**Community & Family medicine**

**Medical nutritional therapy of diabetes mellitus**

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**SIGNIFICANCE OF NUTRITION IN DIABETES**

Diabetes is a metabolic disorder affecting carbohydrate, fat and protein metabolism

MNT plays a major role in:

• Regulating CHO, fat and protein homeostasis

• For the safe and effective use of insulin and OHA.

**Goals of MNT:**

1. **Maintenance of as near normal BG levels as possible .**
2. **Decrease fat intake to achieve optimal serum lipid levels.**
3. **Prevention and treatment of the acute or chronic complications .**
4. **Improvement of overall health through optimal nutrition**
5. **Encourage weight loss.**

 **ROLE OF MEDICAL NUTRITION THERAPIST IN DM**

1. “To help people maintain glycemic control through right choices of foods,

2. To assist and facilitate individual lifestyle and behavior changes that will lead to improved metabolic control.”

**GLYCEMIC INDEX OF FOODS**

**The glycemic index (GI) is a measure of the blood glucose-raising potential of the carbohydrate content of a food compared to a reference food (generally pure glucose). Carbohydrate-containing foods can be classified as high- (≥70), moderate- (56-69), or low-GI (≤55) relative to pure glucose (GI=100).**

§Foods that have a low glycemic index will have little effect on the body’s sugar levels.

§Comparatively, foods that have a high glycemic index will have an instant effect on blood sugar levels.

**FACTORS AFFECTING GLYCAEMIC INDEX**

• Rate of ingestion.

• Presence of gastro paresis.

• Effect of cooking methods:

1.Steam, Moist heat cooking : increases GI

2.Dry heat cooking, deep fat frying: Decrease-GI

**CARBOHYDRATE IN DM-QUALITY VS QUANTITY.**

Slow release CHO(CHO with fibre) should be preferred over fast release (CHO with

out fibre) in type 2 DM as the insulin secretion is blunt and

release is slow.

• RESISTANT STARCH should be used.

**PROTEIN IN DM- QUALITY VS QUANTITY**

• Protein in Diabetic Nutritional Therapy should be classified as

• Fast turn over - curd casein.

• Slow turn over -Veg. Protein, soya protein.

• Quantity- depends on metabolic and nutritional needs, associated complications- increase infection, post major surgery/ decrease nephropathy.

**SOYA: A UNIQUE PROTEIN**

Soya bean is a rich source protein

**EFFECT OF SOYA IN DIABETES**

• Soya fibers reduces insulin requirement in diabetes.

• Soya beans have a very useful effect in dietary management of protein quality and amino acid content.

Soya protein contains large amount of glycine and arginine which tend to reduce blood insulin level.

Low blood glucose insulin decrease hepatic synthesis of cholesterol.

• In contrast, animal protein are low in glycine and arginine and high in lysine.

Lysine raises insulin levels and promotes cholesterol synthesis.

**Fiber**

Lowers Post prandial blood glucose through the followings:

ØAlters the rate of nutrient absorption from GI tract

ØProvide physical barrier which protects carbohydrates

from enzymatic digestion

ØReduces the rate of intestinal absorption of carbohydrates and other nutrients

ØReduces the glucagon and somatostatin secretions

 associated with fall in blood glucose level

ØAttenuates hepatic glucose output

ØDecreases fasting & post prandial serum triglycerides

Fiber: Recommended intake- 20g/1000 kcals, in ratio of 50:50

***Insoluble fibers***

* Satiety value

 • Helps in weight reduction

 • Prevents constipation & colon cancer

 • Sources – bran, whole grains, vegetables, fruits .

***Soluble fibers***

* Digestion & absorption of glucose delayed

 • Reduces cholesterol & triglycerides

 • Sources – oats, legumes, barley, , beans, carrots, apples

**FRUCTOSE**

• Fructose is a monosaccharide, that has the same chemical formula as glucose but a different molecular structure. Sometimes called fruit sugar, fructose is found in fruit, some vegetables, honey.

 • Because fructose does not increase blood glucose and does not require insulin, individuals with diabetes can often tolerate it better than other sugars.

**MICRONUTRIENTS IN DM**

• When dietary intake is adequate, there is generally no need for additional vitamin and mineral supplementation for the majority of people with diabetes.

• Restricted diets are usually require supplementation.

**Meal time**

• Food is distributed in 3 main meals with 2 small mid meals/snacks.

 • Small snack options are given which generally include fruit.

 • Mid time drink includes tea, coffee, green tea, herbal tea , soup etc.

**FREE FOODS**

Foods that can be eaten in unlimited amounts

1. Vegetables.

2. Clear soups

3. skimmed milk (without sugar)

**MNT FOR CVD RISK**

HbA1C as close as normal without hypoglycemia.

• MNT high in fruits, vegetables, whole grains and nuts.

• Sodium intake < 2gm/day .

• Modest amount of weight loss benefits reduction of BP.

**MNT IN GDM(gestational diabetes)**

Adequate energy intake for weight gain.

• Weight loss is not recommended.

• For overweight and obese GDM women – modest energy and carbohydrate restriction is appropriate.

• Ketonimia from ketoacidosis or starvation ketosis should be avoided.

• Risk factor for subsequent type 2 DM post partum, therefore weight reduction, lifestyle modification and increased physical activity recommended

**EXERCISE**

No MNT is complete without a well-balanced exercise program (150 min/week).

While most people think of exercise as a way to reduce body weight (especially since 80% of diabetes are obese), exercise reduces insulin resistance .



