Welcome to the COPE Webinar Series for Health Professionals!

December 15, 2015

Nutrition and Preconception Health

Time: 12 noon – 1 PM EDT
Moderator: Lisa Diewald, MS, RD, LDN
Program Manager
MacDonald Center for Obesity Prevention & Education

Handouts of the slides are posted at: www.villanova.edu/COPE

MacDonald Center for Obesity Prevention and Education (COPE) Goals

Nutrition and Preconception Health

Objectives:
The learner will be able to:
1. State why preconception health and health care (PCC) is an important component of overall women’s health.
2. Describe the impact of maternal nutrition and weight status during the reproductive years.
3. Describe ways public health professionals can promote healthy nutrition practices as part of PCC.

Credits: This webinar awards 1 contact hour for nurses and 1 CPEU for dietitians.
Suggested CDR Learning Need Codes: 5370 and 4000; Level 2.

Notice:
Villanova University College of Nursing is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center Commission on Accreditation.
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12/9/2015
Nutrition and Preconception Health

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DISCLOSURE

Neither the planners or presenter have any conflicts of interest to disclose.

Accredited status does not imply endorsement by Villanova University, COPE or the American Nurses Credentialing Center of any commercial products or medical/nutrition advice displayed in conjunction with an activity.

Part of the work presented by the speakers today was from an ongoing project supported in part by a grant from the Health Resources and Services Administration, Maternal and Child Health Bureau (contract # T79MC00007)
Preconception and Interconception Health

- Refer to the state of a woman’s health before and between pregnancies.
- It includes care before a first pregnancy or between pregnancies (interconception care).
- Identify and modify biomedical, behavioral and social risks to a woman’s health or pregnancy outcome through prevention and management.
- The goal of the care is two-fold: improve the woman’s health and help reduce health risks to her future baby.

Why Does it Matter?

- Increased importance as a way to improve woman’s and infant’s health.
- Influences women’s overall wellbeing today and later in life.
- Health of women prior to pregnancy affects health of their offspring, and possibly subsequent generations. Many risks are nutrition related and affect genetic expression or fetal programming.
- Children born to women who experience preconception health care should be less likely to be premature, low or high birthweight, have a birth defect or other disabling condition.
Organizing Frameworks

• Social Determinants of Health
• Life Course Theory
• Fetal Origins Hypothesis or Barker Hypothesis

Concepts Support Health

• Live in healthy environment with clean air and water.
• Enhance factors positively associated with health, e.g. access to health care.
• Reduce factors with a negative influence, e.g. smoking.
• Engage in health promoting behaviors, e.g. physical activity and healthy eating.
• Access to knowledge and resources needed to plan pregnancies.

Preconception Health Care

• Is a set of primary prevention interventions to address problems that are difficult or impossible to change during pregnancy e.g. folic acid intake or weight.
• Seeks to positively influence factors associated with poor pregnancy outcomes, such as interconception length, chronic disease control and unintended conception.
Preconception Health Care (cont.)

• Is clinical care tailored to women to increase their chances of having a healthy baby.

• Includes health assessment and maintenance across the life span integrating childbearing and contraceptive considerations with women’s general health concerns.

• An important component is reproductive life planning that involves activities to help women plan, based on their values and resources, how to achieve personal goals about whether or when to have children.

Unintended Pregnancy

• A challenge is unintended pregnancy. If a woman is unaware she is pregnant she cannot attend to the critical needs associated with the early weeks of pregnancy.

• On average in this country, a woman spends about five years pregnant, postpartum or trying to become pregnant, and three decades—more than three-quarters of her reproductive life—trying to avoid an unintended pregnancy.

• Currently, about 51 percent or 3.4 million pregnancies in the United States each year are unintended.

What is Needed

• Requires multiple, sustainable interventions that occur concurrently to improve overall health.

• Affects public health system (policy, systems and environment) and clinical practice.

• Seek to integrate preconception care into clinical care and make it widely available, so that women ask for this care, providers offer it and insurers reimburse for services.
Resources

• The National Preconception Health and Healthcare Initiative is a leader in promoting preconception health. A public/private partnership led by CDC.

