Preconception Nutrition p. 49-51, 56-69, 70-73, 79-83

Key Concepts

Preconception period is included in Healthy People 2020 nutrition-related objectives

Fertility is effected by nutrition-related factors including: body fat, iron status, ETOH

There is a strong relationship between nutrient consumption/status during periconception and

conception

a healthy pregnancy

robust newborn

Get in shape **prior** to “the big game”

From **Table 2.3** Factors related to altered fertility in women and men2,4,12,13–15

Nutrition & Fertility

Undernutrition

Body fat

Nutrient status

Consider how consumption alters:

Environment the egg and sperm develop

Hormone levels that regulate reproductive processes

Undernutrition and Fertility

Chronic undernutrition

LBW & frail newborns

Newborns more likely to die in first year of life

Maternal hormonal changes

Acute undernutrition

Dramatic decline in fertility

Recovers when food consumption increases

Body fat & fertility

Decreased fertility seen at BMI <20 or >30 d/t alterations in hormones

Estrogen, testosterone & leptin

both extremes lower fertility

Too much

Central body fatness -> insulin resistance, high insulin, chronic inflammation, oxidative stress and metabolic syndrome.

Insulin resistance: increased circulating androgens -> anovulation, irregular menstrual cycle, delayed time to conception

Men: high testosterone converts to estrogen, oxidative stress, may be related to autism spectrum disorder, sperm quality

Can be “metabolically healthy” obese?

All fat is not created equal

Metabolic Syndrome (often are obese)

Diagnosed if 3 of 5 conditions exist:

 1. Waist circumference:

 > 40” (38) in men & > 35” (34) in women

 2. Blood triglyceride: ≥150 mg/dL

 3. HDL – C:

 < 40 mg/dL in men & < 50 mg/dL in women

 4. Blood pressure: >130/85 mm Hg

 5. Fasting blood glucose: > 100 mg/dL

High Body Fat & Fertility

Low testosterone & sex hormone binding globulin levels

Elevated leptin, FSH & estrogen

Decrease sperm #, motility, increased sperm malformation

Oxidative stress & inflammation

High estrogen, free testosterone & leptin

Low sex hormone binding globulin levels

Insulin resistance

Oxidative stress & inflammation

Nutrition status

Antioxidants: foods rich in vitamins E & C, beta carotene, selenium and pigments in fruits and vegetables.

Supps may help correct deficiencies -> improve fertility

Zinc status in men: poor sperm quality, concentration & abnormal shape

Zinc supps only for deficiency

High soy in men & women (not in 7th)

Low iron status in women

Caffeine: mixed

Hard to ID caffeine effect separate from smoking and other phytochemicals in coffee and tea.

ETOH: controversial

May alter testosterone, estrogen, FSH…

Recommended 0 to “moderate drinking”

0 once pregnant

May be more dramatic for women over 30 yo

Exercise: likely not a problem if consume sufficient calories

Nutrition during periconception

Folate: + effect on male and female infertility

Lowers risk of NTD

Sperm concentration, motility & chromosomes

Iron: low iron stores and frank deficiency are common.

Interferes with ovulation and may result in pre-term delivery.

Enter pregnancy well-nourished

Negative energy balance

May cause hypothalamic amenorrhea:

absence of ovulation and menstruation

ED: more likely to miscarry, have preterm delivery, and babies under 5.5 lbs at birth (LBW)

“low energy availability” (FKA Female athlete triad): starts with inadequate kcals

Exercise

Weight Loss and Fertility

Females

Weight loss >10-15% of usual weight decreases estrogen

Results in amenorrhea, anovulatory cycle & short or absent luteal phases

Males

Starvation decreases male fertility by 50% (from Keys’ studies during World War II)

Sperm viability & motility:

decrease with wt 10 to 15% below normal

cease at wt >25% of normal

Celiac disease chronic undernutrition

Autoimmune dz

Immune system causes inflammation that damages villi and microvilli of the small intestine -> malabsorption & malnutrition

Untreated: amenorrhea, miscarriage, low-birth weight, delayed sexual maturation in males, low sex hormones

Gluten sensitivity & wheat allergy

Nutrition care process: 4 steps

Nutrition assessment

Diet, weight, medical history

Nutrition knowledge, behaviors and food availability

Physical activity

Labs and anthropometric measures

Nutrition diagnosis

ID nutrition-specific problems

Food and nutrient intake, clinical findings/lab values, behavioral and knowledge deficits

Nutrition intervention

Create and implement effective intervention that will improve/resolve problem

Nutrition monitoring and evaluation

Measure and monitor progress