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Nutrition and Dietetics Concerning Diabetes Mellitus: Type 1 Diabetes Mellitus

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ABSTRACT

The Academy of Nutrition and Dietetics pioneered the nutrition care approach and concept. It has since developed and been altered, and it is currently used by dietitians and nutritionists all around the world. This paper is designed for understanding the nutrition and dietetic care approach in mind in the case of type 1 diabetes mellitus. The method may be applied in a variety of settings, including clinical dietetics and public health. Although the case studies in this article revolve around the Pakistan Nutrition and Dietetic Society model and process used by dietitians in Pakistan, they can also be utilized in conjunction with other versions of the process and model. The model begins with the identification of nutritional needs and progresses through six stages: assessment, identification of the nutrition and dietetic diagnosis, planning the nutrition and dietetic intervention, implementation, monitoring and reviewing the intervention, and finally evaluating the intervention. The nutritional and dietetic practitioner's challenges are to avoid and lessen the burden of nutrition-related health issues in individuals or groups of people. Dietitians and nutritionists must transition from experience-based to evidence-based practice, show quality, and optimize nutritional outcomes.

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1. INTRODUCTION

Assessment is a key element in the nutrition and dietetic process and is vital to dietetic and nutrition practice (Kamilah & Nandiyanto, 2024). The World Health Organization (WHO) described the assessment as a systematic process of gathering and analyzing information to make choices on the nature and cause of nutrition-related health issues that impact an individual, a group, or a community (Frank, 2018). It serves as the foundation for nutrition and dietetic diagnosis and intervention, and it is critical in creating outcome measures to assess and monitor the intervention (Rana *et al*., 2022). Here, the purpose of this study was to explore a case study for nutrition and dietetics concerning diabetes mellitus for type 1 diabetes mellitus.

2. METHODS

This paper is based on the format that has been developed to structure and standardize dietetic and nutrition assessment. The information collected during assessment and the tools used to collect this information vary depending on the setting, for example, individual, group, community, and population. Establishing the extent to which nutritional needs are being met is core to the nutrition and dietetic assessment. It is usually important to assess current food and beverage intake, changes in duration and severity for appetite, and factors that affect intake. In clinical situations may also be important to consider recent changes in meal patterns, food choice, and consistency.

Several aspects will influence the type of dietary assessment used, including the environment, population, age, literacy, assessor training and expertise, cost, nutrients to be examined, and so on. To assure the most appropriate approach in clinical and other contexts, it is critical to understand the limitations and applicability of each method. The assessment might be either previous or current. It is critical to weigh or estimate the amount of food and beverages eaten. To assist with quantification, photographs, models, and standard-size serving containers may be employed. Dietary data can be used subjectively, for example, to analyze food preferences or meal patterns, but it is most commonly employed quantitatively in clinical practice.

Food composition data is used to determine the energy and nutritional content of the diet. To make these computations easier, a software tool is usually employed. Nonetheless, it is critical to appreciate the limits of food composition data. All nutritional assessment results must be interpreted in the context of the individual or population's needs. This is often accomplished by comparison with dietary reference values issued by the Department of Health in Pakistan, dietary guidelines, or the Institute of Medicine in Pakistan. Nonetheless, the limits of any dietary reference value must be considered.

3. RESULTS AND DISCUSSION

3.1. Initial Data

Ahmad (*pseudonym*), a 21-year-old man, was diagnosed with type 1 diabetes at the age of nine. He lives with his parents and has just started an office apprenticeship. Ahmad has not used specialist diabetic or nutrition services in several years, instead relying on his primary care physician to manage his diabetes. Because of the lack of involvement with expert services and the high HbA1c documented 6 months earlier, the Doctor proposed a referral to the adult community diabetes service. Detailed information regarding Ahmad is shown in **Table 1**.

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Table 1. Data information for Ahmad.