• Before, Between and Beyond Pregnancy website was established as comprehensive clinical resource.

EPIDEMIOLOGY OF OBESITY AMONG FEMALES OF REPRODUCTIVE AGE

Why should we be concerned?

Rates of Overweight and Obesity (BMI ≥ 25 or ≥ 85th percentile) Among Females, by Race/Ethnicity

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>12-19 yr</th>
<th>20-39 yr</th>
<th>40-59 yrs</th>
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<tbody>
<tr>
<td>Total</td>
<td>33.8</td>
<td>58.5</td>
<td>71.7</td>
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<tr>
<td>Non-Hispanic White</td>
<td>31.0</td>
<td>55.0</td>
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<tr>
<td>Non-Hispanic Black</td>
<td>42.5</td>
<td>80.0</td>
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<td>Non-Hispanic Asian</td>
<td>15.0</td>
<td>26.2</td>
<td>39.4</td>
</tr>
<tr>
<td>Hispanic</td>
<td>36.5</td>
<td>69.5</td>
<td>84.0</td>
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</table>

### Rates of Obesity (BMI > 30 or > 95th percentile) Among Females, by Race/Ethnicity

<table>
<thead>
<tr>
<th></th>
<th>12-19 yr</th>
<th>20-39 yr</th>
<th>40-59 yrs</th>
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<tbody>
<tr>
<td>Total</td>
<td>20.7</td>
<td>31.8</td>
<td>39.5</td>
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<tr>
<td>Non-Hispanic White</td>
<td>20.9</td>
<td>27.8</td>
<td>36.3</td>
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<tr>
<td>Non-Hispanic Black</td>
<td>22.7</td>
<td>55.8</td>
<td>58.6</td>
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<tr>
<td>Non-Hispanic Asian</td>
<td>7.3</td>
<td>10.9</td>
<td>11.8</td>
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<tr>
<td>Hispanic</td>
<td>21.3</td>
<td>35.8</td>
<td>51.9</td>
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</table>


### Rates of Grade 2 and 3 Obesity Among Females, by Race/Ethnicity

<table>
<thead>
<tr>
<th></th>
<th>20-39 yr</th>
<th>40-59 yrs</th>
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</thead>
<tbody>
<tr>
<td>Grades 2 and 3 (BMI ≥ 35)</td>
<td>15.4</td>
<td>19.1</td>
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<tr>
<td>Non-Hispanic White</td>
<td>13.7</td>
<td>16.9</td>
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<tr>
<td>Non-Hispanic Black</td>
<td>30.6</td>
<td>30.4</td>
</tr>
<tr>
<td>Hispanic</td>
<td>15.1</td>
<td>25.5</td>
</tr>
<tr>
<td>Grade 3 (BMI ≥ 40)</td>
<td>7.7</td>
<td>9.8</td>
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<tr>
<td>Non-Hispanic White</td>
<td>6.8</td>
<td>8.4</td>
</tr>
<tr>
<td>Non-Hispanic Black</td>
<td>17.5</td>
<td>17.9</td>
</tr>
<tr>
<td>Hispanic</td>
<td>5.8</td>
<td>9.1</td>
</tr>
</tbody>
</table>

### OBESITY, NUTRITION AND MATERNAL AND FETAL HEALTH
Obesity and Fertility

• Fecundity reduced by overweight and obesity
  – 28% lower among overweight women
  – 40% lower among obese women
  – 62% lower among very obese women
• Weight gain of 15 kg or more after age 17 was a significant risk for reduced fertility
  – Weight change between pregnancies can affect fertility though limited data are available

Weight and Women’s Health

Higher ovulatory infertility risk with higher BMI at age 18

Prepregnancy Weight and Fertility

• Odds of success in assisted reproductive technology (ART) are lower in obese women
  – Odds are 9% lower among overweight women
  – Odds are 13% lower among obese women
  – Live birth rates are 9% lower among overweight women who had successful ART
  – Live birth rates are 20% lower among obese women who had successful ART
  – Miscarriage rates following ART are 24% higher among overweight and 36% higher among obese women following ART
Weight Loss and Fertility

