Dietary recommendations in Obesity, Hypertension, Hyperlipidemia, and Diabetes

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Objectives

- To review dietary recommendations in the following conditions:
  - Obesity
  - Hypertension
  - Diabetes
  - Hyperlipidemia

Disclosures

- None

Part 1: Obesity

A 37-year-old man presents for physical examination. Body mass index is 32kg/m². This man's weight is categorized as:

A. Normal

B. Overweight

C. Class I obesity

D. Class II obesity

E. Class III obesity

Classification of obesity

Classification	Body Mass Index
Underweight	<18.5kg/m²
Normal	18.5-24.9kg/m²
Overweight	25-29.9kg/m²
Class I obese	30-34.9kg/m²
Class II obese	35-39.9kg/m²
Class III obese	$\geq$40kg/m²

Q: What other physical finding is useful in predicting morbidity and mortality in the overweight and obese individual?

A: Waist circumference
(>88cm/34in in women)
(>102cm/40in in men)

Role of waist circumference and risk

	Waist Circumference	
	Normal	Increased
Overweight	Increased disease risk	**High disease risk**
Class I obesity	High disease risk	**Very high disease risk**
Class II obesity	Very high disease risk	Very high disease risk
Class III obesity	Extremely high disease risk	Extremely high disease risk

Hypertension, diabetes, and dyslipidemia are all well-known consequences of obesity. Which of the following is not a consequence of obesity?

A. Pancreatic cancer

B. Pulmonary embolism

C. Polycystic ovarian syndrome

D. End-stage renal disease

E. None of the above

Obesity-associated health problems

Body System	Associated Diseases
Endocrine	• Type 2 diabetes; polycystic ovarian syndrome; dyslipidemia
Cardiovascular	• Hypertension; coronary artery disease; heart failure; atrial fibrillation
Gastrointestinal	• GERD; erosive gastritis; gallstones; non-alcoholic fatty liver disease
Pulmonary	• Obstructive sleep apnea; pulmonary embolism
Renal	• Nephrolithiasis; chronic kidney disease; ESRD
Malignancy	• Liver; stomach; pancreas; esophagus; gallbladder; rectum; multiple myeloma

A 43-year-old man has a BMI of 32kg/m², but no other complications of obesity. The first step in management of this patient should be:

A. Assess his desire to lose weight

B. Prescribe a weight-loss pill

C. Refer to a Nutritionist

D. Set a goal of 5kg weight reduction in the next month

Assessing readiness

- Before engaging in a weight loss program, doctors and patients should:
  - Agree that weight loss is appropriate
  - Assess whether the patient is prepared to undertake the measures necessary to lose weight
  - Determine the priorities in preventing illness (i.e., smoking cessation; diabetes control)
- Things to ask about:
  - Past weight history
  - Factors associated with weight gain/loss in the past
  - Past efforts to lose weight

The most effective strategy that results in weight reduction is:

A. Carbohydrate-restricted diets

B. Extreme calorie-reduction (1000kcal/day) diets

C. Self-monitoring of weight, food and exercise

D. Vigorous exercise programs

Behavior and weight loss

- Self-monitoring of weight, diet, and exercise is the most effective behavior strategy that results in weight loss

- Portion control also has a role in weight loss

- Meal planning can control portion size, guide shopping, and prevent overeating

Your 42y.o. man with BMI 32kg/m² (weight 100kg) wants to lose weight. He has never tried to lose weight before. Your best advice to him is:

A. Lose 5kg in the next month

B. Lose 5kg in the next two months

C. Lose 10kg in the next three months

D. Lose 10kg in the next six months

Recommendations for pace of weight loss

- **General initial goal: 5-10% loss of body weight over 6 months**

- Overweight/Class I Obese patients: 0.5 – 1 pound/week

- Class II/Class III Obese patients: 1 – 2 pounds/week

Your patient asks you how many calories he needs to cut out of the average day to lose 0.5 – 1 pound/week. The correct answer is:

A. 50 – 100 kcal/day

B. 100 – 250 kcal/day

C. 300 – 500 kcal/day

D. 700 – 1000 kcal/day

Caloric restriction and weight loss

- Reduce calories 300-500kcal/day for 0.5 – 1 pound/week weight loss

- Reduce calories 500-750kcal/day for 1 – 2 pound/week weight loss

- Popular diets (e.g., Atkins; South Beach etc.) result in similar weight loss after 2 years and should be tailored to individual preferences

How many calories are in this popular food item?

