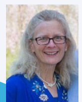
COPE Webinar Series for Health Professionals

March 17, 2021

The Relationship between Female Fertility & Bariatric Surgery and Nutritional Considerations



Moderator
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Today's Webinar Objectives

- Provide an overview of infertility and the causes and impact of weight on fertility.
- Discuss impact of bariatric surgery on fertility.
- Review nutritional and lifestyle considerations for post-bariatric surgery patients seeking and/or achieving pregnancy.

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The Relationship between Female Fertility & Bariatric Surgery and Nutritional Considerations

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Disclosures

The planners and presenter of this program have no conflicts of interest to disclose.

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Let's find out about today's audience

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The Relationship between Female Fertility & Bariatric Surgery and Nutritional Considerations

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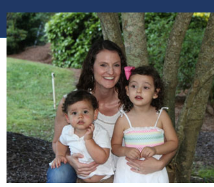
About me…



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Defining Infertility

- Women > 35 yrs old: failure to become pregnant after 6 months[1]
- Women < 35 yrs old: failure to become pregnant after 12 months[1]
- American College of Obstetricians and Gynecologists (ACOG) reports that up to 15% of couples experience infertility[1]

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The Impact of Weight on Fertility [2]

Women who are underweight experience 4x longer time to pregnancy

Women with obesity experience 2x longer time to pregnancy

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BMI [3]

- Underweight BMI <= 18.5
- Normal weight = BMI 18.6-24.9
- Overweight = BMI 25-29.9
- Class 1: BMI 30-34.9
- Class 2: BMI 35-39.9
- Class 3: BMI > 40

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Prevalence of Obesity & Women

- 2017-2018, prevalence of obesity was 42.4% [3]
  - only 1% of eligible Americans have bariatric surgery [4]
- 36.5% of women aged 20-39 are obese [4]
- Average American female is 5’3”, 170 pounds, and BMI 29.7[3]

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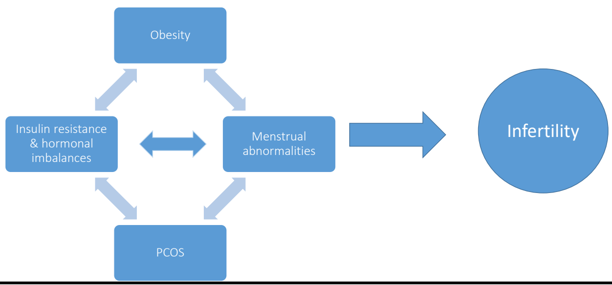
Infertility in Women with Obesity



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Menstrual Abnormalities

- Higher incidence of menstrual irregularity and lower chance of conception within 1 year of stopping contraception compared to normal-weight women. [6]
  - 66% of obese women conceive in 1 year compared to 81% of those of normal weight.
- Ovulatory dysfunction can be related to PCOS but commonly accepted mechanisms independent to PCOS have also been proposed caused by hormonal imbalances. [6]
- Anovulatory infertility is also more common in women with BMI > 27 compared to lower BMIs and is related to menstrual abnormalities

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Causes of Infertility in Women with Obesity

- Through a study of women participating in IVF , it was found that oocytes in women with BMI >25 have been shown to be smaller and less likely to complete development after being fertilized.[6]

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Polycystic Ovarian Syndrome [2 & 7]

PCOS & Obesity

The prevalence of obesity in PCOS is variable—estimates: 30-70%	Conversely, 30% of women with obesity have PCOS	Obesity can exacerbate irregular menstruation which is a primary cause of infertility in women with PCOS.	Symptoms of PCOS are sensitive to weight changes and as little as 5% weight loss can improve ovulatory dysfunction and restore fertility.