Data	Condition
Anthropometric, hematological, and biochemical Measures.	Current Weight 63.4 Previous Weight 62.1 Height 1.6 m HbA1c 117mmol/mol 6/12 ago SBGM which is Self blood glucose monitoring was not undertaken at the time of the assessment
Physio-Clinical Assessment lypohypertrophy	Medication 45 Units Per day At 9 pm Insulin detemir (background insulin)
Diet	Insulin lispro (quick-acting insulin) 14 units with breakfast, often missed at lunch, 16–20 units with an evening meal.
Diet	Diet Breakfast (Early Morning) Half Pratha with One Spoon of olive oil (30 g), full-fat milk (120 ml) Morning Snack Packet of Biscuits (50g) Lunch Sandwich, Salad, Boiled Potato, pickle (205 g), and mayonnaise (120 g) Chocolate bar (50g) May also eat packet crisps (40 g) and/or chocolate bar (54 g) Dinner For example, 2 Bread, Seasonal Vegetables Cooked with Spices. One Cup Tea (Full fat Milk +Tea) 2 slices of medium toast Lives at home, parents shop and cook Socializes with friends 1–2 a week, 30-minute walk twice a week

3.2. Assessment

Ahmad is concerned about having diabetic issues later in life and recognizes that this is a substantial danger for him given his present HbA1c and the fact that type 1 diabetes is chronic. He is not trying to lose weight. He has had past poor encounters with diabetes care and has a limited recollection of earlier carbohydrate estimate lessons. Ahmad does not have the information, awareness, or continuing access to specialized health professional help that he needs to effectively self-manage his diabetes.

This might be connected to his previous experiences with services and the inadequate or unstructured transition care that was provided (or taken up). In this scenario, the goal of creating and implementing a dietetic intervention is to build a strong rapport and a good therapeutic connection with the patient to encourage attendance and involvement with the program. It is so critical to embody nonjudgmental and person-centered methods. This will enable the delivery of a full package of education, either in a clinical setting or in a group setting, depending on patient preference. But, it is also critical to satisfying the patient's treatment expectations; that is, the patient expects professional counsel and assistance to result in some observable improvement in more immediate outcome measures, such as blood glucose and sense of well-being.

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3.3. Dietetic Plan

The original objective is to give regular (monthly) sessions in the collaborative dietician and diabetic nurse clinics for 3-6 months. During each appointment, Ahmad will see the diabetes nurse for 30 minutes and the dietician for 30 minutes. Between sessions, telephone and email support is available. The sessions will include teaching all elements of type 1 diabetes self-management as well as motivational assistance for implementing newly learned self-management behaviors. Ahmad will be encouraged and supported to participate in a recognized organized type 1 diabetes patient education program. Ahmad recognized the necessity to begin blood glucose monitoring and insulin injections with all meals or appropriate snacks on the first appointment.

Nevertheless, before providing the essential teaching and assistance, it was important to better understand Ahmad's present understanding of diabetes, his hurdles to such adjustments, and prospective insulin requirements to give some early safe, and effective advice. These parts are done in tandem by conducting an informal (non-judgmental, non-threatening) and exploratory dialogue with Ahmad about his present daily routines, how he currently decides on insulin dosages, and what options or choices he may make given the new knowledge accessible to him. The diabetic nurse adjusted Ahmad's baseline insulin (detemir) to split the single dose of 47 units into two 15-unit doses, morning and night.

At the initial session, the basic ideas of carbohydrate estimation and matching insulin dosages to carbs consumed were discussed. Based on Ahmad's diet, current insulin dosages, and predicted carbohydrate consumption, a beginning dose of 2 units of insulin lispro for every 10 g of carbohydrate taken was recommended (referred to as the 'insulin to carbohydrate ratio'). Ahmad would then be obliged to check his blood glucose levels before each meal and before going to bed to assess the appropriateness of this and make any adjustments.