How many calories in this popular food item?

How many calories in this popular food item?

How many calories in this popular food item?

Your 100kg patient wants to exercise by walking on a treadmill at 3mph for one hour/day. How many calories will he burn in that hour?

A. About 100kcal

B. About 200kcal

C. About 300kcal

D. About 500kcal

Exercise and weight loss

- Exercise is less effective at causing weight loss, unless sustained at high levels (i.e., >300 minutes/week)
  - Mean weight loss of 0.1kg/week

- However, people who exercise and reduce calories are more successful at maintaining weight loss

- Exercise has other benefits (e.g., lipid metabolism; blood pressure; reduced frailty) that are important

Exercise recommendations

Organization (year)	General Recommendation	Additional Benefits With…	Weight Loss With…
World Health Org. (2011) US Dept. of HHS (2008)	• 150min/wk moderate or • 75min/wk vigorous • (strength training 2x/wk)	• 300min/wk moderate • 150min/wk vigorous	More duration of vigorous may be needed

Part 2:Diet and blood pressure

For the average person who eats a diet of packaged/prepared foods, eliminating adding salt to food will reduce salt intake by:

A. 25%

B. 35%

C. 50%

D. 75%

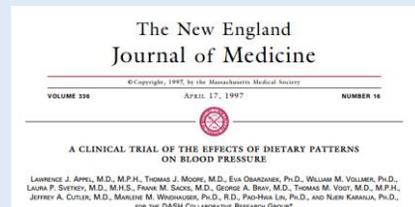
The stated goal in controlling salt intake is to limit sodium intake to no more than:

• 1000mg/day

• 1500mg/day

• 2000mg/day

• 2400mg/day

• 4800mg/day

Recommendations on sodium

• Consume no more than 1500mg of sodium/day

• If this goal is not achievable, try to reduce sodium intake by 1000mg/day

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The DASH diet

The New England Journal of Medicine

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A CLINICAL TRIAL OF THE EFFECTS OF DIETARY PATTERNS ON BLOOD PRESSURE

Lawrence J. Appel, M.D., M.P.H., Thomas J. Moore, M.D., Eva Obarzanek, Ph.D., William M. Vollmer, Ph.D., Laura P. Svetkey, M.D., M.H.S., Frank M. Sacks, M.D., George A. Bray, M.D., Thomas M. Vogt, M.D., M.P.H., Jeffrey A. Cutler, M.D., Marlene M. Windhauser, Ph.D., R.D., Pao-Hwa Lin, Ph.D., and Njeri Karanja, Ph.D., for the DASH Collaborative Research Group*

Three groups studied over 3-week periods:

Group 1	Group 2	Group 3
Typical American diet	Diet rich in fruits and vegetables	Diet rich in fruits and vegetables + low-fat dairy products

Group 1	Group 2	Group 3
No change in BP	Systolic BP lowered 3 points	Systolic BP lowered 11 points

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The Mediterranean Diet

- 'Seven Countries Study' done in 1984 showed fewer cardiovascular deaths in Southern European countries

- Diet in these countries thought to be a contributor

- Quickly became known as the Mediterranean Diet

- Many studies since have confirmed CV benefits from this diet

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Components of the Mediterranean diet

Micro/macronutrient	Goal	Examples
Macronutrient	Increase	• Fresh fruits • Fresh vegetables (esp. root and green varieties) • Whole grains (e.g., cereals; breads; rice; pasta) • Nuts (e.g., walnuts; almonds; hazelnuts) • Oils (e.g., olive oil; canola oil) • Fatty fish