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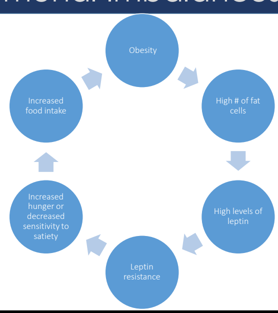
Hormonal Imbalances



- Higher levels of circulating leptin more common in women with PCOS
- Leptin has also been shown to contribute to insulin resistance. [2]
- This higher levels of leptin might contribute to dysfunction of follicular maturation and ovulation. [2]

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Insulin Resistance

- Insulin resistance can be caused by obesity or excess adiposity.[2]
  - Higher waist circumference
- Insulin resistance could also be cause infertility in women with obesity.[7]
  - Obesity and PCOS independently contribute to insulin resistance.

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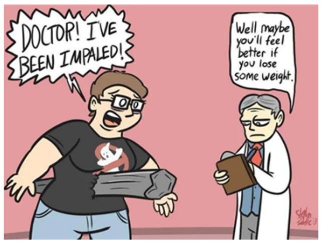
Treatment of Obesity



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What is the goal?

- ACOG Committee on Gynecologic Practice and American Society of Reproductive Medicine recommends:
  - Attempt to attain a normal body mass index (BMI) before conceiving due to the association of high BMI with infertility and maternal and fetal pregnancy complications.[9]

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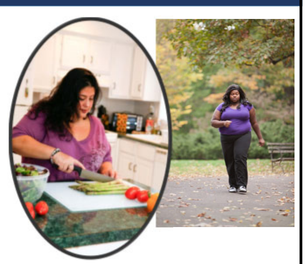
Lifestyle Modifications

- PCOS symptoms have been shown to improve with lifestyle changes and 5% weight loss. 7
- The positions statement from ASMBS, ACOG & TOS on Infertility states that while evidence is limited there are associations between improved fertility and diets that replace animal sources of protein and fat with vegetable sources. 2
- Associations have also been found between increased physical activity & a "Mediterranean" style eating patter may lower instances of infertility independent of weight loss. 8



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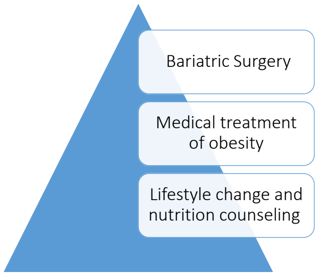
Treatment options for Obesity- change to tree



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Who qualifies for bariatric surgery? [5]

- BMI > 40
- BMI = 35-39.9 with at least 1 co-morbid condition
  - Ex. Diabetes, HTN, sleep apnea, etc
- Contraindications:
  - Current Smoker
  - Current/Recent (<1 yr) Substance Abuse
  - Psychological History
    - Current eating disorders, current/past psychiatric disorders
  - Medical history (cardiac or pulmonary clearance required)
  - Surgical history (extensive abdominal surgeries)
  - Age (>70 may be considered too high risk)
  - Pregnant or breastfeeding

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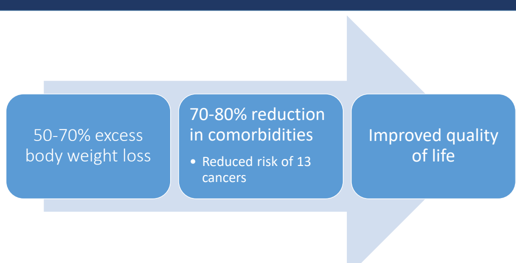
Benefits to Bariatric Surgery



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Bariatric Surgery Options

- Vertical sleeve gastrectomy ✓
- Roux-en-Y gastric bypass ✓
- Adjustable gastric band ☒
- Duodenal switch with or without duodenal switch ☒

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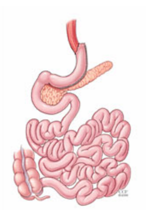
Sleeve Gastrectomy [11]

- **Average** 60% excess weight loss over 2 yrs
- 80% improvement or resolution of comorbidities
- 61.4% of cases done in U.S. (as of 2018)
- Less than 0.5% mortality
- 10% failure
- 2-3% reoperation rate
- 1.74% serious event [5]



https://asmbs.org/patients/bariatric-surgery-procedures

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Roux-en-Y Gastric Bypass

- **Average** 60-80% excess weight loss over 1.5 years
- 80% improvement or resolution of comorbidities (best procedure for diabetics)
- 17% of cases done in U.S. (as of 2018) 2
- 0.3-0.5% mortality
- 3-4% failure
- 10% reoperation rate

https://asmbs.org/patients/bariatric-surgery-procedures

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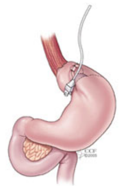
Adjustable Gastric Band (Band or ABG or Lap Band)

