the intervention are crucial for designing outcome metrics. It serves as the foundation for dietetic diagnosis and treatment. For this reason, investigating a case study for dietetics and nutrition concerning gestational diabetes mellitus was the aim of this study. This research is a continuation of previous research (Ahsan, 2022; Ahsan, 2023).

2. METHODS

This is a case study, developed by question and answer between a medical doctor and a patient. This study's framework was developed to standardize and organize dietetic and nutritional assessment. Different information is obtained during evaluation depending on the situation, such as the individual, group, community, or population, and different tools are used to gather this information. Identifying how well nutritional demands are being met forms the basis of the nutrition and dietetic assessment. It is often crucial to evaluate current food and drink intake, changes in the length and intensity of appetite, and factors that affect intake. Consideration should be given to recent changes in mealtime routines, dietary preferences, and consistency in clinical settings.

The type of nutritional assessment used will depend on the environment, population, age, literacy level, training, and experience of the assessors, cost, the nutrients to be examined, and other considerations. To ensure the most appropriate approach in clinical and other situations, it is crucial to understand the limitations and applicability of each technique. The assessment could be current or historical. It's crucial to weigh or measure out the food and beverages ingested. To aid with quantifying, images, models, and common serving utensils can all be employed. food information can be used subjectively to look at food preferences or meal patterns, although it is most usually employed statistically in clinical practice.

The number of calories and nutrients in a diet is determined using information on food composition. The majority of the time, a software tool is employed to make these calculations simpler. But it's important to be aware of the knowledge on food composition's limits. The demands of the person or population must be taken into consideration when interpreting any nutritional evaluation results. Comparisons with nutritional reference values provided by the Pakistani Institute of Medicine, Department of Health, or dietary recommendations are routinely used to do this. Any nutritional reference value, however, needs to be understood within its limitations.

3. RESULTS AND DISCUSSION

Aliza (*pseudonym*) is a 35-year-old Punjabi lady who is married and has an 8-year-old kid. Her spouse is an accountant, and she is a hospital pharmacist. She was born in the United Kingdom, but her parents were born and raised in Pakistan, therefore her nutrition is influenced by both the Pakistani and British diets. She follows a South-East Asian/Western diet, enjoys eating out, and orders takeout frequently (Chinese, pizzas, or Indian). She is pregnant for the second time, and her mother-in-law has moved in with her to help. Her mother-in-law insists that she eat for two. She arrived at the prenatal clinic during her third

trimester with elevated blood glucose levels. A prenatal specialist suggested nutritional guidance. A detailed assessment is in **Table 1**.

Table 1. Assessment data for the patient.

Data	Information
Anthropometric, hematological, and biochemical Measures	Biochemical and hematological markers Weight Current 98 kg Pre-pregnancy 80 kg Height 1.61 m BMI 37.8 kg/m2 Random glucose 7.8 mmol/L HbA1c 65 mmol/mol Clinical BP 150/95 mmHg Overweight since early childhood Pre-eclampsia in 1st pregnancy Medication Methyldopa 250 mg bd Folic acid 5 mg/day Ferrous sulfate 200 mg/day Metformin 500 mg bd Insulatard 4 U/day
Diet	Diet history Breakfast Roti with Corn oil, Yogurt Cup (120g) Morning Snack Full-fat milk (140ml) Lunch Roti with Salan, Sometimes Fast Food Burgers, Pizza Weekends – cheese (full fat cheddar) (60 g) on white toast (2 × 27 g), Indian milky spiced tea (190 g) (full-fat milk (50 g), 2 tsp sugar (10 g)) or Take-away breakfast – sausage patty, hash brown (1), scrambled egg, toasted English muffin (160 g) Mid-morning or Large jacket potato (220 g) with cheese (30 g), regular fizzy drink (330 mL) Mid-afternoon Tea (260 mL) (semi-skimmed milk (40 mL), 2 tsp sugar (10 g)), fruit (100 g) and/or crisps (30 g packet) Weekends may have samosa (2 × 70 g) (fried pastry filled with potatoes and peas) or handle (60 g) (baked snack made with ground rice, lentils, vegetables, and plain yogurt) or dhokla (40 g) (steamed snack made with ground chickpea flour and plain yogurt), Indian milky spiced tea (190 g) (full-fat milk (30 g), 2 tsp sugar (10 g)
Other Factors	Evening meal 2 medium chapattis (2 × 60 g) (roti) (made with wholemeal flour, 1/2 tsp spoon ghee), chicken/lamb curry (300 g), green salad, NB: Her mother-in-law insists that she has ghee while she is pregnant, for easy delivery NB: Dislikes artificial sweeteners Alcohol glass white wine 3–4 × per week (pre-pregnancy every day) Non-smoker

3.1.   Several Points for Assessment: Question/ Answers

The questions and answers are the following:

i) *What are the nutrition and dietetic diagnoses?*
Imbalanced carbohydrate intake (problem) associated with consumption of sweetened tea and fizzy beverages (etiology) characterized by high blood glucose levels (signs/symptoms).