Ahmad missed his next visit and was re-evaluated two months later. His weight had climbed to 63.5 kg, and Ahmad indicated that he had implemented the modifications that had been suggested, and as a consequence, he felt more attentive. Nevertheless, when he turned 19, he claimed that he "went off the rails," which meant that he stopped frequently testing blood glucose and administering insulin during the day. The barriers and reasons for this were investigated, but Ahmad was unable to find any, expressing sorrow and remorse for not continuing the behavior.

A revised strategy was agreed upon in which Ahmad would download the web app onto his smartphone, giving him access to a carbohydrate portion list and using the app as a blood glucose diary. Ahmad also agreed to monitor his blood glucose levels regularly and to inject quick-acting insulin with all meals. Ahmad was eager to participate in the structured education course, therefore it was arranged that information would be supplied by postal mail. A one-month follow-up was agreed upon.

Ahmad did not show up for his follow-up visit and was discharged to be re-referred by his primary care physician, as per the Trust's Access Policy. Calls to Ahmad since this time have resulted in his being rescheduled at the diabetic clinic.

3.4. Several Points for Assessment: Question/ Answers

The questions and answers are the following:

(i) *How Ahmad's Current diabetes control was assessed and what further information was provided?*

The degree and frequency of hypoglycemia (hypos), hypo awareness, hyperglycemia symptoms, the existence of diabetic complications, and so on.

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(ii) *What was Ahmad's body weight and BMI, referred from GP? How could weight loss be related to diabetes control?*
Approximately 5% of weight loss; BMI 22.4 kg/m^2 in 5/12 ago and currently 21.3 kg/m^2. Unintentional weight loss is a potential indicator of hyperglycemia, which Ahmad may be unconscious of.

(iii) *How might he think about his weight and how can it be useful?*
Young individuals, particularly men, who lose weight inadvertently are prone to be dissatisfied with their weight reduction. Anecdotal evidence reveals that individuals frequently express a desire to acquire weight, namely lean muscular mass. Male patients are more likely to be motivated by the potential of increased strength and fitness, as well as cosmetic changes. Understanding the link between blood glucose control, insulin, weight, and body composition may boost the patient's motivation to improve blood glucose control. This is because a very high HbA1c indicates a lack of insulin, which inhibits the capacity to develop muscle or maintain body weight.

(iv) *What relationship of lypohypertrophy with Ahmad's current Health status?*
Lypohypertrophy, often known as 'Lypos,' is a typical condition caused by repeated injections at the same place. It is the buildup of fat and perhaps scar tissue beneath the skin as a result of tissue injury, which resembles a bump. The size of lumps might vary. Injection into these lumps may disrupt insulin absorption, resulting in an insulin time action profile that does not match that predicted, resulting in unexpected effects on blood glucose. Lypohypertrophy can be prevented by rotating the injection location regularly. The lumps will disappear after the afflicted location is no longer utilized for injections, which might take months...

(v) *What is the estimation of Ahmad's Carbohydrate content?*
Depending on whether Ahmad eats the chips, chocolate bar, and snack before night, he will have 19-26 carbohydrate portions (10 g)...

(vi) *What is your opinion on Ahmads' current diet? Either you advise him to take Estrella's plate Now or not?*
Because it is heavy in fat and sugar and poor in vegetables and fruit, Ahmad's diet does not fulfill contemporary health eating standards. While the advice to alter his diet is crucial, its efficacy in regulating blood glucose in type 1 diabetes, that is, without concurrent advice on matching insulin dosages, is limited. At this level, the knowledge and abilities necessary to accomplish carbohydrate estimate and insulin dosage modification should be prioritized. Depending on the patient's priorities, dietary quality might be addressed at a later time.

(vii) *What is your advice to take an evening snack for Ahmad?*
Because of Ahmad's insulin regimen, snacking should be a choice rather than a necessity. Snacks may be required to manage activity or to regulate blood glucose levels before night; however, if this occurs regularly, it may suggest that the insulin dose needs to be adjusted...

