Food, Lifestyle Factors and Fertility: The Role of the Registered Dietitian in Supporting Reproductive Health

Hillary Wright, MEd, RDN, LDN
Director of Nutrition
Domar Center for Mind Body Health at Boston IVF

Defining Infertility

“Infertility is a disease characterized by the failure to establish a clinical pregnancy after 12 months of regular, unprotected sexual intercourse ... interventions may be initiated in less than 1 year based on medical, sexual and reproductive history, age, physical findings and diagnostic testing. Infertility is a disease, which generates disability as an impairment of function.”
- Resolve.org

How Common are Fertility Problems?

- 1 in 8 couples (or 12% of married women) have trouble conceiving or sustaining a pregnancy (2006-2010, CDC)
- 7.4 million women, or 11.9% of women, have infertility services in their lifetime. (2006-2010, CDC)
- Approximately one-third of infertility is attributed to the female partner, one-third the male partner and one-third a combination both, or is unexplained. (www.asrm.org)
- A couple ages 29-33 with a normal functioning reproductive system has only a 20-25% chance of conceiving in any given month; after six months of trying, 60-80% of couples will conceive without medical assistance.
- resolve.org

Risk Factors for Infertility: Women

General Health:
- Excess or very low levels of body fat
- Chronic diseases: diabetes, thyroid dz, lupus, hypertension, asthma, arthritis (or meds)
- Cervical procedures for abnormalities
- Hormonal imbalances: periods > six days; cycles < 24 days or > than 35 days apart; irregular, unpredictable cycles, very heavy periods
- Hx of multiple miscarriages
- DES exposure in utero
- Environmental factors – smoking, ETOH, exposure to toxins (work/environment)

Risk Factors: Women (continued)

- Age: woman in late 30’s about 30% less fertile than early 20’s → seek medical advice if > age 30 and TTC for six months or more
- STD’s – pelvic inflammatory disease (PID) in women; epididymitis in men
- Tubal Disease – 20% of infertility cases → STDs (gonorrhea, syphilis or chlamydia); surgery or other pelvic symptoms; IUD; two or more abortions
- Endometriosis – early treatment important
- Fibroids – can affect implantation
Risk Factors for Infertility in Men

Male fertility is declining!

Environmental risk factors:
- Occupational exposure (lead, cadmium, mercury, ethylene oxide, vinyl chloride, radioactivity, and x-rays)
- Cigarette or marijuana smoking
- Prescription drug use
- DES exposure in utero
- Exposure of the genitals to elevated temperatures — hot baths, whirlpools, steam rooms

Medical risk factors:
- Hernia repair
- Undescended testicles
- History of prostatitis or genital infection
- Mumps after puberty

Factors that Affect both Men and Women

- Age: By age 40, chance of pregnancy has decreased from 80 percent to 57 percent. By age 46 or 50, below 10 percent. (Hormonal abnormalities, chronic illness, more miscarriages. Male fertility also decreases with age — 3 increased risk of autism and schizophrenia; men pass on more genetic mutations than women.
- Emotional factors: Depression and stress may affect hormones that affect ovulation and sperm production
- Occupational and environmental risks: Prolonged exposure to high mental stress, high temperatures, environmental toxins/radiation may reduce fertility in both men and women
- Unprotected sex: Multiple sex partners and unprotected sex increases STDs in both men and women.
- Smoking: Smoking may increase infertility risk in women and reduce sperm production in men.
- Alcohol use: Even moderately — as few as five drinks a week may impair conception.
- Being overweight: Body fat levels 10 percent to 15 percent above normal can produce excess estrogen, affecting the reproductive cycle.
- Being underweight: Body fat levels 10 percent to 15 percent below normal can completely shut down the reproductive axis. Women at risk include those with anorexia nervosa or bulimia, and those on a very low-calorie or restrictive diet
- Stress: Hypothalamic-pituitary-adrenal axis (HPA) may secrete stress hormones, which may affect ovulation and sperm production.

