More than three out of four adults with type 2 diabetes are at least overweight, and nearly half of individuals are obese. Weight loss has long been a recommended strategy for individuals with diabetes, but for many successful weight loss remains elusive. How much weight does an individual with diabetes need to lose to be successful? What is our definition of success in terms of health outcomes? How much emphasis in diabetes practice should we place on weight loss in our discussions with individuals?

Research does suggest that modest weight loss may have clinical benefits (improved glycemia, blood pressure and/or lipids) in some individuals with diabetes, however, what lifestyle interventions will achieve that "modest" weight loss is not as clear. In a recent systematic review and meta-analysis (Franz, 2015), the majority of lifestyle weight-loss interventions in overweight or obese adults with type 2 did not result in modest weight loss (most interventions produced <5% weight loss). A weight loss of >5% appeared to be necessary to achieve beneficial effects on A1C, lipids and blood pressure. However, achieving this level of weight loss required intensive interventions that included energy restriction, regular physical activity, and frequent contact with health professionals. Intensive interventions may not be practical for most health care settings, but does that mean we should not recommend weight loss for our overweight or obese patients? In this presentation, we will explore the evidence on lifestyle weight loss interventions for type 2 diabetes and its applications to practice.

References:


Weight Loss for Type 2 Diabetes: Nice, But Necessary?

Jackie Boucher, MS, RDN, CDE
Children’s HeartLink
jackie@childrensheartlink.org

Thank you to Marion Franz, MS, RDN, CDE for sharing her slides with me for this presentation!

Objectives

- Discuss current evidence on lifestyle weight loss interventions and health outcomes for individuals with type 2 diabetes.
- Recommend effective nutrition therapy interventions in type 2 diabetes

The Evolution of Nutrition Therapy for Diabetes Management

- Starvation Diet (1910-1921)
  - Fasting
  - Alcohol for comfort

- Discovery of Insulin (1922)
  - Limited supply
  - Diet still core to therapy
  - Role of exercise evolving

- Macronutrient Focus (prior to 1994)
  - Prescriptive macronutrient percentages
  - Inflexible

- Current Day
  - Flexible
  - Individualized therapy
  - Focus on quality of food choices and portion sizes

Carb 50%
Pro 20%
Fat 30%

Goals of Nutrition Therapy for Adults with Diabetes

- To promote and support healthful eating patterns, emphasizing a variety of nutrient-dense foods in appropriate portion sizes, in order to improve overall health and to attain the following goals:
  - A1C <7%
  - Blood pressure <140/80 mmHg
  - LDL <100 mg/dL; TG < 150 mg/dL; HDL >50 mg/dL men and >50 mg/dL for women
  - Body weight goals
  - Delay or prevent diabetes complications

Goals of Nutrition Therapy for Adults with Diabetes (continued)

- To address individual nutrition needs based on personal and cultural preferences, health literacy and numeracy, access to healthy food choices, willingness and ability to make behavioral changes, as well as barriers to change.
- To maintain the pleasure of eating by providing positive messages about food choices while limiting food choices only when indicated by scientific evidence.


Weight Loss (Energy Balance)

- We know more than 3 out of every 4 people with diabetes are at least overweight and nearly half of all individuals with diabetes are overweight.
- Often because of the relationship between body weight (i.e., adiposity) and insulin resistance weight loss has been recommended as a strategy for adults with diabetes.
- Yet we also know weight loss is challenging, and there is no optimal macronutrient intake to support reduction in excess body weight.


