

In the name of God





Nutritional Recommendations for the Diabetes Managements

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OVERVIEW

Healthful eating pattern, regular physical activity, and often pharmacotherapy are key components of diabetes management.

For many individuals with diabetes, the most challenging part of the treatment is determining what to eat?



Diabetes: Treatment Goals

- It is the position of the American Diabetes Association (ADA):
 - **That there is not a “one-size-fits-all” eating pattern for individuals with diabetes**
- A major focus of therapy is related to how well the glycemia is controlled (measured by HbA1c).



Diabetes: Treatment Goals

- The ADA's 'Standards of Medical Care in Diabetes' recommends:
- Lowering HbA1c to $<7.0\%$ in most patients to reduce the incidence of microvascular disease.

This can be achieved with:

- mean plasma glucose of $\sim 150\text{--}160$ mg/dl
- Fasting should be maintained at <130 mg/dl. the postprandial glucose at <180 mg/dl).



Diabetes: Treatment Goals

- More stringent:

- HbA1c targets 6.0–6.5% might be considered in selected patients (with short disease duration,

- less stringent:

- HbA1c targets 7.5–8.0% are appropriate for patients with a history of severe hypoglycaemia, limited life expectancy, advanced complications, extensive co-morbid conditions



Therapeutic options

It is important to individualise treatment targets.

- Overweight or obese individual:
- Weight reduction, achieved through dietary means alone or with adjunctive medical or surgical intervention **to improves glycaemic control.**
- Modest weight loss (5–10%) contributes meaningfully to achieving improved glucose control



Therapeutic options

- At diagnosis, highly motivated patients with HbA1c, near target <7.5% should be given the opportunity to engage in:
- lifestyle change for a period of **3–6** months before embarking on pharmacotherapy (usually metformin).
- Patients should be encouraged to eat healthy foods that are consistent with the prevailing population-wide dietary recommendations



Medical Nutrition Therapy

Address individual nutrition needs

Individualize energy needs. Nutrition care based on metabolic profile, eating habits, lifestyle, and changes person is willing and able to make



Medical Nutrition Therapy

- Specific situations
 - Meet unique needs to youth with type 1 or type 2 diabetes, pregnant and lactating women and older adults with diabetes
 - To maintain the pleasure of eating

Only limiting food choices when indicated by scientific evidence



Recommendations

- **NUTRITION RECOMMENDATIONS AND INTERVENTIONS FOR THE PREVENTION OF DIABETES (pre diabetes to diabetes)**
 - Emphasize lifestyle changes that include moderate weight loss (7% body weight) and regular physical activity (150 min/week), with dietary strategies including reduced calories and reduced intake of dietary fat.
 - dietary fiber (14 g fiber/1,000 kcal) and foods containing whole grains (one-half of grain intake).
 - low– glycemic index foods that are rich in fiber and other important nutrients are to be encouraged



Recommendations

- **NUTRITION RECOMMENDATIONS AND INTERVENTIONS FOR THE MANAGEMENT OF DIABETES (SECONDARY PREVENTION)**
 - dietary pattern that includes carbohydrate from vegetables, fruits, whole grains, legumes, and low-fat milk.
 - Monitoring carbohydrate, by carbohydrate counting, use exchanges list. **Focus on CHO rather than energy**
 - The use of glycemic index and load provide a modest additional benefit over total carbohydrate alone.



Recommendations

- **NUTRITION RECOMMENDATIONS AND INTERVENTIONS FOR THE MANAGEMENT OF DIABETES (SECONDARY PREVENTION)**
 - Sucrose-containing foods can be substituted for other carbohydrates in the meal plan or, if added to the meal plan, covered with insulin or other glucose lowering medications.

Avoid excess energy intake.