(viii) *Why Ahmad stopped engaging with service and what could be your plan to change his behavior?*
Patients discontinue the use of services for a variety of reasons. Perhaps Jack found it too difficult to engage in the self-monitoring tasks discussed in the clinic. However, he may discover that his social life has influenced his diabetes and his desire to engage in essential self-care activities. Jack could have changed employment and won't be able to make it to clinic visits. Patients frequently have preconceived notions about what health professionals would "expect" of them, and they perceive far too many hurdles to a

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healthy therapeutic relationship. The solutions to these difficulties are as diverse as the issues themselves; yet, counseling and communication skills are at the heart of all productive interactions with patients. Superior listening skills, as well as a comprehensive and successful assessment that investigates the patient's desires, anxieties, and comprehension of the issue, are essential. In this scenario, encouraging Jack to participate in a structured education program might have a significant influence because of the interaction he would have with other individuals who have type 1 diabetes. Apart from the instructional component of the course, the emotional support and vicarious learning that occurs in the scenarios are extremely beneficial in encouraging patients. A phone call, rather than a letter, may have a greater impact and might make Jack feel supported in connecting with the program. Lastly, making services flexible and accessible may assist prevent certain patients from disengaging. Are clinics available at the appropriate hours and in the appropriate locations? Can we assist by email, phone, or text message?

(ix) *What structured education course helps you to study type 1 diabetes and what rationale is used for it?*
An organized education program tries to increase a patient's knowledge, abilities, and confidence so that they can take care of their condition more effectively. It should address every element of diabetes, including food, carbohydrate counting, insulin dosages, and foot care. NICE advises that such a program be made available to all newly diagnosed diabetes. Dose Adjustment for Normal Eating (DAFNE) is an example of a type 1 diabetes regimen. After attendance, evidence shows that an improvement in HbA1c of around 1% and significant improvements in quality of life are possible (DAFNE Study Group, 2002). Diabetes Education and Self-management for Continuing and Recently Diagnosed Patients is an example of a type 2 diabetes program (DESMOND).

(x) *What is the dietetic diagnosis?*
The healthy living program dropped (problem) as a result of inadequate transfer from child services (etiology), as demonstrated by appointment cancellations (signs and symptoms).

(xi) *Outcomes measures to assess Ahmad's progress?*
Weight and BMI changes, HbA1C, and patient involvement with services as measured by attendance records might all be outcome metrics.

3.5. Answers to Further Questions

Other questions are the following:

(i) *What are the necessary elements of transition care in DM?*
Transition care must be well-planned, organized, and age-appropriate (Knauth *et al*., 2006). NICE Synopsis Transition recommendations: It is now time to become acquainted with the practicalities of transformation; Agree to local protocols; Transfer at a period of relative stability; Organize age-banded clinics in collaboration with adult colleagues; and Educate young people about changes in diabetes care, such as BG targets and complication screening. During the changeover phase, there is an increased risk of diabetes-related hospitalization. Individuals who were transferred to a new healthcare team but did not change doctors were 77% less likely to be hospitalized. Young individuals who receive less than one appointment per year after transition have higher HbA1c levels, greater hospitalization rates, and a higher risk of diabetes complications (Holmes-Walker *et al*., 2007; Garvey *et al*., 2012).

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(ii) *Insulin Suggestion?*
Attendance at the clinic regularly (3-4 years); The insulin detemir time action profile implies a duration of up to 18 hours. The goal of background insulin is to give a constant supply of insulin throughout the day (Dhatariya *et al*., 2012). According to DAFNE audit statistics, patients with type 1 diabetes who inject background insulin twice a day had a lower HbA1c (Landstedt-Hallin, 2015; Akturk *et al*., 2018).

(iii) *Is it necessary to keep in contact with Ahmad?*
Yes, dated consent and all the records should be kept.

4. CONCLUSION

This paper is a review of a study case regarding nutrition and dietetics concerning diabetes mellitus for type 1 diabetes mellitus. This paper explained the case study, including question and answer, as well as initial data for the patient. This paper can become a reference for medical treatment for patients with diabetes mellitus.

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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