Fueling Fertility: Nutrition Interventions for Women

Presented by:
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Objectives

✓ Define infertility
✓ Demonstrate how preconception care and nutrition therapy can optimize fertility and promote healthy pregnancy outcomes
✓ Establish a basic understanding of the appropriate use of dietary supplements to optimize fertility and promote healthy pregnancy outcomes
Infertility Defined

- Infertility impacts 12% of women of child bearing age (7.3 million)

- Primary Infertility: failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse (6 months if the women if over age 35)
  - Most couples will achieve pregnancy within the first 6 months of trying
  - 90% will become pregnant after one year

- Secondary Infertility: couples who have been pregnant at least once, but are not able to get pregnant now


Primary Contributing Factors to Infertility

- 25% of infertile couples have more than one factor that contributes to their infertility.
- Irregular or abnormal ovulation accounts for approximately 25 percent of all female infertility problems.
- Most infertility cases -- 85% to 90% -- are treated with conventional medical therapies such as medication or surgery.
- While vital for some patients, in vitro fertilization and similar treatments account for less than 3% of infertility services, and about (or approximately) seven hundredths of one percent (0.07%) of U.S. health care costs.
- Twelve percent of all infertility cases are a result of the woman either weighing too little or too much.
- It is possible for women with body weight disorders to reverse their infertility by attaining and maintaining a healthy weight.
- Up to 13 percent of female infertility is caused by cigarette smoking.
- Chlamydia causes about 4 to 5 million infections annually in the United States. If left untreated, chlamydia can cause infertility.

Why preconception care?

Preconception study of 367 couples ranging in age from 22 to 59

- History of infertility (37% of couple), miscarriage (38%), therapeutic abortion (11%), stillbirths (3%), low-birth-weight babies (15%), malformations (2%), and SIDS (1%).
- All couples received basic preconception care including nutrition counseling and a prenatal multivitamin for both partners.
- After 2 years 89% of the couples achieved live births. Of those with previously diagnosed infertility, 81% achieved live births, suggesting that lifestyle modification may positively affect fertility.

Where Nutrition Impacts Infertility

- Polycystic Ovarian Syndrome (PCOS)
- Weight status (underweight or overweight)
- Environmental toxins (as it relates to nutrient needs for detoxification)
- Hypothalamic Amenorrhea
- Eating Disorders (or history of restricted eating)
- Endometriosis and Fibroids
- Nutrient deficiencies
- Celiac Disease and food allergy
- Inflammatory Diseases
Weight Status

- Obesity accounts for 6% of primary infertility
- Low body weight in women accounts for 6% primary infertility

American Society for Reproductive Medicine: “More than 70% of women who are infertile as the result of body weight disorders will conceive spontaneously if their weight disorder is corrected through a weight-gaining or weight-reduction diet as appropriate”

A modest decrease of body weight, which can have a significant impact on improving fertility in over-weight/obese women. In one trial, 90% of women resumed ovulation and 45% spontaneously conceived following a 5% weight loss.

Estradiol Metabolism in women depending on weight

Estrogen deficiency vs. excess estrogen

- Women with a healthy body weight metabolize estradiol to 2-hydroxyestrone – an antiestrogen
  - Progressively “turning down” the reproductive cycle until it is “turned off” when body weight is too low
- Obese women metabolize estradiol to estriol – a weak estrogen
  - Progressively increase their alternate estrogens (estrone and estriol) until ovulation ceases and they become infertile

Excess energy storage in adipose tissue causes deficits in the pool of oxidizable fuels available for the reproductive system → reproduction becomes inhibited.

Negatively impacts sex hormone secretion and overall function of chemical messengers in the reproductive system.

Hyperandrogenism in obese women.


Polycystic Ovary Syndrome (PCOS)

- Most common cause of infertility in women
- Common endocrine disorder of unknown etiology
- Affects estimated 10% of women
- Characterized by various combinations of symptoms including:
  - Infertility, anovulation, amenorrhea or menstrual irregularities, hirsutism, acne, male pattern baldness, obesity, sleep apnea, enlarged ovaries with multiple cysts
- Biochemical and endocrine abnormalities
  - Elevated levels of androgens, hyperinsulinemia, impaired glucose tolerance, hyperlipidemia
Dietary interventions can help improve chances of fertility

Diet:

- Address insulin sensitivity
  - weight loss if overweight
  - avoid refined sugar and other refined carbs
  - small frequent meals
  - Emphasize high-fiber foods
  - Increase healthy fats and protein
Environmental Factors

- Exposure to volatile organic solvents, chemical dusts, or pesticides is associated with an increased risk of infertility
- Endocrine disrupters such as BPA (and many other plasticizers!)
- Association between cigarette smoking and decreased fertility

Practical Nutrition Tips:
- Choose organic when possible, especially when it comes to the “Dirty Dozen”
- Choose glass containers and utensils over plastics
Hypothalamic Amenorrhea

- Hypothalamus slows or stops releasing gonadotrophin-releasing hormone (GnRH), the hormone that starts the menstrual cycle.

