Metabolic Syndrome: Addressing Root Causes

10/28/16
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Outline

Metabolic Syndrome
- Definition
- Importance
- Treating Root Causes
  - Nutrition
  - Sleep
  - Trust in God
**Criteria for Clinical Diagnosis of the Metabolic Syndrome**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Obesity</td>
<td>Waist circumference—ethnicity specific. For persons of European origin may use waist circ. ≥ 40 inches for men and ≥ 35 inches for women. For non-Europeans, use IDF definitions.</td>
</tr>
<tr>
<td>Elevated Triglycerides (or drug treatment for elevated triglycerides)</td>
<td>≥ 150 mg/dl (1.7 mm/l)</td>
</tr>
<tr>
<td>Reduced HDL-C (or drug treatment for reduced HDL-C)</td>
<td>&lt; 40 mg/dl (1.03 mmol/l) in men &lt; 50 mg/dl (1.29 mmol/l) in women</td>
</tr>
<tr>
<td>Elevated Blood Pressure (antihypertensive drug treatment in a patient with a history of HTN)</td>
<td>Systolic ≥ 130 mmHg OR Diastolic ≥ 85 mmHg</td>
</tr>
<tr>
<td>Elevated Fasting Glucose (drug treatment of elevated glucose)</td>
<td>≥ 100 mg/dl (5.6 mol/l)</td>
</tr>
</tbody>
</table>

Harmonizing the metabolic syndrome: a joint interim statement of the International Diabetes Federation Task Force on Epidemiology and Prevention; National Heart, Lung, and Blood Institute; American Heart Association; World Heart Federation; International Atherosclerosis Society; and International Association for the Study of Obesity. *Circulation*. 2009 Oct 20;120(16):1640-5
Metabolic Syndrome

- Doubles the risk of developing ASCVD over the next 5 to 10 years
- Confers a 5-fold increase in risk of type 2 diabetes mellitus

Harmonizing the metabolic syndrome: a joint interim statement of the International Diabetes Federation Task Force on Epidemiology and Prevention; National Heart, Lung, and Blood Institute; American Heart Association; World Heart Federation; International Atherosclerosis Society; and International Association for the Study of Obesity.

_Circulation_. 2009 Oct 20;120(16):1640-5
Goal

• “The greatest potential for management of the syndrome lies in reversing its root causes.”\(^1\)
  
  • Root causes\(^1\)
  
  • Overweight/obesity
  
  • Physical inactivity
  
  • Insulin resistance

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Nutrition and Metabolic Syndrome

- Case-control study with 8313 Chinese subjects
- High-protein/cholesterol pattern: high intakes of animal offal, animal blood, and sausage
- High-carbohydrate/sweet pattern: high intake of candied fruits, cakes, ice cream, and juice
- Balanced pattern: intake of vegetables, mushrooms and coarse cereals
- Consumption of animal foods was associated with highest prevalence of MS.
- Consumption of vegetables, coarse cereals, fruits associated with the lowest prevalence of MS.

Diet and Macronutrients

• 34 women with obesity
• 28-week study
• Control group
• Hypocaloric diet, resulting in 10% weight loss
  • (RDA) of protein: 0.8 grams/kg body weight ➞ 25 to 30 percent ↑ insulin sensitivity
  • High protein: 1.2 grams/ kg body weight ➞ no improvement in insulin sensitivity

Nutrition

• Whole-foods plant-based diet
  • Grains, fruits, nuts, and vegetables constitute the diet chosen for us by our Creator. These foods, prepared in as simple and natural a manner as possible, are the most healthful\(^1\)

  • That which is most conducive to health can be secured in almost every land. . . preparations of rice, wheat, corn, and oats are sent abroad everywhere, also beans, peas, and lentils\(^2\)

1. Ellen G. White, *Councils on Diet and Foods* 81.2.
2. Ellen G. White, *Counsels on Diet and Foods* 94.4.
Food choices and Weight gain

- Nurses’ Health Study (NHS)
  - Dietary factors assessed 1986-2006
  - Final analysis included 50,422

- Nurses’ Health Study II (NHSII)
  - Dietary factors assessed between 1991-2003
  - Final analysis included 47,898

- Health Professionals Follow-up Study (HPFS)
  - Dietary factors assessed 1986-2006
  - Final analysis included 22,557

Healthy Eating

- Plant-based diet\(^1\)

- Foods high in fiber and low in glycemic load\(^2\)

- If overweight or obese, restrict calories with goal of 5-10% weight loss\(^2\)

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Water-Rich Foods

- Cucumbers 96%
- Lettuce 96%
- Celery 95%
- Tomatoes 94%
- Spinach 92%
- Broccoli 91%
- Grapefruit 91%

A helpful list of foods high in fiber

### Nuts and Seeds (Ideal in small amounts)

<table>
<thead>
<tr>
<th>Food</th>
<th>Served</th>
<th>Serving Size</th>
<th>Calories</th>
<th>Fiber Grams</th>
</tr>
</thead>
<tbody>
<tr>
<td>almonds</td>
<td>raw</td>
<td>1 oz (23 almonds)</td>
<td>163</td>
<td>4</td>
</tr>
<tr>
<td>brazil nuts</td>
<td>raw</td>
<td>1 oz (6)</td>
<td>186</td>
<td>2</td>
</tr>
<tr>
<td>chia seeds</td>
<td>raw</td>
<td>1 oz (5 Tbs)</td>
<td>138</td>
<td>10</td>
</tr>
</tbody>
</table>