Type 2 Diabetes: A Progressive Disease

BG remains normal until insulin deficiency

Causes of Overweight and Obesity

- Genes
- Factors involved in energy homeostasis
  - Metabolic mechanisms that impact on physiological risk: hormones that influence appetite, satiety, and fat distribution (leptin, insulin, ghrelin, adiponectin, and others)
  - Adaptation of thermogenesis
- Environment
  - Changes in eating and physical activity
Role of Weight Loss Interventions in the Treatment of Overweight and Obesity

- Weight loss interventions in the general public:
  - At ~6 months individuals can lose 5% to 10% of their starting weight
  - Regardless of the intervention, plateaus and regain of weight loss are expected; compensatory mechanisms protect against weight loss
  - If treatment is discontinued, weight gain occurs
  - With support, modest weight loss can be maintained


Average Weight Loss Per Subject Completing a Minimum 1-Yr Intervention
80 studies; 26,455 subjects; 18,199 completers (69%)

<table>
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Weight Loss (Energy Balance)
(continued)
- The literature does not support one nutrition therapy approach to reduce excess weight, but rather eating patterns that reduce energy intake.
- A weight loss of >6 kg (~7-8.5% loss of initial body weight), regular physical activity and frequent contact with RDs appear important for consistent beneficial effects of weight loss interventions.
- Strategies associated with successful weight loss included: weekly self-weighing, eating breakfast, reduced intake of fast foods, increasing physical activity, reducing portion sizes, using meal replacements and choosing healthful foods.


The AHA/ACC/TOS Obesity Guidelines
- Reviewed 15 dietary approaches for weight loss in overweight and obese adults and concluded that all of them were associated with weight loss if reduction in dietary energy intake is achieved. (High)
- The principle components of effective weight loss interventions include: prescription of a moderately-reduced calorie eating pattern; a program of increased PA, and use of behavioral strategies to facilitate adherence to nutrition therapy and activity recommendations (High)


Comparison of WLI with Different Percentages of Fat, Protein, and Carbohydrates
- 811 adults (80% completers) randomized to 15% vs 25% protein, 20% vs 40% fat, 35% vs 65% CHO diets
  - At 6 mo subjects in each diet group lost an ave of 6 kg (7%) and began to regain weight after 12 mo
  - At 2-y, all completers lost an ave of 4 kg
  - Satiety, hunger, satisfaction with diet, and attendance at group sessions similar for diets
  - All diet improved lipid-related risks, fasting insulin levels, and ↓ BP 1-2 mm Hg


Conclusions from Comparison of WLI
- Calories count—not macronutrients!!
- Multiple encounters are needed (59 group and 13 individual counseling sessions offered)
- "Any type of weight loss diet taught with enthusiasm and persistence can be effective."
- "Thus, even these highly motivated, intelligent participants who were coached by expert professionals could not achieve the weight losses needed to reverse the obesity epidemic."

What Are The Benefits From Modest Weight Loss (~5% of Initial Weight)?

- Prevention or delay of type 2 diabetes
- Decreases in systolic and diastolic blood pressure in dose-dependent fashion
- Decreases in circulating inflammatory markers (C-reactive protein and cytokines)
- Potential improvement in triglyceride levels, total and LDL cholesterol


Role of Weight Loss Interventions in Prevention/Delay of Type 2 Diabetes

- Placebo
- Metformin
- Intensive Lifestyle

Base BW (kg)

<table>
<thead>
<tr>
<th>Years after Randomization</th>
<th>Placebo</th>
<th>Metformin</th>
<th>Intensive Lifestyle</th>
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Recommendations for Weight Loss from Academy of Nutrition and Dietetics

- Encourage reduced energy healthful eating plan for overweight or obese adults with diabetes. (Consensus)
- For overweight or obese adults with diabetes, the RDN should encourage a reduced energy, healthful eating plan, with a goal of weight loss, weight loss maintenance and prevention of weight gain.
- Studies based on reduced energy interventions reported significant reductions in HbA1c of 0.3% to 2.0% in adults with type 2 diabetes and of 1.0% to 1.9% in adults with type 1 diabetes, as well as optimization of medication therapy and improved quality of life.