- Loss of 10% of body weight can show remarkable increases in fertility
- 6-month lifestyle program in Australia
  - Weekly visits with diet and exercise instruction
  - Average BMI of 37 with 10 Kg (22 lb) weight loss
  - 60 of 67 anovulatory subjects resumed menses
  - 52 conceived, 45 delivered live infant
  - Previous treatment costs were $275,000 (Au) per infant birth
  - Lifestyle program costs was $4600 (Au) per live birth


Obesity and Hypertension

- Hypertension is one of the top 3 causes of maternal morbidity
- About 10% of women of reproductive age have pre-existing hypertension
  - 15% among women 35 – 44 years old
  - 19% among black women
  - 9% among white women
- Hypertension increases the risk of pre-eclampsia, placental abruption, gestational diabetes, preterm delivery, small for gestational age delivery and fetal mortality


Obesity as a Risk for Gestational Hypertension and Pre-eclampsia

- Rates of hypertension among women have doubled in the past 2 decades, mirroring increases in obesity rates
  - More than 6% of obese women enter pregnancy with hypertension compared to 0.4% of women with BMI < 25
- Gestational hypertension rates follow the same racial/ethnic and age patterns as preconception obesity

**Obesity, Gestational Hypertension and Pre-eclampsia**

- Gestational hypertension occurs 4 to 6 times more frequently in obese compared to non-obese women
- Obesity prior to pregnancy increases the risk of pre-eclampsia 3- to 8-fold
- Gestational hypertension and pre-eclampsia double a woman’s risk of developing type 2 diabetes later in life
  - Risk is increased 13 times if woman experiences both GDM and hypertension during pregnancy

**Obesity and Gestational Diabetes**

- Approximately 2% of women who become pregnant have pre-existing diabetes
- Women who are obese prior to pregnancy are at increased risk for development gestational diabetes (GDM) compared to non-obese women
  - 3 times the risk for class I obesity
  - 4 times the risk for class II obesity
  - 6 times the risk for class III obesity

**Obesity and Assisted Delivery**

- Obese women approximately twice as likely to require induction of labor
  - 4 times higher rate among if diagnosed with hypertension
  - 11 time higher rate is diagnosed with gestational diabetes
- C-section rate increased among obese women
  - 26.5% among normal weight women
  - 38.2% among women with class 1 obesity
  - 43.1% among women with class 2 obesity
  - 49.7% among women with class 3 obesity
  - Each BMI unit above 30 increases risk by 7%
  - 3 times higher rate among obese women due to pre-eclampsia
  - 2 times higher rate among women due to fetal distress or failure to progress during labor

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Prepregnancy Weight and Birth Defects

- Congenital anomalies are more common among overweight and obese women
  - Birth defects occur in 4.7% of infants born to normal weight women vs 5.5% of infants born to obese women
- Obesity prior to pregnancy is an independent risk factor for some birth defects
  - Doubles the risk for neural tube defects (spina bifida)
  - Increases the risk of cardiac defects by 30% to 40%
  - Increases the risk of limb reduction by > 30%
- Underweight prior to pregnancy may be a risk for birth defects
  - Cleft lip and palate

Obesity and Birthweight

- Birthweights among full-term infants born to obese mothers are 100-200g higher than those born to normal weight mothers
  - Macrosomia is two- to three-times more common among infants born to obese mothers
- Low birthweight occurs more often among infants born to obese mothers
  - Twice the risk in presence of class 1 and 2 obesity
  - Three times the risk in presence of class 3 obesity
- Preterm birth rates have been found to be higher among obese women
  - Medically indicated due to hypertension or diabetes
  - Spontaneous secondary to infection or inflammation

Obesity and Depression

- A high prepregnancy BMI is a risk factor for postpartum depression 6 – 8 week after delivery
  - 19% among women with class 1 obesity
  - 32% among women with class 2 obesity
  - 40% among women with class 3 obesity
- Most of these women have also experienced excessive gestational weight gain
  - Risk of postpartum depression at 12 months is 2.9 times higher among women who gained excessively vs those who gained within the IOM recommendations
**Obesity and Postpartum Health**