- Average 50% excess weight loss
- 0.1% mortality
- 15% weight loss failure
- 10% reoperation rates (as many as 1/10 bands need to be removed)
- Requires monthly adjustments
- Used to be most common procedure done in U.S., now only 1.1% of cases (as of 2018)



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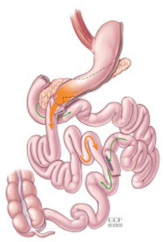
Duodenal Switch with/without Biliopancreatic Diversion (DS or DS-BPD)

- Average 79% excess weight loss
- Highest mortality of any bariatric procedure
  - 1.1% for laparoscopic[5]
- 7% complication rate[6]
- Higher rates of vitamin/mineral deficiency
- Early complications - Leak, obstruction, GI bleed
- Late complication – obstruction, malnutrition, incisional hernia
- 0.8% of cases done in U.S. (as of 2018) [2]



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Pregnancy & Bariatric Surgery

- Bariatric surgery has a significant effect on increased fertility. [5]
- Conception is not recommended until after 12-24 months after surgery. [5]
  - Pregnancy within 1st year:
    - Increased concern of nutritional implications
    - Impact weight loss sucess

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Pregnancy & Bariatric Surgery[13]

Lowered Risks
- Pregnancies after bariatric surgery were associated with lower risk of
  - Gestational DM
  - Large for gestational age infants (>90th percentile)

Increased Risks
- Pregnancies after bariatric surgery were associated with increased risk of
  - Small for gestational age infants
  - Shorter gestation (-4.5 days), but risk of preterm birth (<37 weeks) was not significantly difference
  - Potentially increased risk of stillbirth or neonatal death (1.7% vs. 0.7% in control group)

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Pregnancy after Bariatric Surgery

As RDNs/RNs we may encounter women who become pregnant after bariatric surgery unplanned or women who desire bariatric surgery as a method to lose weight to improve fertility.

- 80% of bariatric surgeries are performed on women[21]

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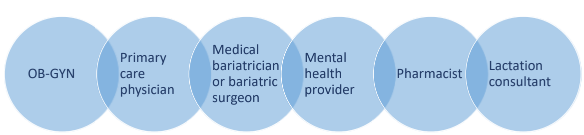
Pregnancy after Bariatric Surgery

- Now we have a patient who is pregnant post bariatric surgery, what do we do?
- First-- be sure the patient as a Multidisciplinary team and communicate nutrition goals with this team



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Pregnancy after Bariatric Surgery Weight Gain

- Weight gain during pregnancy after bariatric surgery[11]
  - Underweight (BMI < 18.5)= 28-40 lbs
  - Normal weight (BMI 18.5-24.9)= 25-35 lbs
  - Overweight (BMI 25-29.9)= 15-25 lbs
  - Obese (BMI > 30)= 11-20 lbs

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Pregnancy Nutrition Goals Post Bariatric Surgery

Nutrition prescription:
- Energy needs: adequate to support appropriate weight gain/maintenance
- Protein needs: 1.2g/kg/IBW
- Fluids: 3 liters

Key behaviors
- Small frequent meals of nutrient rich foods
- Small bites and chew food well
- Small frequent sips of fluids

Pregnancy complications
- Nausea
- Vomiting or Excessive weight loss
- Food aversions

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Other considerations

- Women are likely healthier post bariatric surgery due to changes in quality of food eaten, activity level, and improvements in co morbid conditions
- Some women may have a fear of weight gain
  - Focus on nutrition to ultimately support a healthy pregnancy and child, not on weight gain
  - Empower clients in the power of their bodies to create life and their bodies to adapt after birth
  - Discuss nutrition to support pregnancy and ultimately breast feeding
  - Be able to recognize when you need to refer a client to eating disorder specialist