The Psychological Impact of Infertility: a comparison with patients with other medical conditions


- Compared psych symptoms of women with infertility to other medical conditions
- 149 infertility, 136 chronic pain, 22 cardiac rehab, 93 cancer, 77 HTN, 11 HIV
- Distress associated with infertility as profound as dx of cancer and heart disease
- Also known higher rates of depression. One study of 526 medical outpatients, 19.8% had positive depression scores compared to 36.7% of infertility patients. Domar, A (1992) The prevalence and predictability of depression in infertile women.

Hypothalamus: The Supreme Multitasker!

- Releases hormones
- Regulates body temperature
- Maintains daily physiological cycles — hypothalamic-pituitary-ovarian axis
- Controls appetite — receives hormonal signals that indicate how much and what is being consumed, and how much energy is stored
- Encourages or discourages eating to balance energy needs with intake
- Manages sexual behavior
- Regulates emotional responses (perceives stress) — involved in the hypothalamic-pituitary-adrenal axis which secretes cortisol, which may reduce fertility

Stress adversely affects fertility: How?

- Both anxiety and depression correlate with IVF failure
- Most likely classic “fight or flight”
- Shifts blood to heart, brain and muscles from “nonessential” organs like the ovary, to deal with threat
- Number of studies support a vasoconstrictive mechanism reducing blood flow to the ovary
- A greater rise in diastolic BP in response to stressful stimuli predicted lower chance of pregnancy. (Psychosom Med. 1984)
- Low flow index around the dominant ovarian follicle associated with dramatically lower rate of clinical pregnancy (Mendes, et al. 1992)
- Anxiety and perceived stress reported significantly higher, and self-efficacy at dealing with stress lower, the day before retrieval in women referred to treatment (Tucker et al. 2001)
- Psychological interventions (especially CBT) associated with higher pregnancy rates and psychological outcomes!
How is Infertility Diagnosed?
Understanding the process is critical for relating to our patients

- Menstrual, pregnancy, birth control and sexual history
- Medications
- Surgeries and other significant health problems
- Lifestyle and work environment
- Physical exam – thyroid, hair patterns, breast and pelvic exam
- Tests – pap, possibly body temp charts, ovulation kits, blood tests for ovarian function, luteal phase testing (progesterone, hormone tests, endometrial biopsy, cervical mucus
- Procedures – ultrasound, HSG, hysteroscopy, laparoscopy

Fertility Interventions:

- Treatment of fibroids, endometrial polyps, endometriosis, fallopian tube conditions
- Treatment of ovulatory problems (Clomid or Letrozole) with timed intercourse or intrauterine insemination (IUI)
- IVF – intrauterine insemination involving ovulation induction, egg retrieval, fertilization and embryo transfer
- ICSI – IVF where a single sperm is injected into an egg

In the United States, the live birth rate for each IVF cycle started is approximately:

- 41-43% for women under age 35
- 33-36% for women ages 35 to 37
- 23-27% for women ages 38 to 40
- 13-18% for women ages over 40

= average 20-35% (insurance covers in 15 states)

Is insurance paying???
In most states, no ☺
16 states have insurance coverage laws and five states have fertility preservation laws for medically induced infertility:

- Arkansas
- California
- Connecticut
- Delaware
- Hawaii
- Illinois
- Louisiana
- Maryland
- Massachusetts
- Montana
- New Jersey
- New York
- Ohio
- Rhode Island
- Texas
- West Virginia

➢ Average cost per cycle in MA $11,500 – $13,500 not including testing and meds

Questions we may get on fertility and nutrition

- How much weight do I need to gain or lose to improve my fertility?
- Do I need to avoid gluten, dairy, soy or other foods when TTC?
- Is exercise OK?
- Are there foods I should be avoiding or eating more of, or supplements I should be taking?
- Will eating only organic foods help my fertility?
- Have I done anything to myself to reduce my fertility?

