What’s New in Nutrition Recommendations for People with Diabetes

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Upon completion of this activity, participants will be able to:

1. Describe expert consensus relative to nutrition therapy for adults with diabetes
2. Discuss latest expert opinion regarding nutrition recommendations for adults with prediabetes
No disclosures at this time
What patients with diabetes hear

- You need to get your sugars down.
- Cut the sugar from your diet.
- You need to eat healthy!
- You should go on a diet!
- You should cut your calories.
- You need to lose weight.
- You need to eat less fat.
• Prevention/Prediabetes
• Eating Patterns
• Emphasis on options for weight loss and management
• Gastroparesis
• Protein/Fat effect on insulin dosing
MNT is effective in improving outcomes

A1c reduction can be similar to or greater than what would be expected with treatment using currently available medication for diabetes.

- Type 2 Diabetes: Up to 2.0% decrease at 3-6 months
- Type 1 Diabetes: Up to 1.9% decrease at 3-6 months

Ongoing MNT support is helpful in maintaining glycemic improvements.

### Goals of Nutrition Therapy

<table>
<thead>
<tr>
<th>Goals of Nutrition Therapy</th>
<th>To address individual nutrition needs based on:</th>
</tr>
</thead>
<tbody>
<tr>
<td>To promote and support healthful eating patterns, emphasizing a variety of nutrient-dense</td>
<td>1. Personal and cultural preferences</td>
</tr>
<tr>
<td>food in appropriate portion sizes, in order to improve overall health</td>
<td>2. Health literacy and numeracy</td>
</tr>
<tr>
<td>1. Improve A1c, blood pressure and cholesterol levels</td>
<td>3. Access to healthful food choices</td>
</tr>
<tr>
<td>2. Achieve and maintain body weight goals</td>
<td>4. Willingness and ability to make behavioral changes</td>
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<tr>
<td>3. Delay or prevent complications of diabetes</td>
<td>5. Barriers to change</td>
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<tr>
<td>To maintain the pleasure of eating by providing positive messages about food choice, while</td>
<td>To provide the individual with diabetes with practical tools for day-to-day meal planning</td>
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<td>limiting food choices only when indicated by scientific evidence</td>
<td></td>
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</tbody>
</table>
DSME and MNT Education Algorithm

- At diagnosis
- Annual assessment
- When complicating factors influence self-management
- Transition in care

Diabetes Care, 2015;38:1372-1382.
Macronutrients for Diabetes

What should the breakdown be?

• No ideal percentage of calories from carbohydrate, protein and fat
• Macronutrient proportions and distribution should be individualized.
• People with diabetes consume the same macronutrient mix of the general public:
  • 45% carbohydrate
  • 36-40% fat
  • 16-18% protein

Carbohydrate Needs

CHO ≠ CHO ≠ CHO

Not all carbs are created equal.

Whole vs Processed
What about fiber?

- Adequate fiber intake is associated with lower all-cause mortality in people with diabetes.
- Average American gets roughly 15 grams fiber on a daily basis.
- DGA 2015-2020: Minimum of 14 g per 1,000 kcal
  - $\frac{1}{2}$ grain consumption in whole intact grains
- Modest A1c ↓ with intake above 50 grams daily ($0.2$-$0.3\%$ ↓)


Limited research in people with diabetes or prediabetes without kidney disease

2013 meta-analysis

• 25-32% protein vs. 15-20% protein
• Higher protein eating plan
  • 2 kg greater weight loss
  • 0.5% greater reduction in A1c
  • No difference in FPG, serum lipid profiles, BP

Fat and Cholesterol Needs

- 20-35% of total caloric intake
- Eating patterns that replace some CHO food with foods higher in total fat have shown improvements in glycemia and certain CVD risk factors
  - HDL-C and TG
- Synthetic sources of trans fat should be minimized.
- Cholesterol intake does not correlate with CVD events

Nutrition Therapies for Prediabetes

• DPP demonstrated that intensive lifestyle intervention with weight loss decreased incidence of Type 2 diabetes by 58% over 3 years.

• And it’s sustainable:
  • Da Quing Diabetes Prevention Study: 43% at 20 years
  • Finnish Diabetes Prevention Study (DPS): 43% at 7 years
  • U.S. Diabetes Prevention Program Outcomes Study (DPPOS):
    • 34% at 10 years
    • 27% 15 years
Goals for DPP

- Year long program
- To achieve 5 to 7% weight loss from baseline body weight
- At least 150 minutes weekly of purposeful physical activity
- Self-monitoring of diet and physical activity
Eating Patterns

- There are lots of choices out there today.
- Patients need guidance to plan when, what and how much to eat on a daily basis.
Mediterranean-Style Eating Pattern

Mixed effect on A1c, weight and lipids

Potential Benefits:
- Reduced risk of diabetes
- Lowered triglycerides
- A1c reduction
- Reduced risk of major cardiovascular events

**PREDIMED**

- Compared Mediterranean and low-fat
- Glycemic management improved and need for glucose lowering medications was lower in Mediterranean group.
- Intervention enriched with olive oil or nuts ↓ CVD incidence in people with and without diabetes.

**DIRECT**

- Calorie-restricted Mediterranean, calorie-restricted lower-fat or low-CHO without calorie restriction
- Fasting glucose lower in Mediterranean group
- A1c lowest in low-CHO group

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Mediterranean-Style Eating Pattern

- Plant-based food
  - Vegetables, beans, nuts, seeds, fruit and whole intact grains
- Fish and other seafood
- Olive oil principal source of dietary fat
- Dairy in low to moderate amounts
- Fewer than 4 eggs per week
- Red meat in low frequency and quantity
- Wine in low to moderate amounts
- Concentrated sugar or honey rarely
Vegetarian or Vegan Eating Pattern

Mixed results on glycemia and CVD risk factors

Potential Benefits

- Reduced risk of diabetes
- A1c reduction
- Weight loss
- Lowered LDL-C and non-HDL-C

Two large studies showed that vegetarian and vegan eating plans reduced A1c by an average of 0.3-0.4% in people with Type 2 diabetes.