Role of Weight Loss in Early-Onset of Type 2 Diabetes

- Low-calorie Mediterranean-style eating pattern: enrolled only individuals with newly diagnosed diabetes
  - Weight loss at 1-yr: —6.2kg; 4-yr: —3.8 kg
  - A1C improvements at 1 year: —1.2%; 4-yr: —0.9%
- Retrospective cohort study, newly diagnosed (n=2,574) pts with T2DM
  - 12.2% lost 10.7 kg by 18 mo with regain by 36-mo
  - 4-yr A1C 6.4% despite weight gain vs weight stable 6.9%; blood pressure also better


Role of Weight Loss in Early-Onset of Type 2 Diabetes

- UKPDS: 4.5 kg mean ↓; A1C 2% ↓ from diagnosis

Conventional Group

Intensive Group

“...reduction of energy intake is as important, if not more important, than the actual weight lost in determining the fasting plasma glucose.”

Role of Weight Loss in Longer Duration of Type 2 Diabetes

- Is it more difficult for persons with diabetes to lose weight?
- When and how much weight loss is effective for overweight and/or obese persons with diabetes?
- So, if weight loss is not effective, what nutrition therapy interventions are?

The Dilemma of Weight Loss in Diabetes

- "Diet" doesn't fail—the beta cells of the pancreas fail
- Insulin resistance
  - Modest amounts of weight loss (and physical activity) can prevent or delay type 2 diabetes
  - Weight loss after initial diagnosis may improve risk factors
- Insulin deficiency
  - Focus is on nutrition strategies for normalization of blood glucose levels, lipids and blood pressure
  - A reduced energy intake continues to be effective but may not result in weight loss

Weight Loss Intervention Studies in Type 2 Diabetes

- What are outcomes from WLI resulting in weight losses > or < than 5% at 12 months? What are the outcomes from differing macronutrient percentages in WLI?
- Systematic Review and Meta-Analysis: 1-yr study duration; 70% completion rate; 2000 to 2013
- 11 studies (5 >1-yr): 8 compared weight loss interventions (WLI) and 3 compared WLI to usual care or control (19 WLI groups)
- Weight, A1C, lipid, and BP effectiveness

Systematic Review cont.

- Weight losses at 1-yr:
  - <5%: 17 interventions: -1.9 to 4.8 kg
    - Smallest: low carbohydrate -1.9 kg
  - >5%: 2, Mediterranean-style -6.2 kg; ILI -8.4 kg
- Meta-analysis study groups wt loss <5%:
  - NS benefits on A1C, lipids, or blood pressure at 1-yr
- 2 study groups with wt loss >5%
  - MED-style in newly diagnosed adults and ILI in the Look AHEAD trial: significant benefits on A1C, lipids, and BP
  - Both included regular physical activity and frequent contacts with health professionals

Average Weight Loss/Maintenance in Persons with Type 2 Diabetes

- (11 studies; 6,710 participants)

Why doesn't weight loss always lead to improved glycemia?

- Usual weight loss therapies do not lead to adequate weight loss
  - OR
- Persons are primarily insulin deficient—need medications to be combined with nutrition therapy
  - OR
- Energy restriction leads to improved glycemia, not weight loss per se
Comparison Among Named Diet Programs

- Meta-analysis to determine weight loss outcomes for popular diets based on macronutrient composition.
- Searched 6 databases (from inception to April 2014).
- Overweight/obese adults (BMI > 25) with follow-up data of at least 3 months.
- Main outcomes: weight loss and BMI at 6 and 12 month follow-up.
- 59 eligible articles with 48 unique randomized trials.


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Comparison Among Named Diet Programs

- Both low-carbohydrate and low-fat diets were associated with an estimated 8-kg weight loss at 6 month follow-up compared with no diet. Behavioral support and exercise enhanced weight loss.
- Approximately 1 to 2 kg of this effect was lost by 12 month follow-up.
- Author conclusion: “These findings support recent recommendations for weight loss in that most calorie-reducing diets result in clinically important weight loss as long as the diet is maintained. This supports the practice of recommending any diet that a patient will adhere too…”


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JAMA Editorial by Linda VanHorn

- In response to the meta-analysis, editorial: “A Diet by Any Other Name Is Still About Energy”
- Key Points She Emphasized:
  - In the meta-analysis, the LEARN program and moderate macronutrient diets (including Biggest Loser, Jenny Craig, Nutrisystem, Volumetrics, and Weight Watchers) were associated with loss of body weight of about 2 kg less overall than comparison.
  - There are more low-carbohydrate diet (Atkins, Zone, and South Beach) studies reported than any other diet.
  - Results emphasize weight loss but what about nutrient quality, and long-term adherence?