Macronutrient	Decrease	• Red meats
		    o Instead, substitute lean meats
		 • High-fat dairy products
		    o Instead, substitute low-fat dairy products
		 • Butter
		    o Instead, substitute margarines made from rapeseed or flaxseed oils

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ACC/AHA lifestyle management guidelines

Lifestyle intervention	Blood pressure change	Comments
Weight loss in obese	-5mm Hg	For overweight/obese patients, expect 1mm Hg reduction per 1kg weight lost.
DASH-type diet	-11mm Hg	Diet rich in fresh fruits, vegetables, whole grains, low-fat dairy. Low in saturated and total fat.
Sodium restriction	-5-6mm Hg	Optimal daily intake is 1500mg sodium. Alternatively, reduce sodium intake by 1000mg/day.
High-potassium diet	-4-5mm Hg	Ideally through foods high in potassium. Caution in patients with CKD.
Aerobic exercise	-5-8mm Hg	90-150 minutes/week at 65-75% maximal predicted heart rate.
Resistance exercise	-4-5mm Hg	90-150 minutes/week

Part 3: Diet and cholesterol

Which of the following raises LDL ('bad') cholesterol the most?

A. Dietary carbohydrates

B. Dietary cholesterol

C. Dietary saturated fat

D. Dietary unsaturated fat

An individual with elevated cholesterol eliminates all fat from her diet. What will be the result in her LDL ('bad') and HDL ('good') cholesterol?
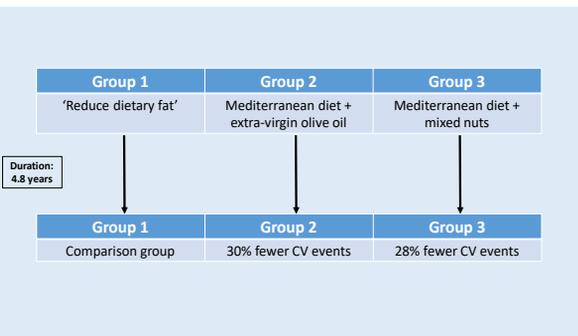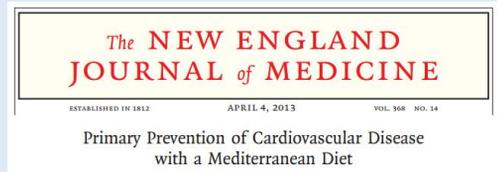
A. LDL will go down; HDL will go down

B. LDL will go down; HDL will go up

C. LDL will go up; HDL will go down

D. LDL will go up; HDL will go up

Diet and cholesterol

• Diet is a contributor to your lipid profile

• There are secondary benefits to a healthful diet, so recommendations should be followed even if medications are prescribed

• In many individuals, diet alone is not enough to control lipids

Category	Causes of elevated LDL-C	Causes of elevated triglycerides
Diet	• Diet rich in saturated or trans fats • Weight gain • Anorexia	• Weight gain • Very low-fat diets • High intake of refined carbohydrates • Excessive alcohol intake
Drugs	• Diuretics • Cyclosporine • Glucocorticoids • Amiodarone	• Oral estrogens • Glucocorticoids • Bile acid sequestrants • Protease inhibitors • Retinoic acid • Anabolic steroids • Sirolimus • Raloxifene • Tamoxifen • Beta blocker (not carvedilol) • Thiazides
Diseases	• Biliary obstruction • Nephrotic syndrome	• Nephrotic syndrome • Chronic renal failure • Lipodystrophies
Disorders and altered states of metabolism	• Hypothyroidism • Obesity • Pregnancy	• Poorly-controlled diabetes • Hypothyroidism • Obesity • Pregnancy

Controlling diet is proven to reduce the risk of heart disease

The **NEW ENGLAND JOURNAL** *of* **MEDICINE**

ESTABLISHED IN 1812   APRIL 4, 2013   VOL. 368   NO. 14

Primary Prevention of Cardiovascular Disease with a Mediterranean Diet

Group 1	Group 2	Group 3
'Reduce dietary fat'	Mediterranean diet + extra-virgin olive oil	Mediterranean diet + mixed nuts