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Micronutrient Needs[16 17]

- Patients should continue to take bariatric specific multivitamins

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Supplement Facts
Serving Size: 1 Capsule
Servings Per Container: 30

	Amount Per Serving	% Daily Value
Vitamin A (as *wm retinyl palmitate and 50% as beta-carotene)	3,000 mcg	333%
Vitamin C (as ascorbic acid)	90 mg	100%
Vitamin D3 (as *wm cholecalciferol)	75 mcg	375%
Vitamin E (as *wm d-alpha-tocopheryl acetate)	40 mg	267%
Vitamin K (as phylloquinone)	120 mcg	100%
Thiamin (as thiamin mononitrate)	12 mg	1,000%
Riboflavin	12 mg	923%
Niacin (as niacinamide)	40 mg	250%
Vitamin B_6 (as pyridoxine HCl)	4 mg	235%
Folate	1,333 mcg DFE (800 mcg folic acid)	333%
Vitamin B_{12} (as methylcobalamin & cyanocobalamin)	500 mcg	20,833%
Biotin	600 mcg	2,000%
Pantothenic acid (as D-calcium pantothenate)	20 mg	400%
‡Iron (as carbonyl iron and ferrous fumarate)	45 mg	250%
Iodine (as potassium iodide)	150 mcg	100%
Magnesium (as magnesium oxide and magnesium citrate)	100 mg	24%
Zinc (as zinc bisglycinate chelate)	30 mg	273%
Selenium (as selenium glycinate complex)	140 mcg	255%
Copper (as copper bisglycinate chelate)	3 mg	333%
Manganese (as manganese bisglycinate chelate)	2 mg	87%
Chromium (as chromium nicotinate glycinate chelate)	200 mcg	571%
Molybdenum (as molybdenum amino acid chelate)	75 mcg	167%

Other ingredients: Gelatin, magnesium stearate and silica.

*Denotes water miscible

Supplement Facts
Serving Size 1 Softgel

Amount Per Softgel	% Daily Value for Pregnant Women and Lactating Women
Calories 5	
Vitamin A (as Beta Carotene) 770 mcg	59%
Vitamin C (as Ascorbic Acid) 85 mg	71%
Vitamin D_3 (as Cholecalciferol) 25 mcg (1000 IU)	167%
Vitamin E (as d-Alpha Tocopherol) 15 mg	79%
Vitamin K (as Phytonadione) 90 mcg	100%
Thiamin (as Thiamine Mononitrate) 1.4 mg	100%
Riboflavin 1.4 mg	88%
Niacin (as Niacinamide) 18 mg	100%
Vitamin B_6 (as Pyridoxine Hydrochloride) 1.9 mg	95%
Folate 1330 mcg DFE (800 mcg Folic Acid)	222%
Vitamin B_{12} (as Cyanocobalamin) 5.2 mcg	186%
Biotin 30 mcg	86%
Pantothenic Acid (as d-Calcium Pantothenate) 6 mg	86%
Calcium (as Calcium Carbonate) 150 mg	12%
Iron (as Ferrous Fumarate) 27 mg	100%
Iodine (as Potassium Iodide) 150 mcg	52%
Magnesium (as Magnesium Oxide) 45 mg	11%
Zinc (as Zinc Oxide) 11 mg	85%
Omega-3 Fatty Acids (from Fish Oil Concentrate)†† 260 mg	*
Omega-3 Docosahexaenoic Acid (DHA)†† 200 mg	*
Omega-3 Eicosapentaenoic Acid (EPA)†† 60 mg	*

*Daily Value not established.