VanHorn L. JAMA. 2014;312:900-901.

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The Pounds Lost Trial

RCT testing 4 weight-loss arms:

- Low-fat, average protein diet (20% fat, 15% protein, 65% carb)
- Low-fat, high-protein diet (20% fat, 25% protein, 55% carb)
- High-fat, average protein diet (40% fat, 15% protein, and 45% carbohydrate)
- High-fat, high protein diet (40% fat, 25% protein, and 35% carb)

In addition, saturated fat was 8% or less of calories per day, dietary fiber was 20g/d or higher and it was reduced in cholesterol.


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The Pounds Lost Trial (cont.)

- Weight losses were similar across all 4 diets at 2 years.
- Specific components of weight loss (body fat, abdominal fat, hepatic fat) were also similar with no differences in lean body mass.
- No differences in food cravings or mood changes. Weight loss was associated with significant reductions in cravings for fats, sweets, and starches while cravings for fruits and vegetables increased!


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Weight Loss Maintenance

- In Look AHEAD, 42% of the 887 participants who lost at least 10% of their body weight at year 1 maintained at least 10% weight loss at 4 years.
- In the National Weight Control Registry (which includes people who have lost >30 pounds and maintained for ≥1 year, the following was observed:
  - Mean weight loss was 31.3 kg at baseline, 23.8 kg at 5 years and 23.1 kg at 10 years.
  - More than 87% of participants were estimated to be still maintaining at least 10% weight loss at years 5 and 10.

Is Nutrition Therapy for Diabetes Effective?
If So, What Nutrition Therapy Interventions Are Effective?

- Academy of Nutrition and Dietetics
- Adults with T2DM: 14 studies; n=2,137; nutrition therapy provided by RDNs
  - 0.3% to 2.0% decrease in A1C during the first 6 months
  - 0.9% to 1.8% decrease in A1C maintained up to 2-yrs (3 studies; n=354)
  - Usual care A1C change: 0 to +0.2%

Effectiveness cont.
- In adults with T2DM and normal to mildly elevated lipid levels and near-normal blood pressure levels, nutrition therapy had mixed effects on lipid and blood pressure levels
- Body weight outcomes were also mixed
- Decreases in doses and/or number of glucose-lowering medication were reported in 12 study arms.
- Improvements in quality of life reported in 6 studies

What Nutrition Therapy Interventions Are Effective?
- A variety of nutrition therapy interventions, such as reduced energy/fat intake, individualized or simplified eating plans, carbohydrate counting, exchange choices, physical activity, and behavioral strategies
  - Type 2 diabetes: reduced energy intake
  - Type 1 diabetes: matching insulin to CHO intake
- A number of initial individual or group sessions and follow-up encounters were implemented

Eating Patterns
- Eating patterns, also called dietary patterns, is a term used to describe combinations of different food groups that characterize relationships between nutrition and health promotion and disease prevention.
- Eating patterns include patterns of intake among specific populations to eating patterns prescribed to improve health.
- Goal is moving away from talking about “diet” to talking about how people eat and healthful foods.

Bottom Line on Eating Patterns
A variety of eating patterns (combinations of different foods or food groups) are acceptable for the management of diabetes.

Personal preferences (e.g., tradition, culture, religion, health beliefs, goals, economics) and metabolic goals should be considered when recommending one eating pattern over another.