Ovulatory Problems

- Occurs in 20% of women with difficulty conceiving
- Overweight or underweight women may ovulate less frequently
- If overweight, losing as little as 5-10% of weight may resort ovulation without additional treatment
- Weight restoration in underweight women can restore ovulation (may take 3-6 months)
- PCOS most common cause of anovulation
The Deep Correlation between Energy Metabolism and Reproduction: A View on the Effects of Nutrition for Women Fertility – Nutrients, 2016, 8, 87

- "The unlimited availability of nutrients, in association with reduced energy expenditure, leads to alterations in many metabolic pathways and to impairments in the finely tuned inter-relation between energy metabolism and reproduction, thereby affecting female infertility."

- "...being under- and over-weight, obesity and strenuous physical activity are all conditions that alter the profiles of specific hormones, such as insulin and adipokines... dietary fatty acids, carbohydrates, proteins and their food-associated components (such as endocrine disrupters) have per se physiological activities, and their unbalanced intake... might impair metabolic homeostasis and fertility..."

Incidence estimated at 6-18% or more of women (approximately 5 million in US)

Causes 80% of anovulatory infertility* (up to 30% of infertility)

Hallmarks of PCOS are hyperandrogenism and chronic ovulatory dysfunction

Upwards of 70% are insulin resistant irrespective of weight; 10% have type 2 diabetes

40% of women with PCOS meet criteria for metabolic syndrome

PCOS: The most common hormonal disorder in women of reproductive

- Incidence estimated at 6-18% or more of women (approximately 5 million in US)
- Causes 80% of anovulatory infertility* (up to 30% of infertility)
- Hallmarks of PCOS are hyperandrogenism and chronic ovulatory dysfunction
- Upwards of 70% are insulin resistant irrespective of weight; 10% have type 2 diabetes
- 40% of women with PCOS meet criteria for metabolic syndrome

Overweight & Obesity in PCOS

- Reported in 50-80% or more of women w/ PCOS
- Obese women with PCOS more insulin resistant → at greater risk of infertility and DM
- Obese women with PCOS have lower levels of SHBG → higher testosterone levels
- PCOS women tend to eat more fat/calories, often driven by cravings for carbohydrates
- Weight loss is the primary goal of nutrition intervention – often best achieved by managing insulin resistance to improve pro-anabolic state, risk of DM and fertility.
- As little as 5-7% weight loss may return ovulatory function, reduce hirsutism, acne

Diet Therapy for PCOS

Needs to be individualized but several overall principles apply:

- Review of glucose, insulin metabolism and interface with reproductive hormones
- More plant-based diet; weight loss is generally a primary goal
- Regular meal pattern emphasizing even distribution of carbs (carb counting to assist with interpreting labels and nutrition logging apps
- Lean protein (satiety) & "healthy" fats w/meals = insulin sensitivity affected by fluidity of cell membranes → saturated fats "stiffen" cell membranes whereas poly and mono-unsaturated fats may ↑ membrane fluidity/↓ insulin resistance
- Reinforce exercise as insulin sensitizer, not just burning calories; strength training key

Being overweight reduces fertility with or without PCOS!

- Adipose tissue is metabolically active → obesity associated with reduced fertility (2/3 of women age 20 and older in the US have a BMI ≥ 25; 36% are obese)
- Major cause of anovulatory infertility → among obese women estimated that infertility rises 4% per unit of BMI
- Production of estrogen and sex hormone binding globulins are correlated with distribution of body fat (higher rates of infertility with visceral adiposity)
- Obese ovulatory women have higher rates of infertility r/t to egg quality (Insulin is pro-inflammatory and can negatively affect the genetic material in reproductive cells).

Preconception state and fertility/egg quality:

- "Success rates and pregnancy outcomes were most favorable in cohorts of recipients with low and normal BMI, but progressively worsened as BMI increased" – Analysis of 22,317 IVF donors cycles 1996-2013
- "Women with obesity or poorly controlled diabetes have an increased risk of infertility, miscarriage, obstetric complications, neonatal morbidity and mortality, and birth defects in their offspring" – Ling G, Metabolic control of oocyte development: linking maternal nutrition and reproductive outcomes, Cell Molec Life Sci Jan 2015, Vol 72 (2):pp 251-271

Figure 2: schematic diagram for the proposed pathways through which maternal nutritional status exerts its effects on oocyte metabolism and, therefore, reproductive outcome.