- Lifelong type 2 diabetes risk is elevated up to 12 times by presence of obesity in women
  - Bariatric surgery may resolve type 2 diabetes in up to 75% of obese women
- Obesity increases the risk of cardiovascular disease by up to 300%
  - Most elevated risk seen among women with waist circumference > 88 cm or waist to hip ratio > 0.88

**Postpartum Weight Retention**

- 75% of women have higher weights at 12 months postpartum than before pregnancy
  - 47% retain 10 lb or more
  - 24% retain 20 lb or more
  - Largely seen among women with prepregnancy obesity rather than those with excessive gain
  - Up to 13% of women will move from prepregnancy normal weight to postpartum overweight status
- Weight retention at 6 months postpartum associated with higher weight status and larger waist circumferences at 7yr and 15yr postpartum

**Low Pre-pregnancy BMI**

- In two cohort studies, pre-pregnancy BMI <18.5 was associated with an increased risk of preterm birth
  - Preterm Prediction Study, RR=2.5
  - Pregnancy, Infection and Nutrition Study, adjusted OR = 1.6 [1.2,3.3]
  - Primarily associated with preterm labor but not with PROM or medically induced delivery
    - OR = 2.0 [1.2,3.4]
  - Primarily associated with late preterm birth
    - OR = 1.6 [1.0,2.4]
DOES NUTRITIONAL STATUS MATTER?

Iron Supplementation and Pregnancy Outcomes

- Effects of iron supplementation are positive
  - Higher hemoglobin concentration
    - 4.59 g/dL
  - Reduced risk of all types of anemia
    - RR = 0.5 (0.42-0.59)
  - Reduced risk of iron deficiency
    - RR = 0.59 (0.46-0.79)
  - Reduced risk of iron deficiency anemia
    - RR = 0.4 (0.26-0.6)
  - Reduced risk of low birthweight
    - RR = 0.81 (0.71-0.93)
  - Higher birth weight
    - 3325g vs 3217g
  - No effect on preterm birth
  - Several studies did show up to 32% reduction

Evidence exists for an association between maternal hemoglobin concentration and birth weight, as well as between maternal hemoglobin concentration and preterm birth outcomes

<table>
<thead>
<tr>
<th>% Pregnant Women with Anemia in 3rd Trimester by Race/Ethnicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>White, non-Hispanic</td>
</tr>
<tr>
<td>Black, non-Hispanic</td>
</tr>
<tr>
<td>Hispanic</td>
</tr>
<tr>
<td>American Indian/Alaskan Native</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
</tr>
<tr>
<td>Multiple Races</td>
</tr>
<tr>
<td>Other/Unknown</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

* Adapted from 2010 Pregnancy Nutrition Surveillance.
Folic Acid and Pregnancy

- Recommended intakes are 400ug per day, with 800ug to 4000 ug per day recommended for women with family or prior history of neural tube defects
- Fortification of grain products with folic acid at 140 ug/100 g of food (1998)
- 28% reduction in neural tube defects
- Supplementation with folic acid recommended for all women
  - Obese women have lower folate levels than normal weight women
  - Daily supplementation with folic acid reported by less than half of women
    - 47% of 25-34 yr
    - 40% of 35-45 yr
    - 30% of 18-24 yr

Folate and Pregnancy

- Low serum folate levels may be associated with preterm birth
  - Low serum folate levels in 2nd trimester nearly twice as likely to deliver preterm
    - RR = 1.8 (1.3-2.5)
- Preconception folic acid supplementation for 12 months found to reduce preterm birth
  - RR = 0.5 (0.3-0.9)
  - Biological gradient thus greater serum folate response equaled greater reduction in preterm birth risk