Recommendations

- Dietary carbohydrate is the major determinant of postprandial glucose levels.
- Both the quantity and the type or source of carbohydrates found in foods influence postprandial glucose levels.
- The specific type of food ingested, type of starch, style of preparation (cooking method and time, amount of heat or moisture used), ripeness, and degree of processing variables that.
- Macronutrient distribution of the meal in which the food is consumed also will affect.



Recommendations

- Substituting low-glycemic load foods for higher-glycemic load foods may modestly improve glycemic control.
- Fructose consumed (naturally occurring fruit) may result in better glycemic control compared with isocaloric intake of sucrose or starch.
- Fructose is not likely to have detrimental effects on triglycerides if intake is not excessive (more than 12% energy)



Recommendations

- **Resistant-starch**
- It has been proposed that foods containing resistant starch may modify postprandial glycemic response, prevent hypoglycemia, and reduce hyperglycemia.
- However, there are no published long-term studies in subjects with diabetes to prove benefit from the use of resistant starch.



Recommendations

- **Dietary fat and cholesterol in diabetes management**
 - Limit saturated fat to 7% of total calories.
 - Intake of *trans fat should be minimized*.
 - In individuals with diabetes, limit dietary cholesterol to 200 mg/day.
 - Two servings of fish per week provide n-3 polyunsaturated fatty acids.



Recommendations

- In metabolic studies in which energy intake and weight are held constant, diets **low in saturated fatty acids and high in *monounsaturated* fatty acids** lowered plasma LDL cholesterol.
- In people with type 2 diabetes, **a Mediterranean-style, (MUFA)-rich eating pattern** may benefit glycemic control and CVD risk factors and can, therefore, be recommended as an effective alternative to a lower-fat, higher-carbohydrate eating Pattern



Recommendations

- Mediterranean-style eating pattern has been studied extensively over the last decade. Six published RCTs that included individuals with type 2 diabetes reported improved glycemic control and/or blood lipids when MUFA was substituted partially for carbohydrate and/or saturated fats



Recommendations

- In 2011, the Evidence Analysis Library (EAL) of the Academy of Nutrition and Dietetics found strong evidence that dietary MUFAs are associated with improvements in blood lipids based on 13 studies including participants with and without diabetes. According to the EAL, 5% energy replacement of saturated fatty acid (SFA) with MUFA improves insulin responsiveness in insulin-resistant and type 2 diabetic subjects



Recommendations

■ **Omega-3 fatty acids**

- Evidence does not support recommending omega-3 (EPA and DHA) supplements for people with diabetes for the prevention or treatment of cardiovascular events.

- An increase in foods containing EPA and DHA from fatty fish and omega-3 linolenic acid (ALA) is recommended for individuals with diabetes because of their beneficial effects on lipoproteins



Recommendations

- **Omega-3 fatty acids**
- Supplementation with flaxseed (32 g/day) or flaxseed oil (13 g/day) for 12 weeks did not affect glycemic control.
- Three longer-duration studies (4 months-40 months 6.2 years) also reported mixed outcomes.
- Two studies reported no beneficial effects on supplementation



Recommendations

- **Protein in diabetes management**
- For individuals with diabetes and normal renal function, there is insufficient evidence to suggest that usual protein intake (15–20% of energy) should be modified.
- In individuals with type 2 diabetes, ingested protein **can increase insulin response without increasing plasma glucose concentrations.**
- Therefore, protein should not be used to treat acute or prevent night-time hypoglycemia



Recommendations

- High-protein diets are not recommended as a method for weight loss.
- Although such diets may produce short-term weight loss and improved glycemia, but the long-term effects of protein intake of more than 20% of calories on diabetes management and its complications are unknown.



Recommendations

- **Optimal mix of macronutrients**
 - The best mix of carbohydrate, protein, and fat appears to vary depending on individual circumstances.
 - It must be clearly recognized that regardless of the macronutrient mix, total caloric intake must be appropriate to weight management goals.