How effective are weight-loss interventions for improving fertility in women and men who are overweight or obese? A systematic review and meta-analysis of the evidence


- 14 RCT, 6 non-randomized, 20 cohorts with interventions of OW/obese men and women
- Calorie intakes ranged 1000 – 2000 cals/d; 3 VLCD
- Most physical activity was aerobic

Key findings:
- Weight loss interventions, particularly those including diet and exercise, resulted in more natural pregnancies, though no effect on IVF outcomes or miscarriage rates

A retrospective cohort study to evaluate the impact of meaningful weight loss on fertility outcomes in an overweight population with infertility.

Kort JD, Fertil Steril 2014 May;101(5):1400-1420

- 52 overweight and obese women studied to see if weight loss of 10% could improve pregnancy and live birth rates
- Followed by an endocrinologist who provided diet and exercise recommendations, metabolic screening, and pharmacologic intervention when indicated

Results: Thirty-two percent of patients achieved >10% weight loss, which correlated with significantly higher conception (88% vs. 54%) and live birth rates (71% vs. 37%) than those who did not

Obesity and Assisted Reproduction (IVF)

- Success rates fall with increase in BMI in both overweight and obese women
- Live births down 9% among overweight, 20% among obese women
- Miscarriage rates 24% higher among overweight, 36% higher among obese women following assisted reproduction
- Conception rates higher when donor eggs used → higher egg quality effected by differences in follicular fluid insulin, triglycerides, free fatty acids, proinflammatory cytokines, oxidized low density lipoprotein, and fatty acid composition;* uterine lining issues can still effect implantation

Weight loss improves reproductive outcomes in obese women undergoing fertility treatment: a randomized controlled trial.

Sim KA, Clin Obes. 2014 Apr;4(2):61-8

- 49 obese women age 37 or less seeking fertility tx → 27 to intervention, 22 control
- Control → printed material for weight loss
- Intervention → 6 weeks of medically supervised very low cal diet (~600 kcal) followed by 6 weeks on an RD-prescribed diet (600 kcal deficit), weekly group education, 10,000 steps monitored walking

Results: 80% completed the intervention; intervention group lost 5 kg more; reduced BMI by 1.8 units more than control (2.4 units total); waist circumference dropped by 8.7 cm (controls only 0.7)

Pregnancy rates were 48% among intervention (three naturally), 14% among control (intervention group avg 2 tx cycles vs 4 for controls)

But not all studies agree ....

Weight reduction intervention for obese infertile women prior to IVF: a randomized controlled trial

Hum Reprod. 2017 Aug 1;32(8):1621-1630

Question: Does intensive weight loss improve live births with IVF?
- 317 women from Sweden, Denmark and Iceland
- BMI 30 to <34
- Weight loss before IVF vs IVF only

Results?

WL/IVF 29.6% vs IVF 27.5% (not statistically significant)

Significantly more live births were achieved through spontaneous pregnancies in the weight reduction and IVF group, 10.5% compared to the IVF only group 2.6%
**Should obese women lose weight before TTC?**

*Randomized Trial of a Lifestyle Program in Obese Infertile Women (Netherlands)*

- Randomly assigned infertile women with a BMI of >29 to a 6-month lifestyle intervention preceding treatment for infertility (n. 290) or to practice treatment for infertility (n. 287)
- The primary outcome was a healthy vaginal birth at term within 24 months after randomization
- Results:
  - obese infertile women, a 6-month structured lifestyle intervention preceding infertility treatment did not result in higher rates of live births at 24 months compared to women who received usual infertility care
  - However, natural conception was significantly higher and 5% of infertility treatments was significantly lower in the intervention group (only 38% lost 5-10% of weight)