Vitamin D and Pregnancy

- The effects of vitamin D status on birth outcomes not clear at this time
- Some indication that high levels of supplementation may reduce risk of poor pregnancy outcomes
  - Low birthweight
    - RR = 0.40 (0.23 – 0.71)
  - Small for gestational age (IUGR)
    - RR = 0.67 (0.40 – 1.11)
  - Preterm birth not significantly changed
    - RR = 0.77 (0.35 – 1.66)
- Possible mechanisms include immune response, anti-oxidation, inflammation
Zinc and Pregnancy

- Low zinc intake associated with increased risk of preterm birth from PPROM
  - OR = 3.5 (1.0-11.5)
- Risk from low zinc intake even higher if iron deficiency anemia occurred
  - OR = 5.4 (1.6-18.8)
- Zinc supplementation may be associated with 14% reduction in risk of preterm birth
  - RR = 0.86 (0.76, 0.97)
  - Largely seen among low income women

DHA and Pregnancy Outcomes

350 women given 600 mg/day of DHA supplement
- Longer gestation
  - 2.9 days (3.8 days black, 2.1 days other)
- Higher birthweight
  - 172 g (50 g black, 207 g other)
- Greater birth length
  - 0.7 cm (0.4 cm black, 0.8 cm other)
- Greater head circumference
  - 0.5 cm
- Less early preterm birth (< 34 weeks)
  - 0.6% vs 4.8%
- Birthweight <2500 g
  - 3.9% vs 9%
- Birthweight <1500 g
  - 0% vs 3.4%
- Shorter preterm infant hospitalization
  - 8.9 day vs 40.8 days

Omega 3 Fatty Acids in Pregnancy

- Systematic review of 29 studies
  - 15 trials, 14 observational
- Increases in birthweight
  - 42.2 g
- No differences in length, head circumference
- Lower risk of early preterm birth
  - 26% reduction (RR = 0.74, 0.58-0.94)
- Possible decreased risk of late preterm birth
  - RR = 0.91 (0.82-1.01)
- Possible decreased risk of low birthweight
  - RR = 0.92 (0.83, 1.02)
- No effects on pre-eclampsia, hypertension
NUTRITION AS PART OF PRECONCEPTION HEALTH AND HEALTH CARE

Role

• Nutrition and healthy weight are key components of PCC having both a public health and a clinical aspect.

• Address from a clinical and public health perspective.
  – The public health aspect addresses creating environments where healthy eating and activity are the easy choices. Creating these environments is built on policy, systems and environmental chance efforts.
  – The clinical aspect requires addressing health conditions with a nutrition component e.g. diabetes.

Preconception Nutrition Topics

• Healthy weight

• Dietary quality and access

• Nutrition status prior to conception or in the very early stage of pregnancy e.g. folic acid status

• Medical nutrition therapy for conditions such as diabetes, hypertension anemia, and metabolic syndromes and other.
What Can You Do?

• Support the development of preconception services
• Encourage women to participate in preconception care
• Include nutrition interventions and services
• Use both a public health and a clinical approach
• Address health disparities and use culturally competent interventions

Resources

• Association of State Public Health Nutritionists (ASPHN.org)
  • The Role of Nutrition in Infant Mortality: A Public Health Perspective, MCH Council, Winter 2013
  • Preconception Care: The Role of Nutrition, MCH Nutrition Council, Winter 2015 - 16

Evaluations and CE Certificates

• Everyone who has completed the webinar will be emailed a link to the evaluation.
• The email will be sent to the email address that you used to register for the webinar.
• Please complete the evaluation soon after you receive the email. The evaluation does expire after 3 weeks. Once expired, you cannot obtain a certificate.
• Once the evaluation is completed, the CE certificate will be emailed separately within 2 business days.
COPE’s December Professional Webinar

Devon Golem PhD, RD, LD

Zzzz’s and lbs.: The impact of sleep on weight

Date: Wednesday, January 20, 2016
Time: 12:00PM - 1:00PM EST
CE Credit: 1.0 contact hour, 1.0 CPEU

Moderator: Lisa Dewald, MS, RDN, LDN
Email: cope@villanova.edu
Web site: www.villanova.edu/COPE

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Questions and Answers!