Duration: 4.8 years

Group 1	Group 2	Group 3
Comparison group	30% fewer CV events	28% fewer CV events

A 52-year-old man begins a routine of 30-minutes of aerobic exercise daily. Expected changes in his lipids will be:

A. LDL cholesterol goes down a little

B. LDL cholesterol goes down a lot

C. HDL cholesterol goes up a little

D. HDL cholesterol goes up a lot

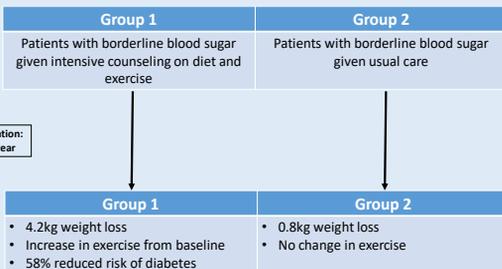## Exercise and lipids

Exercise type	Lipid component	Impact
Aerobic	LDL-C and non-HDL-C	• Lowers LDL-C 3-6mg/dL • Lowers non-HDL-C 6mg/dL
Aerobic	HDL-C	• No effect
Aerobic	TG	• No effect
Resistance	LDL-C and non-HDL-C	• Lowers LDL-C 6-9mg/dL • Lowers non-HDL-C 6-9mg/dL
Resistance	HDL-C	• No effect
Resistance	TG	• Lowers TG 6-9mg/dL

Part 4: Diet and diabetes

A 52-year-old woman weighs 80kg has Class I obesity. How many kg will she need to lose to significantly reduce her risk of diabetes?

A. 5kg

B. 10kg

C. 15kg

D. 20% of body weight

The New England
Journal of Medicine

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VOLUME 344   MAY 3, 2001   NUMBER 18

PREVENTION OF TYPE 2 DIABETES MELLITUS BY CHANGES IN LIFESTYLE AMONG SUBJECTS WITH IMPAIRED GLUCOSE TOLERANCE

Group 1	Group 2
Patients with borderline blood sugar given intensive counseling on diet and exercise	Patients with borderline blood sugar given usual care

Duration: 1 year

Group 1	Group 2
• 4.2kg weight loss • Increase in exercise from baseline • 58% reduced risk of diabetes	• 0.8kg weight loss • No change in exercise

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Diet and diabetes

• The most important risk factor for diabetes is BMI

• Lack of exercise is another risk factor for diabetes

• Modest weight loss and regular exercise dramatically reduce risk of diabetes

Complex carbohydrates and simple carbohydrates

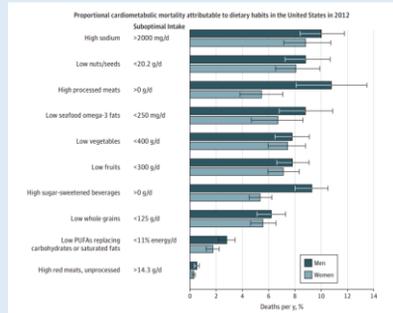| Complex carbohydrates	Simple carbohydrates
• Vegetables	• Sodas
• Whole grains	• Cakes
• Legumes	• Cookies
• Dairy products	• Potatoes
• High-fiber fruit	• White bread

JAMA | Original Investigation

Association Between Dietary Factors and Mortality From Heart Disease, Stroke, and Type 2 Diabetes in the United States

Renata Micha, RD, PhD; Jose L. Peñalvo, PhD; Frederick Cudhea, PhD; Fumiaki Imamura, PhD; Colin D. Rehm, PhD; Dariush Mozaffarian, MD, DrPH

JAMA. 2017; 317: 912-24.

Proportional cardiometabolic mortality attributable to dietary habits in the United States in 2012

Conclusions

• Diet, typically in combination with regular exercise, is very effective at reducing:

  • Obesity

  • Blood pressure

  • Hyperlipidemia

  • Diabetes