- Common characteristics of women with hypothalamic amenorrhea include:
  - Low body weight
  - Low percentage body fat
  - Very low intake of calories or fat
  - Emotional stress
  - Strenuous exercise → inadequate calories to meet needs
  - Leptin deficiency
  - A medical condition or illness


Celiac Disease and Food Allergy

- Can cause infertility in women
  - Nutrition deficiencies secondary to malabsorption

Consumption of gluten-free diet frequently restores fertility

- Other food allergies and sensitivities should be considered as potential contributing factor

Caffeine and Tannic Acid

- Consumption of large amounts of caffeine by women associated with delayed conception
  - Lowest level of caffeine intake associated with delayed conception between 300-500mg/day (4-7 cups of coffee)
  - <300mg caffeine/day had no effect
  - Tannic acid (present in both coffee and tea) true culprit?

Cramer DW. Caffeine and Infertility. Lancet 1990;335:792
Alcohol

- Infertility is common among chronic alcoholics
- Moderate alcohol intake may lead to impaired fertility in women
  - Result of ovulatory disturbances or endometriosis
- CDC now says, “no amount of alcohol is safe” for pregnant women and “Stop drinking alcohol if they are trying to get pregnant or could get pregnant.”
- Dose dependent?


**Protein: plant based best?**

- **Findings from the Nurses’ Health Study**
- **N=18,555**
  - Lowest protein intake (77g/day) vs. Highest protein intake (115g/day)
  - Women in highest protein group were 41% more likely to have reported problems with ovulatory infertility than women in lowest protein group
  - Ovulatory infertility was 39% more likely in women with the highest intake of animal protein
  - Women who had the highest intake of plant protein were substantially less likely to have ovulatory infertility than those with the lowest intake of plant protein

Findings from Nurse’s Health Study

- An increased risk of anovulatory infertility was associated with diets that provided an overall higher glycemic load, and contained trans fatty acids, low-fat dairy, and animal protein sources.

- A reduced risk was associated with consumption of adequate folic acid, iron from plant sources, one high-fat dairy product daily, and vegetable protein sources.

Emerging research suggests that women who follow a Mediterranean-style diet pattern may increase their chance of pregnancy.

A preconception "Mediterranean" diet by couples undergoing IVF/ICSI treatment may contribute to the success of achieving pregnancy.


Trans Fatty Acid

- Prospective cohort study of 18,555 premenopausal women without hx of infertility who attempted to become pregnant during an 8-year period
  - Higher intake of trans fatty acids was associated with an increased risk of infertility due to ovulatory abnormalities
  - 2% increase in absolute intake of energy from trans fatty acids was associated with a 75% increase in risk of ovulatory infertility

<table>
<thead>
<tr>
<th>Getting 2% of Calories from Trans Fat Instead of 2% of Calories from:</th>
<th>Increases the risk of Ovulatory Infertility by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbohydrates</td>
<td>73%</td>
</tr>
<tr>
<td>Polyunsaturated fat</td>
<td>79%</td>
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<tr>
<td>Monounsaturated fat</td>
<td>131%</td>
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Diet & Lifestyle Interventions

- Diet should be rich in:
  - plant-based, antioxidant-rich foods
  - high-quality protein
  - healthy fats (remove sources of trans fat)
  - full-fat dairy
Supplements

- Prenatal Multivitamin: go for high quality, pharmaceutical grade options
  - Free of fillers, colors, and dyes
  - Contains active forms of vitamins:
    - Pyridoxal 5'-phosphate (vitamin B6)
    - Riboflavin 5'-phosphate (vitamin B2)
    - Folinic acid or L-5-MTHF (active forms of folate)
    - Adenosylcobalamin or methylcobalamin (vitamin B12)
    - Calcium citrate, malate, taurinate, or glyinate
- Has broad spectrum of vitamins AND minerals
- EPA/DHA: fish oil, algae
Resources

- The Fertility Diet: Groundbreaking Research Reveals Natural Ways to Boost Ovulation & Improve Your Chances of Getting Pregnant by Jorge E. Chavarro, MD, Walter Willett, MD, Patrick J. Skerrett


- The PCOS Workbook: Your Guide to Complete Physical and Emotional Health, Angela Grassi, MS, RD, LDN, 2009

- Eating Expectantly: Practical Advice for Healthy Eating Before, During and After Pregnancy, Bridget Swinney, MS, RD, 2013

Questions?
References

References

- Cramer DW. Caffeine and Infertility. Lancet 1990;335:792
References

- McEwen BS. Stressed or stressed out: what is the difference? *J Psychiatry Neurosci;* 30: 315-318

*Most of this presentation has been adapted from “Fueling Fertility: Nutrition Interventions for Men and Women” by Ayla Withee, MS, RDN, LDN, CLT*