**Question:** Is it ethical to deny obese women access to assisted reproduction until they lose weight?!

---

**Diet and Men’s fertility: does diet affect sperm quality?**

*Fertil Steril* Vol 110, No 4, September 2018

- Understudied but 3 meta-analyses document downward trends in sperm concentration and count over the last 8 decades
- Recommendations to improve:
  - Increase omega 3s from supplements, fish or nuts
  - MVF that contains folate, B12, zinc
  - Encourage dietary pattern reflected in Mediterranean diet, DASH, Healthy Eating Index, Alternative Healthy Eating Index

* Dietary patterns are positively associated with semen quality, Fertil Steril Vol 109, No 5, May 2018

---

**Can we do anything about age?**

*You may be in great shape for 51 but your eggs are 51* - AD

- Age has a major effect on mitochondrial function and oocyte quality (coQ10)
- Age affects number of oocytes retrieved with fertility drug stim
- DHEA (adrenal androgen that converts to testosterone) and circulation testosterone decrease with age
- Some studies show improved stim with oral DHEA x 2-3 months, though data not conclusive; can have strong androgenic effects (acne, oily skin)
- Increased oxidative stress with age (reduced embryo quality; sperm DNA)
- Lifestyle habits can increase years of life, but data does not support can extend reproductive years
  - Encourage a “prudent diet,” weight management and sensible supplementation

---

**Egg Quality**

- CoQ10 = antioxidant, membrane stabilizer, influences mitochondria
  - High DHEA and low DHEA levels associated with optimal embryo rejection to kinetic parameters and higher pregnancy rates
  - CoQ10 supplementation in both normal (99 weeks) and infertile (94 weeks x 5, 123 women, 100 mg Q10)
- Antioxidants (Basel) 2018 Oct; 10(4): 683-694

- Vitamin D
  - vitamin D supplementation can help return serum vitamin D levels in infertile women to PDDS and ultra normal levels leading to an improvement in the quality of embryos and a significantly higher clinical pregnancy rate*
  - Study of 86 women with PDDS and IVF, vitamin D therapy and IVF outcome

* Women of the ovum of to those treatments with moderate hom with polymorphisms and a significant decrease*
So what can RDNs do about this?

❖ Ideally health care professionals would start discussions with their overweight and obese patients long before they contemplate pregnancy!
❖ RDNs are better positioned than anyone to help women mediate some of these risks by supporting them through lifestyle interventions
❖ Interventions should be aimed at preconception phase, during gestation, and post-partum to discourage weight retention
❖ Reasonable, achievable weight loss can make a difference (5-10%)

Preconception: Impact of diet and lifestyle on embryo quality and blastocyst formation

Irrespective of weight, in IVF most high quality in-vitro produced embryos still don’t implant, however ....

❖ Obesity negatively affects IVF outcome; physical activity enhances implantation and pregnancy rates.
❖ Diet quality may affect reproductive outcome in both males and females.
❖ Lifestyle factors may influence whether embryos may progress to blastocyst formation before transfer.

2015 study sought to evaluate whether lifestyle factors and eating habits can influence embryo quality.

The impact of food intake and social habits on embryo quality and the likelihood of blastocyst formation

- 2659 embryos from 269 women undergoing ICSI (intracytoplasmic sperm injection) between Jan 2012 – July 2013
- Interview/validated questionnaire on food frequency and social habits over previous year
- Outcome: Effects of diet/social habits on embryo quality day 3; pregnancy rates
  - Foods investigated: cereals, vegetables, legumes, fruit, red meat (including pork), chicken, fish, dairy, chocolate, soda (including caffeinated), alcohol, artificial sweeteners and coffee
  - Separate questionnaire on exercise, weight loss dieting over previous 3 months, # meals eaten per day, and smoking; BMI measured

The impact of food intake and social habits on embryo quality and the likelihood of blastocyst formation: RESULTS