ii) *What is the possible mechanism for GDM?*
Hormones generated during pregnancy, such as progesterone, estrogen, and human placental lactogen, are required to ensure that the baby receives enough glucose and nutrients to thrive (Murphy *et al.*, 2006). As a result, the body requires more insulin. Some women, however, may not generate enough insulin or have insulin resistance, resulting in hyperglycemia (Gallagher *et al.*, 2010).
GDM (gestational diabetes mellitus) is commonly diagnosed during the second trimester (Maegawa *et al.*, 2003). GDM may be identified in other women during the first trimester of pregnancy (Maegawa *et al.*, 2003). The condition most likely occurred before the pregnancy in these women.

iii) *What is the explanation of the risk factors associated with GDM?*
The risk factors are Obesity (BMI > 31.2 kg/m^2) (Kim *et al.*, 2010; Sahu *et al.*, 2007). Family history of DM (Parent). An unexplained stillbirth or neonatal death in a previous pregnancy, and/or a very large infant in a previous pregnancy is ≥ 4 kg (8.8 lb).
Gestation DM, Preeclampsia was Seen in previous Pregnancy. South Asian, Black Caribbean, or Middle Eastern ethnicity. Aliza is at risk for GDM as she was obese before conceiving (BMI 31.2 kg/m2), was diagnosed with pre-eclampsia in a previous pregnancy, and is South Asian.

iv) *Explain what complications are associated with poorly managed GDM?*
Complications include Miscarriage, Stillbirth, and other points. Macrosomia (high birth weight) increases the likelihood of assisted (e.g., forceps) or cesarean delivery, induced labor, and birth complications such as shoulder dystocia (obstructed labor), which can hinder or halt the baby's breathing during birth.
Premature birth carries several risks, including respiratory distress and jaundice (Ramachandrappa & Jain, 2009. Hypoglycaemia, for example, is a postnatal issue in the newborn. Throughout labor, there is fetal suffering. Greater chance of the woman getting gestational diabetes and type 2 diabetes later in life. The infant is more likely to acquire diabetes and/or obesity later in life.

v) *How GDM is diagnosed?*
A glucose tolerance test (OGTT) is administered. A fasting blood glucose level is tested, followed by 2 hours later by a glucose drink (75 g glucose). The WHO/IDF (2006) criteria are the most often used diagnostic criteria: 7 mmol/L fasting venous plasma glucose (VPG) (this test is not diagnostic in GDM), VPG 7.8 mmol/L 2 hours after the glucose load, while the WHO supports HbA1c as a diagnostic tool for diabetes, it does not recommend it for GDM.

vi) *What is the estimation of her current Dietary requirements?*
Her present diet may supply salt between 8 and 10 g/day, exceeding her daily recommended sum of carbs and salt intake (6 g/day). The following are the goals of the nutritional intervention: Tighter blood glucose control as per NICE (2015) - fasting 3.5-5.9 and 1 h postprandial 7.8 mmol/L; Avoiding additional weight gain; and Adopting healthy eating habits and dietary choices...

vii) *What is the explanation of the aims of dietary interventions?*

For intervention, Begin the meeting by clarifying your awareness of the health hazards. This lady is at significant risk of getting type 2 diabetes and coronary heart disease. Address the considerable benefits of decreasing 5-10% of one's body weight, as well as weight reduction after delivery. This would lower her chances of developing type 2 diabetes and enhance her lipid profile and blood pressure. Recommend three regular meals, each with some starch, and avoid skipping meals.

Having a nutritious breakfast would help minimize between-meal munching. Replace biscuits with fruit to increase fiber and micronutrient consumption, avoid adding sugar to beverages and consider artificial sweeteners (try different brands) (Monteiro *et al.*, 2018). Avoid excessively high carbohydrate consumption if they cause postprandial hyperglycemia, such as a 12-inch baguette. Decrease your consumption of added sugars. Bring a nutritious lunch to work. Try substituting herbs and spices for salt in your cuisine. Discuss better food/drink options and portion control when dining out. Try lowering the fat in curries and replacing it with healthy fats, such as monounsaturated fats. Investigate methods to include fitness into your routine.

viii) *Comments on Aliza's GI and GL?*

The glycaemic index (GI) is a classification of carbohydrates based on their overall influence on blood glucose levels (Granfeldt *et al.*, 2006). Slowly absorbed foods have a low GI rating, whereas fast-absorbed meals have a higher rating. Post-prandial glucose levels are raised faster by high-GI meals than by low-GI ones.

ix) *What outcomes are useful in monitoring and evaluation of intervention?*

When you have diabetes, choosing slowly digested carbs over quickly absorbed carbohydrates can help smooth out blood glucose levels. Glycaemic load is a metric that considers the number of carbohydrates in a serving of food as well as how rapidly it elevates blood glucose levels.