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Micronutrient Monitoring[18]

- Labs should be assessed initially and then at each trimester or more often if deficiencies are present
  - For list of specific lab values & repletion of deficiencies refer to the Clinical Practice Guidelines for Childbearing Female Candidates for Bariatric Surgery, Pregnancy, and Post-partum Management After Bariatric Surgery [18]

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Nutrient at risk of def during pregnancy	Bariatric Supplement Recommendation	Pregnancy Consideration	Comment
Vitamin A	5000-10,000 IU	No more than 5000 IU [18]	Preferably in form of beta carotene vs retinol
Zinc	8-22mg[15]	10mg[18]	
Copper	1mg[18]	1mg[18]	
Folic Acid	400-800µg [15]	800-1000µg [15]	5mg/day if hx of neural tube defects
Iron	46-60mg[15]	45-60mg	May increase up to 240mg orally if there is a deficiency
Choline	n/a	425-450mg recommended[19,20]	Often not in standard MVI
Calcium + vitamin D	1200-1500mg calcium citrate or carbonate[15] 3000 IU[15]		
May need to add additional single supplements to daily vitamin/mineral regimen to meet increased needs if a deficiency is present.			

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Case Study 1

- 38 YOF with hx of PCOS, Type 2 DM, hyperlipidemia, and BMI 39.4 with 2 years unable to conceive.
  - Pt has a long history of obesity since college; Has slowly gained weight since her 20s and tried many different weight loss diets and programs.
- 24 Hr diet recall:
  - B: Skips
  - L: eats from hospital cafeteria—meat + 2 sides. Usually eats quickly and gets back to work or eats while working
  - D: Fast foods or to go from her favorite Mexican restaurant
- Fluids: water, diet coke, coffee
- Activity: Some, likes to walk neighborhood once or twice a week with friends; Sedentary job in HR for a large hospital.

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Case Study 1

- What you recommend to the patient?
- Does the patient qualify for bariatric surgery?
- Nutrition assessment/diagnosis
- Nutritional Intervention/Counseling:
- Nutrition Monitoring and Evaluation:

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Case Study 1

- What you recommend to the patient?
- Does the patient qualify for bariatric surgery?
  - Yes- BMI >35 with 2 co morbid conditions
- Nutrition assessment/diagnosis
  - Discuss the patients health goals overall and related to pregnancy
    - Dive into weight/diet history a bit more to get more perspective
  - Has the patient considered bariatric surgery
- Nutritional Intervention/Counseling:
  - Do what we do best, use motivational interviewing to set some realistic diet/exercise goals
  - Discuss weight loss options including bariatric surgery as an option and make referral if appropriate
- Nutrition Monitoring and Evaluation:
  - Create a follow up a patient centered follow up plan

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Case Study 2

- 37 YOF s/p RYGB 9/15/2020
  - Pre Surgery Weight: 291 lbs
    - 3 month post op weight: 261 lbs
  - Weight today: 240 lbs
- 17 weeks pregnant
- 24 Hr diet recall: B: 1 egg; L: 1/2 turkey sandwich; S: apple; Dinner: 2oz chicken breast & 1/3 cup broccoli
- Fluids: apple juice, water, & Gatorade
- Supplements: PreNatal MVI 1x/day, Ca + vitamin D supplement

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Case Study 2

- Nutritional Assessment and Diagnosis:
- Nutritional Intervention/Counseling:
- Nutrition Monitoring and Evaluation:

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Case Study 2

- Nutritional Assessment and Diagnosis:
  - Ensure appropriate labs are checked at visit and then at least every 3 months if not more
- Nutritional Intervention:
  - Advise pt to continue bariatric formulated vitamins
  - Increase nutrient rich foods in diet:
    - Add snacks between meals
    - Incorporate a fruit or vegetable with each meal or snack
    - Add protein shake once per day to reach increased protein goal
  - Encourage less sugar sweetened beverages, more water.
- Nutrition Monitoring and Evaluation:
  - Labs
  - Weight gain
  - PO intake – protein

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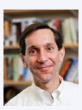
Leveraging the New Economics of Nutrition for Improved Patient Care and Public Health

Wednesday, April 7 12-1 PM



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To Register:
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Be a part of the CHAMPS Study!

- A study of the experience and self-reported health and well-being of essential workers, first responders, service staff and healthcare professionals who provided support for patients, treatment sites and the community during the COVID-19 pandemic.
- Survey: 15-20 minutes
- See Villanova.edu/cope for more info
- Pass along to colleagues

CHAMPS
Caring about Health for All
A study of the COVID-19 workforce

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Questions?

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