Legumes

• Adults with T2 diabetes given 3-month diet trial

• 1 cup/day of cooked beans, chickpeas or lentils
  • Lost 5.7 lbs, ↓A1c 0.5, ↓triglycerides 21 points

Meal Frequency

- Adults with T2 diabetes
  - 3 meals with 3 snacks (6 meals)
  - 2 meals
    - 6-10 AM
    - Noon-4 PM
  - Calories restricted by 500 kcal/day for all persons

<table>
<thead>
<tr>
<th></th>
<th>Waist circumference</th>
<th>BMI</th>
<th>Fasting blood glucose</th>
<th>Insulin sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 meals</td>
<td>↓ 2.02 inches</td>
<td>↓ 1.23</td>
<td>↓ 14.04 mg/dL</td>
<td>↑ 21</td>
</tr>
<tr>
<td>6 meals</td>
<td>↓ 0.53 inches</td>
<td>↓ 0.82</td>
<td>↓ 8.46 mg/dL</td>
<td>↑ 8.2</td>
</tr>
</tbody>
</table>

Meal Frequency

The practice of eating but two meals a day is generally found a benefit to health; yet under some circumstances, persons may require a third meal.¹

- Health Professionals Follow-Up Study ²
- Over 29,000 men
- Snacking
  (eating more than 3 meals per day)
  → increased risk of T2 diabetes was linked with higher BMI.

1. Ellen G. White, *Counsels on Diet and Foods* 176.2
Diabetes: Meal Composition

- Adults with T2 diabetes
- Breakfast Diet:
  703 kcal breakfast
  602 kcal lunch
  205 kcal dinner
- Dinner Diet:
  205 kcal breakfast
  602 kcal lunch
  703 kcal dinner

Glucose 20% ↓
1-2 hr post-meal

Insulin 20% ↑

Meal Composition

• At breakfast time the stomach is in a better condition to take care of more food than at the second or third meal of the day. . . . Make your breakfast correspond more nearly to the heartiest meal of the day.

Ellen G. White, *Counsels on Diet and Foods* 173.2
Meal Composition

• Breakfast like a king

• Lunch like a queen

• Supper like a commoner
We do not mark out any precise line to be followed in diet.¹

1. Ellen G. White, *Counsels on Diet and Foods* 95.4
Tools

- Sample meal plan
- Recipe file
- Apps—Calorie King, etc.
- https://www.supertracker.usda.gov
- Fiber guides
- Magazines
- EHR documentation: saved findings, i.e.
  - “Recommend 3 meals per day, making breakfast the largest meal and supper the smallest.”
  - “Recommend consuming water only between meals unless snacking to treat hypoglycemia.”
Ellen White on Sleep

• The importance of regularity in the time for eating and sleeping should not be overlooked. Since the work of building up the body takes place during the hours of rest, it is essential, especially in youth, that sleep should be regular and abundant.¹

• Sleep is worth far more before than after midnight. Two hours' good sleep before twelve o'clock is worth more than four hours after twelve o'clock.²

¹ Ellen G. White, Child Guidance 363.2
² Ellen G. White, Manuscript Releases Volume 7, 224.3
Sleep Duration and Metabolic Syndrome

• 7-8 hours of sleep/night associated with a lower prevalence of metabolic syndrome.¹

• Those who report a sleep duration <5 hours have a 1.5 higher odds of having metabolic syndrome.²

Social Jet Lag

• Difference between one's naturally-preferred and socially-imposed sleep schedules¹

• Social Jet Lag²
  > 60 minutes linked with
  • lower HDL-C
  • higher triglycerides
  • insulin resistance
  • higher waist circumference
  • higher BMI

Morningness/Eveningness and Met Synd

- Study of 1620 persons: Morning Type, Evening Type or Neither Type

- Morning Type: Bedtime 10:50 PM, Wake time 5:38 AM

- Evening Type: Bedtime 12:53 AM, Wake time 7:32 AM

- Evening Chronotype associated with increased risk of
  - Diabetes Mellitus
  - Metabolic syndrome
  - Sarcopenia

Goal Setting in Clinic

• **Specific**
• **Measurable**
• **Achievable**
• **Results-focused**
• **Timely**

Trust in God—Bible perspective

• Patient lost 80 lbs over 6 months.
  • Through a church-based program
  • Claimed Bible promises when tempted

• In order rightly to understand the subject of temperance, we must consider it from a Bible standpoint.¹

¹ Ellen G. White, Child Guidance 28.3
Biblical Philosophy & Lifestyle Intervention

- Body as temple of God (1 Cor 6:19).
- Taking care of your physical body is a spiritual act of worship. (Rom 12:1).
- Your body is bought with a price, paid for by Jesus. Therefore glorify God in all that you do including what you eat. (1 Cor 6:20).
- From the beginning, God did not want humans to eat too much fat or blood. Man’s original diet was plants (Gen 1:29, 3:18).
- Strength to eat healthy comes from Christ (Phil 4:13).
- Whatever you do, don't lean on your own understanding-acknowledge God, pray to Him, be willing to listen to Him and He will direct your paths (Prov 3:5-6).
- The righteous falls 7 times and gets up (Proverbs 24:17).
- Whatever you eat or drink, do all to the glory of God (1 Cor 10:31).
- The race is not to the swift or the strongest (Eccl 9:11) but to those who endure and lean on the Lord.

Trust in God—Prayer

- Patient’s story
  - T2DM
  - BG log improved at follow-up
  - Attributed glycemic improvement to God’s power and prayer