Aliza's diet consists of high/medium GI carbs such as white bread, baguette, and whole-grain chapatti flour. Aliza's meals include a high glycemic load, such as a 12-in. baguette and crisps (approximately 80 g carbs) or a large jacket potato and standard cola (about 100 g carbohydrates).

Aliza should choose whole grain carbs, such as grain bread and mixed grain chapatti flour, and consider limiting her carbohydrate consumption to around 50 g/meal and including more low-fat protein alternatives, vegetables, and salads in her meals. Risk Factors. Blood glucose levels. HbA1c. Weight. Pregnancy outcome.

x) *What are the barriers to change?*

The following are examples of change barriers: A basic understanding of a healthy diet is lacking. To advise on how to eat a cardio-protective Mediterranean diet rich in vegetables, fruits, legumes, whole grains, olive oil, and seafood. Perhaps Aliza could invite her mother-in-law and husband to the diet consultation to better appreciate the importance of a balanced diet and lifestyle...

xi) *How would you make her aware of hypoglycemia and related outcomes?*

N Not enough knowledge of the shift and lack of vision, direction, and priority. Aliza needs to grasp the importance of food and strict blood glucose management from the standpoint of her pregnancy. It is tough to modify long-held habits. To employ the 'Motivation Interview' approach for behavior modification.

Lack of time to prepare nutritious foods; Aliza will need to be more organized; for example, prepare a healthy lunch in advance for the next day, and enlist the support of her mother-in-law and husband in grocery shopping and meal preparation.

Traditional Asian ideas about eating a lot of fat and energy during and after pregnancy may aid with labor and breastfeeding. Obesity women are more likely to have a cesarean section than women with a normal BMI... Aliza is obese, therefore a balanced diet with excellent fats like olive oil in moderation will help her maintain her weight, as would a healthy diet and proper hydration during nursing.

The Asian diet is often heavy in salt. Because Aliza is on blood pressure medication, advice on low/moderate salt consumption should be given during the session. Her grasp of the necessity of fitness, as well as ancient Asian attitudes about pregnancy, should be addressed. If Aliza did not exercise before the pregnancy, beginning intense activity would be unwise. Walking for 15 minutes twice a day, five days a week is recommended. Iron and vitamin D deficiency among South East Asians: to provide recommendations and to see whether Aliza is taking any supplements. To see whether Aliza is taking any vitamin A pills, as too much vitamin A might be harmful to the baby...

xii) *What are other important points?*
Low blood glucose levels (typically 4 mmol/L) induce hypoglycaemia (Yale *et al*., 2018). Missed or delayed meals, insufficient starchy food, an excessive insulin tablet dose, strenuous exercise, or consuming alcohol on an empty stomach might all be causes. Trembling, perspiration, weakness, headache, tingling lips or tongue, irritability, slurred speech, numbness, or impaired vision are symptoms...

xiii) *What will you add to dietary interventions for her?*
3 glucose tablets/1/2 glass Lucozade or sweet fizzy drink/2 tsp sugar is the recommended treatment. Monitor blood glucose levels in 15-20 minutes; if they remain low, repeat therapy. After that, have a complex carbohydrate snack like a slice of bread/a small banana/digestive biscuit. Aliza will require thorough teaching on injection technique, insulin storage, hypoglycemia, and home monitoring because she is on insulin (long-acting).

3.2.   Answers to Further Questions

Other questions are the following:

i) *What will you advise Aliza about Alcohol and Caffeine drinks?*
Alcohol enters the baby's bloodstream and penetrates the placental barrier. The liver of a newborn is one of the last organs to properly develop and does not mature until late in pregnancy. As a result, newborns are unable to metabolize alcohol, and alcohol exposure can harm development.
The Department of Health advises pregnant women to abstain from alcohol entirely. If you do decide to drink, it is recommended that you limit yourself to one or two units of alcohol (equal to one small glass of wine) once or twice a week to reduce the danger to your kid. Caffeine use during pregnancy can lead to low birth weight kids, which can raise the risk of health problems later in life.

ii) *Why is food safety important during pregnancy?*
There is a concern about food safety. Cheeses that utilize mold in the ripening process, such as camembert, brie, or as a rind, such as goat's cheese, and soft blue-veined cheeses like gorgonzola, may contain listeria bacteria, which causes listeriosis. Listeriosis is uncommon, yet even a little infection can result in a miscarriage, stillbirth, or neonatal disease.
To avoid salmonella poisoning, eggs should be thoroughly boiled (solid yolk and white). Raw and undercooked eggs, as well as egg derivatives like mayonnaise, should be avoided. Milk and milk products that have not been pasteurized (raw/green top) should be

avoided. Unpasteurized milk should be heated before consumption if no other milk is available. Listeria can be found in all types of pâté, including vegetable pâtés.

4. CONCLUSION

This essay is a review of a research case on dietetics and nutrition concerning gestational diabetes mellitus. This essay clarified a case study, together with a question and answer section and preliminary patient data. This study may serve as a medical therapy guide for those who have diabetes.

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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