Embryo quality/blastocyst formation

- Cereals, vegetables and fruits positively influenced embryo quality at cleavage stage
- Conversion of embryos into blastocysts increased with fruit and fish intake
- Day 3 embryo quality negatively associated with ETOH/smoking
- Weight loss diet, ETOH and red meat had negative influence on blastocyst formation

Pregnancy rates

- Red meat consumption, BMI and being on a weight loss diet had a negative effect on pregnancy rates
- Unclear the characteristics of reported “weight loss diet”

Theories behind findings:

❖ Red meat: effects of advanced glycation end products (AGE) on eggs and sperm
❖ Plant foods: lower oxidative stress/improved anti-oxidant status
❖ Fish: interesting because of concerns about toxins; ? balanced with positive effects of omega 3s
❖ Weight loss diet: well known that reproductive function extremely sensitive to calorie availability (excess activity/underweight can lower estrogen, leptin).
❖ BMI: inversely correlates with treatment success
❖ Limitation: lack of data on men

Diet Quality – what is a “prudent diet?”

Basically a Mediterranean, anti-inflammatory dietary pattern.

Adherence to the Mediterranean diet and IVF success rate among non-obese women attempting fertility

Methods: 244 non-obese women who underwent a first IVF treatment in an Assisted Conception Unit in Athens, Greece, between November 2013 and September 2016.

Diet was assessed before the IVF treatment via a validated food-frequency questionnaire (MedDietScore 0-55).

Results: compared with women in the highest tertile of the MedDietScore (≥36, n = 86), women in the lowest tertile (≤30, n = 79) had significantly lower rates of clinical pregnancy (29.1 vs 50.0%, P = 0.01) and live birth (26.6 vs 48.8%, P = 0.01). MedDietScore was positively correlated to clinical pregnancy and live birth among women <35 years old (P < 0.01) but not among women ≥35 years.

Among women <35 years, a beneficial 5-point increase in the MedDietScore was associated with ~2.7 times higher likelihood of achieving clinical pregnancy and live birth.
The Fertility Diet: Willett and Chavarro

- 17,544 women from the Nurses Health Study 2
- 66% lower risk of ovulatory disorders, 27% less due to other causes
- Low trans/ more monounsaturated fats
- Low intake of animal protein, more plant proteins
- High intake of low GI, high fiber carbohydrates
- High non-heme iron (from plant sources)
- Includes as little as one serving of high fat dairy
- Basically a Mediterranean Diet!

➢ But what about keto????????

Maternal whole grain intake and outcomes of in vitro fertilization

- 273 women who collectively underwent 427 IVF cycles.
- Whole grain intake was assessed with validated food frequency questionnaire

Results:
- Women had a median whole grain intake of 34.2 g/day (~1.2 servings/day).
- Adjusted percentage of cycles resulting in live birth for women in the highest quartile of whole grain intake (>52.4 g/day) was 53% compared to 35% for women in the lowest quartile (<21.4 g/day)

Conclusion: Higher whole grain intake in the year prior to fertility treatment was related to higher probability of live birth among women undergoing IVF. Data suggests greatest effect may be on endometrial thickness at time of embryo transfer.

Seafood Intake, Sexual Activity, and Time to Pregnancy

- 501 couples planning pregnancy; followed for ≤ 1 year or until pregnancy; food and sexual activity journals
- Couples with male and female partners who consumed eight or more seafood servings per cycle had shorter time to pregnancy than couples with male and female partners who consumed one or fewer seafood servings per cycle (highest effect when both consumed >servings per cycle).
- Male and female partners with the highest seafood intake (eight or more servings per cycle) also had 22% more sex!