Obesity Guideline Highlights
- Monitor BMI and assess readiness to change.
- Emphasize sustained weight loss of 3-5% to produce clinically meaningful health benefits.
- Consume fewer calories (500 less/day) and increase physical activity based personal preferences.
- Exercise 2 ½ hours per week
- Accountability: ≥ 6 month intervention and 1 year maintenance.
- Consider prescribing pharmacotherapy or bariatric surgery.
ADA Standards of Care Highlights

- Document BMI at every visit (B).
- Diet, physical activity and behavioral therapy to achieve 5% weight loss (A).
  - ≥ 16 sessions in 6 months and 500-750 cal deficit
- Macronutrient approaches are all equally effective in achieving weight loss (A).
- Consider effects of glucose-lowering medications on weight (E).

Using the 5As to Talk About Weight Management

- Assess: Ask about/assess health goals and goals for weight management in order to choose appropriate behavior change goals/methods.
- Advise: Give clear, specific, and personalized advice, including information about weight loss.
- Agree: Collaboratively select appropriate treatment goals and methods based on the patient's interest in and willingness to change.
- Assist: Using behavior change techniques (self-help and/or counseling), aid the patient in achieving agreed-upon goals by acquiring the skills, confidence, and social/environmental supports for behavior change, supplemented with adjunctive medical treatments when appropriate.
- Arrange: Schedule follow-up contacts (in person or by telephone) to provide ongoing assistance/support and to adjust the treatment plan as needed.

The 5As in Action – Step One, Assess

Assess: Ask about/assess health goals and goals for weight management in order to choose appropriate behavior change goals/methods.
- Ask about what they have done in the best to manage weight and what was most successful?
- Ask questions to clarify their goals in following the eating plan they choose – what are they hoping to achieve.
- Ask about other food preferences, traditions, barriers to eating, and willingness to change.

The 5As in Action – Step Two, Advise

Advise: Give clear, specific and personalized advice, including information about benefits and challenges of the approach they choose.
- Discuss their goals and how the eating plan may or may not help them achieve their goals.
- Be clear about what parts of the eating plan may be supported by evidence and which parts may not.
- Give very specific information on what evidence is available to help them achieve their goals.

The 5As in Action – Step Three, Agree

Agree: Collaboratively select appropriate treatment goals and methods based on the patient's interest in and willingness to change.
- Listen to the individual and select goals for nutrition therapy that integrate what they believe and are hoping to achieve with input from you on the evidence.
- Be honest in the process that you are trying to help them achieve their goals. You may not agree with the principles of the eating plan they are following but you do want to support them.

The 5As in Action – Step Four, Assist

Assist: Using behavior change techniques (self-help and/or counseling), aid the patient in achieving agreed-upon goals by acquiring the skills, confidence and social/environmental supports for behavior change, supplemented with adjunctive medical treatments when appropriate.
- Provide tools and resources to help them eat well.
- Discuss strategies to overcome barriers to eating well.
The 5As in Action – Step Five, Arrange

Arrange: Schedule follow-up contacts (in person or by telephone) to provide ongoing assistance/support and to adjust the treatment plan as needed.
- Be clear on rationale and importance of follow-up.
- In follow-up calls or visits use the 5As to further assess, advise, agree, assist and arrange. Focus is on original intent of following the eating pattern and whether the person is still following, working on goals set, and so on.

Summary
- A weight loss of >5% (~6 kg) necessary for benefits from weight loss interventions, which may be difficult for persons with T2DM to achieve
- The emphasis should be on a reduced energy intake for improved glycemic control; in some it may lead to weight loss, in some it may maintain weight loss, and in some it may prevent weight gain, often related to medications used
- Nutrition therapy should encourage a healthy eating pattern, appropriate portion sizes, regular physical activity, and education and support.

Summary: What Have We Learned?
- Intervene early with lifestyle modification counseling and programs
- For the general public and individuals with prediabetes modest weight loss has important health benefits
- As persons with T2DM become insulin deficient weight loss may or may not improve glycemic control
  - Calories count (reduced energy intake!)
  - Fitness is of equal importance to weight loss

Questions?
Contact: jackie@childrensheartlink.org