Larger meta-analysis showed that plant-based eating:

<table>
<thead>
<tr>
<th>Lowered</th>
<th>No Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (2 kg)</td>
<td>Fasting insulin</td>
</tr>
<tr>
<td>Waist circumference</td>
<td>HDL-C</td>
</tr>
<tr>
<td>LDL-C</td>
<td>Triglycerides</td>
</tr>
<tr>
<td>Non-HDL-C</td>
<td>Blood Pressure</td>
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Yokoyama Y, et al. Cardiovasc Daign Ther 2014  Viguiliouk E; Clin Nutr, 2018
# Vegetarian/Vegan Eating Pattern

<table>
<thead>
<tr>
<th>Eating Pattern</th>
<th>Foods Excluded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lacto-ovo-vegetarianism</td>
<td>Meat, poultry, fish, seafood</td>
</tr>
<tr>
<td>Lacto-vegetarianism</td>
<td>Meat, poultry, fish, seafood, eggs</td>
</tr>
<tr>
<td>Vegan</td>
<td>Meat, poultry, fish, seafood, eggs, dairy products (All flesh foods and animal derived products)</td>
</tr>
</tbody>
</table>
Low Fat

Lowering fat intake does not consistently improve glycemia or CVD risk factors in people with Type 2 diabetes.

Benefits from a low-fat eating pattern are mostly related to weight loss as opposed to the eating pattern itself.

Very Low Fat

May improve glucose levels, weight, blood pressure and HDL-C

Mixed effect on triglycerides

<table>
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<tr>
<th>Low-Fat</th>
<th>Very Low-fat</th>
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</thead>
</table>
| - Emphasizes vegetables, fruits, starches, lean protein sources and low-fat dairy products  
- ≤ 30% total fat intake and ≤ 10% saturated fat | - Emphasizes fiber-rich vegetables, beans, fruit, whole intact grains, nonfat dairy, fish and egg whites  
- 70-77% carbohydrate (including 30-60g fiber)  
- 10% fat and 13-20% protein |

Dietary Approaches to Stop Hypertension (DASH)

- Reduced risk of diabetes
- Weight loss
- Lowered blood pressure

Emphasizes vegetables, fruits, and low-fat dairy products

Includes whole, intact grains, poultry, fish and nuts

Reduced in saturated fat, red meat, sweets, and sugar-containing beverages

May also be reduced in sodium

Paleo Eating Pattern

• Emphasizes foods theoretically eaten regularly during early human evolution, such as lean meat, fish, shellfish, vegetables, eggs, nuts and berries

• Avoids grains, dairy, salt, refined fats and sugar

Few, small studies

Mixed effects on A1c, weight and lipids

Inconclusive evidence

Carbohydrate Eating Patterns

Low Carbohydrate

• A1c reduction
• Weight Loss
• Lowered blood pressure
• Increased HDL
• Lowered triglycerides

Very Low Carbohydrate

• A1c reduction
• Weight Loss
• Lowered blood pressure
• Increased HDL
• Lowered triglycerides

Low Carbohydrate Eating Pattern

- Low carbohydrate vegetables
- Salad greens, broccoli, cauliflower, cucumber, cabbage, etc.
- Fat from animal foods, oils, butter and avocado
- Protein in all forms
  - Meat, poultry, fish, shellfish, eggs, cheese, nuts and seeds
- Some include fruit

26-45% total calories
Very Low-Carbohydrate Eating Pattern

• Further limits carbohydrate containing foods
• Derives more than \( \frac{1}{2} \) calories from fat
• Goal of 20-50g of nonfiber CHO/day to induce nutritional ketosis

<26% total calories
• One size does not fit all.
• A variety of eating patterns are acceptable for the management of diabetes.
• Evidence suggests certain eating patterns may be better for specific outcomes.

Emphasize non-starchy vegetables.

Minimize added sugars and refined grains.

Choose whole foods over highly processed foods to the extent possible.
Weight Loss and Weight Management

No threshold of weight loss for maximum benefits
- 5-7% for therapeutic advantages
- 15% or more associated with better outcomes in Type 2 diabetes
- 7-10% for prediabetes

Overweight and obesity are increasing in individuals with Type 1 diabetes.

Weight Loss and Weight Management

Question: What is the best weight loss plan for individuals with diabetes?

Answer: Creates an energy deficit
Macronutrient composition
Eating patterns
Gastroparesis Recommendations

• Correct hyperglycemia
• Smaller, more frequent meals
• Replacing solid food with a greater portion of liquid calories
• Selection of small-particle size foods may decrease symptom severity.
  • “Food easy to mash with a fork” <2mm

Protein/Fat Effect on Insulin Dosing

• Glucose response to mixed meals high in protein and/or fat along with carbohydrate vary among individuals.
• Insulin dosing may not be based on just carbohydrate.
• Cautious approach to increased insulin dosing for high fat and/or protein mixed meals
  • Address delayed hyperglycemia 3 or more hours
  • Split-bolusing
  • CGM

Issues with Nutrition Research

- Large, rigorous clinical trials lacking
- Most studies short-term
- Controlling intervention arms difficult and/or costly
- Can study outcomes be implemented long-term?
Individualized Meal Plan

- Physical Activity
- Dietary Preferences
- Health Literacy
- Meal Preparation Skills
- Resources
- Food Availability
Questions