Endometriosis

- 5-15% of women, 30-50% struggle with infertility
- Studies suggest diet potentially contributes but needs more study

Influence of diet on the risk of developing endometriosis

- Analysis of 12 studies
- Lower risk: Fruits and vegetables, fish oils, dairy products rich in calcium and vitamin D, and Omega-3 fatty acids associated with lower risk of developing endometriosis
- Increased risk: foods, particularly trans, beef/red meat and ETOH

Soy: one case-control study in Japan-9 women with stage II-IV had higher isoflavones in urine
Organic produce and early stage miscarriage

*Pesticide Residue Intake From Consumption of Fruits and Vegetables and Pregnancy Outcomes Among Women Undergoing Infertility Treatment With Assisted Reproductive Technology*

- validated "Pesticide Residue Burden Score"

Findings:
- intake of high-pesticide residue fruits and vegetables was associated with a lower probability of live birth, while low-pesticide residue fruit and vegetable intake was not associated with this outcome.
- Limitations: exposure was based on reports, not directly assessed, but reasonable to recommend “Dirty Dozen” guidance on best options for organic.


Preconception: all women should have weight status assessed and referred for counseling/lifestyle interventions

Obese with infertility: intensive weight loss counseling; 800 mcg folic acid due to increased risk of NTD

What do I do with these women?

- Sensitively discuss the risks associated with excess weight gain while emphasizing that 5-10% weight loss may make a significant difference (losing 7% body weight can improve insulin sensitivity 57%)
- Target the insulin resistance due to PCOS or likely present in those with a BMI > 30 via carb-controlled diet (not low carb); work with women to increase intake/moderate activity with HA.
- Evidence-based supplementation
- Encourage them to be active in context of managing underlying IR

Physical Activity

Exercise is good, just keep it moderate!
- Maternal physical activity before IVF/ICSI cycles improves clinical pregnancy rate and live birth rate: a systematic review and meta-analysis
- PA before was associated with better outcomes (more pregnancies and live births)
- not associated with miscarriage
- relationship probably complex → improved energy balance, insulin sensitization, restores ovarian function, increased sensitivity to Clomid, stress/anxiety management, IR of endometrium can impede implantation
- Assumes physical activity within usual health guidelines, not athletic-level activity

Caffeine

- Studies have been conflicting
- One meta-analysis of caffeine during pregnancy → for every 100 mg/d of caffeine consumption during early pregnancy, the risk of SAB increased by 14% (goal is to treat deficiency)
- and risk of SAB (NHS2/Chavarro) → women consuming > 4 servings of coffee/day (caffeine decaf) prior to pregnancy had a 3.6% higher risk of SAB between weeks 8-16 than those who abstained (hard to untangle caffeine from coffee – association not seen with tea or soda)
- do heavy pre-pregnancy continue to use more during pregnancy?
- Both caffeine and decaf associated – something else in coffee that affects sex hormones? Those at higher risk of miscarriage switching to decaf despite efforts to control?
- Am Congress of OB/GYNs suggest < 200 mg/d

Supplementation

- MVI/antioxidants (prefer food sources of antioxidants)
- Vitamin D – lower levels a/w with lower pregnancy rates with IVF but studies are mixed (goal is to treat deficiency)
- CoQ10 – see aging slide
- Inositol – for insulin resistance and egg quality (prefer 4:1 myo to D-chiro inositol)
- Melatonin – hormone/antioxidant (egg quality)
- Omega 3s – encourage seafood, supplement as option
- DHEA – I defer to the physician
Start with a “Balanced Plate”

Summary:

• Encourage efforts towards weight and stress management
• Encourage moderate activities while avoiding vigorous
• Avoid ETOH and smoking (includes MMJ)
• Promote a plant-based, anti-inflammatory dietary pattern
• Encourage male partners to work on weight, diet quality, activity and take an MVI containing antioxidants

Case Study: PCOS

• Case study: Twenty-two year old woman with infertility with BMI of 32.9 (198#) – conceived on her own two years ago at BMI 28.8 (173#)
• PCOS/cystic acne
• Loves to exercise but struggles to find time with 2 year old
• Meds: Levoxyl
• Supplements: prenatal with DHA
• Hgb A1C 5.2
• Education around PCOS/IR/fertility; log with Good Measures and return for follow up ongoing education and support around weight loss to BMI below 30