Recommendations

- Most women need 3-4 carbohydrate choices at each meal.(45-60 gram)
- Male need 4-5 carbohydrate choices at each meal. (60-75)
- With snacks, use 1-2 carbohydrate choices is reasonable.
- Include plenty of fiber in the diet



Recommendations

■ **Micronutrients in diabetes management**

- There is no clear evidence of benefit from vitamin or mineral supplementation in people with diabetes (compared with the general population) who do not have underlying deficiencies.
- Uncontrolled diabetes is often associated with micronutrient deficiencies. Individuals with diabetes should be aware of the importance of acquiring daily vitamin and mineral requirements from natural food sources and a balanced diet



Recommendations

- **Micronutrients in diabetes management**
- In select groups such as the elderly, pregnant or lactating women, strict vegetarians, or those on calorie-restricted diets, a multivitamin supplement may be needed.



Recommendations

■ **Micronutrients in diabetes management**

- Routine supplementation with antioxidants, such as vitamins E and C and carotene, is not advised because of lack of evidence of efficacy and concern related to long-term safety
- Benefit from chromium supplementation in individuals with diabetes or obesity has not been clearly demonstrated and therefore can not be recommended.



Recommendations

- **Antioxidants in diabetes management**
- Clinical trial data not only indicate the lack of benefit with respect to glycemic control and progression of complications but also provide evidence of the potential harm of vitamin E, carotene, and other antioxidant supplements.
- In addition, available data do not support the use of antioxidant supplements for CVD risk reduction.



Recommendations

- **Chromium, other minerals, and herbs in diabetes management**

- Chromium, potassium, magnesium, and possibly zinc deficiency may aggravate carbohydrate intolerance.

- In the late 1990s, a few randomized placebo-controlled studies found that chromium supplementation had beneficial effects on glycemia

- Cefalu WT, Hu FB: Role of chromium in human health and in diabetes. *Diabetes Care* 27:2741–2751, 2004

- Ryan GJ, Wanko NS, Redman AR, Cook CB: Chromium as adjunctive treatment for type 2 diabetes. *Ann Pharmacother* 37:876–885, 2003



Recommendations

- **Nutrition intervention for specific population**

- For individuals with type 1 diabetes, insulin therapy should be integrated into an individual's dietary and physical activity pattern.
- Individuals using rapid-acting insulin should adjust the meal and snack insulin doses based on the carbohydrate content of the meals and snacks



Recommendations

- **Nutrition intervention for specific population**
 - For individuals using fixed daily insulin doses, carbohydrate intake on a day-to day basis should be kept consistent with respect to time and amount.
 - For planned exercise, insulin doses can be adjusted. For unplanned exercise, extra carbohydrate may be needed



Recommendations

- **Nutrition interventions for pregnancy and lactation with diabetes**

- Adequate energy intake that provides appropriate weight gain is recommended during pregnancy. Weight loss is not recommended; however, for overweight and obese women with GDM, modest energy and carbohydrate restriction may be appropriate.



Recommendations

- **Nutrition interventions for pregnancy and lactation with diabetes**
 - Pre-pregnancy MNT includes an individualized prenatal meal plan to optimize blood glucose control.
 - During pregnancy, the distribution of energy and carbohydrate should be based on the woman's food and eating habits and plasma glucose responses.



Recommendations

- Consistency
- In times and amounts of CHO containing food eaten are important to avoidance of hypoglycemia due to the continuous fetal draw of glucose from the mother Plasma glucose.



Recommendations

- **Nutrition interventions for pregnancy and lactation with diabetes**
 - MNT for GDM primarily involves a **carbohydrate-controlled meal plan** that promotes optimal nutrition for maternal and fetal health with adequate energy for appropriate gestational weight gain, achievement and maintenance of normoglycemia, and absence of ketosis.



Recommendations

- **Nutrition interventions for pregnancy and lactation with diabetes**
 - Hypocaloric diets in obese women with GDM can result in ketonemia and ketonuria.
 - However, moderate caloric restriction (reduction by 15-30% of estimated energy needs) in obese women with GDM may improve glycemic control without ketonemia and reduce maternal weight gain.



Recommendations

- The amount and distribution of carbohydrate should be based on clinical outcome measures (hunger, plasma glucose levels, weight gain, ketone levels). A minimum of 175 g carbohydrate/ day should be provided.
- Carbohydrate should be distributed throughout the day in **three small- to moderate-sized meals** and **two to four snacks**. An evening snack may be needed to prevent accelerated ketosis overnight



Recommendations

- For GDM patients carbohydrate is generally less well tolerated at breakfast than at other meals.
- Breastfeeding is recommended for infants of women with pre-existing diabetes or GDM.
- Lifestyle modifications after pregnancy aimed at reducing weight and increasing physical activity are recommended, they reduce the risk of subsequent diabetes.



Recommendations

- **Nutrition interventions for pregnancy and lactation with diabetes**

- Lactating women have reported fluctuations in blood glucose related to nursing sessions, often requiring a snack containing carbohydrate before or during breastfeeding
- In most situations, breast-feeding mothers require less insulin because of the calories expended with nursing.



Recommendations

- **Nutrition recommendation for controlling diabetes (tertiary prevention)**
- Microvascular complications
- Normal protein intake (15–20% of energy) does not appear to be associated with risk of developing diabetic nephropathy.
- In individuals with diabetes and macroalbuminuria, reducing protein from all sources to **0.8 g/kg body wt** has been associated with slowing the decline in renal function.



Recommendations

- **Nutrition recommendation for controlling diabetes (tertiary prevention)**
- For patients with diabetes at risk for CVD, diets high in fruits, vegetables, whole grains, and nuts may reduce the risk.
- For patients with diabetes and symptomatic heart failure, dietary sodium intake of 2,000 mg/day may reduce symptoms.



Recommendations

- **Nutrition recommendation for controlling diabetes (tertiary prevention)**
- In normotensive and hypertensive individuals, a reduced sodium intake (2,300 mg/day) with a diet high in fruits, vegetables, and low-fat dairy products lowers blood pressure.



Recommendations

- **Nutrition recommendation for treating hypoglycemia (tertiary prevention)**
- Ingestion of 15–20 g glucose is the preferred treatment for hypoglycemia, although any form of carbohydrate that contains glucose may be used.
- The response to treatment of hypoglycemia should be apparent in 10–20 min; however, plasma glucose should be tested again in 60 min, as additional treatment may be necessary.



Recommendations

- **Nutritional intervention for acute complication**
- **Acute illness**
- During acute illnesses, insulin and oral glucose-lowering medications should be continued.
- Drinking adequate amounts of fluids, and ingesting carbohydrate are important.

Recommendations



■ Summary

- Low-carbohydrate diets are not recommended.
- Factors influencing glycemic response to foods: glycemic index (GI) and glycemic load (GL)
- Carbohydrate counting; focus on carbohydrate more than total energy
- Provide consistent amount of carbohydrate with each meal and snack especially for those on a set insulin.
- portions of food containing 15 g carbohydrate
- Exchange lists



Recommendations

■ Summary

- Limit sodium intake to 2,300 mg/day
- Priority should be given to coordinating food with type of insulin for those individuals on insulin
- For individuals who take hypoglycemic medication, Moderate amounts of carbohydrate at each meal and snacks.



Recommendations

■ Summary

- To reduce risk of hypoglycemia:
- Moderate amounts of carbohydrates at each meal and snacks.
- Do not skip meals.
- Physical activity may result in low blood glucose depending on when it is performed.
- Always carry a source of carbohydrates to reduce risk of hypoglycemia

Thank You for Your Attention





Case study

- A 48 years old admistratior woman have type 2 diabetes for 7 years
- WT 95 kl
- HT 169
- FBS 198
- 2PP 342
- T cholesterol 247
- LDL-C 128
- HDL-C 42