



Preconception Health: A Focus on Obesity

Caron J Gray, MD FACOG
Professor and Interim Chair
Department of Obstetrics and Gynecology
Creighton University School of Medicine
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Disclosures

- There are no financial or other conflicts of interest to report.





Objectives

- Recognize the complications of pregnancy related to maternal obesity
- Discuss strategies for prevention of prematurity related to maternal obesity



March of Dimes

- Perinatal morbidity and mortality
- Neonatal morbidity and mortality

The American College of Obstetricians and Gynecologists
WOMEN'S HEALTH CARE PHYSICIANS

A correction was published in December 2016 for this title. [Click here to view the correction.](#)

PRACTICE BULLETIN

CLINICAL MANAGEMENT GUIDELINES FOR OBSTETRICIAN—GYNECOLOGISTS

Number 156, December 2015 (Replaces Committee Opinion Number 549, January 2013) (Reaffirmed 2018)

Committee on Practice Bulletins—Obstetrics. This Practice Bulletin was developed by the Committee on Practice Bulletins—Obstetrics with the assistance of Patrick M. Catalano, MD and Cayle Olson Koutrouvelis, MD. The information is designed to aid practitioners in making decisions about appropriate obstetric and gynecologic care. These guidelines should not be construed as dictating an exclusive course of treatment or procedure. Variations in practice may be warranted based on the needs of the individual patient, resources, and limitations unique to the institution or type of practice.

Obesity in Pregnancy

PDF Format

Table 1. World Health Organization Body Mass Index Categories

Category	BMI*
Underweight	Less than 18.5
Normal weight	18.5–24.9
Overweight	25.0–29.9
Obesity class I	30.0–34.9
Obesity class II	35.0–39.9
Obesity class III	40 or greater

Abbreviation: BMI, body mass index.
*Weight in kilograms divided by height in meters squared (kg/m²).
World Health Organization. Obesity: preventing and managing the global epidemic. Report of a WHO consultation. Geneva: WHO; 2000. Available at: http://www.who.int/nutrition/publications/obesity/WHO_TRS_894/en. Retrieved September 2, 2015.

Prevalence of obesity

- From 1999-2010: Women age 20-39 yo
 - Increased from 28.4% to 34%
 - Higher in non-Hispanic black and Mexican American women
- 2011-2012 CDC
 - Overall increase has leveled off
 - BUT: Increase in class II and class III obesity

Flegal et al, JAMA 2010
Flegal et al, JAMA, 2012

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Obesity and Pregnancy

COMPLICATIONS

Do you want the short list or the long list??

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Obesity related complications in pregnancy

<p>LONG LIST</p> <ul style="list-style-type: none"> • Congenital anomalies • Recurrent pregnancy loss • Gestational diabetes • Preeclampsia • Stillbirth • Cardiac dysfunction • Nonalcoholic fatty liver disease • Proteinuria • Sleep apnea 	<p>SHORT LIST</p> <ul style="list-style-type: none"> • Hypertensive disease in pregnancy • Preeclampsia
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Obesity

- Insulin resistance
- Endothelial dysfunction
- Dyslipidemia
- Inflammatory upregulation
- Alteration in immune function
- Prothrombotic changes

Callaway et al, Hypertension in Pregnancy, Vol 28 2009

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Obesity

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    graph TD
      Obesity --> Inflammation
      Obesity --> Placental
      Obesity --> EndothelialFunction[endothelial function]
      Inflammation --> HypertensiveDiseases[Hypertensive diseases in pregnancy]
      Placental --> HypertensiveDiseases
      EndothelialFunction --> HypertensiveDiseases
    
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Obesity and hypertensive disease in pregnancy

- Dietary factors
- Inadequate physical activity


Callaway et al, Hypertension in Pregnancy, Vol 28 2009

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Obesity and pregnancy complications


- Higher risk of having chronic hypertension
- Higher risk of having pre-existing type 2 diabetes

BOTH INCREASE RISK OF PREECLAMPSIA




Preeclampsia

- With and without severe features
- Early-onset vs. late-onset




Preeclampsia

- **With severe features(SF)**
 - BP: >160 and/or >110
 - HELLP
 - Symptoms(HA, RUQ pain, vision changes)
 - Serum creatinine(double baseline, >1.1)
- **Without severe features(SF)**
 - BP: >140 and/or >90, 4 hours apart
 - Cath Pr:Cr ratio 0.3 or greater




Preeclampsia

- **Early-onset : delivery<34wk**
 - Greater perinatal death
 - Greater severe neonatal morbidity
 - Greater severe maternal morbidity and mortality
 - Pathogenesis:
 - Poor placental implantation
 - Chronic placental insufficiency
 - Subsequent inflammatory cascade
- **Late-onset: delivery>34 wk**
 - Less perinatal death
 - Less severe neonatal morbidity
 - Less severe maternal morbidity and mortality
 - Pathogenesis:
 - Placenta(less)
 - Maternal metabolic and CV RF



Obesity and pregnancy complications

Let's look at the evidence




Brief Cutting Edge Report
EPIDEMIOLOGY/GENETICS

Obesity

Pre-Pregnancy Maternal Obesity and the Risk of Preterm Preeclampsia in the American Primigravida

Omar M. Young¹, Roxanna Tweed², and Janet M. Calton^{1,4}



Pre-pregnancy maternal obesity

- Incidence of hypertensive disorders of pregnancy increases in proportion to a woman's pre-pregnancy body mass index (BMI)
- **It is unknown**
 - How does the severity of pre-pregnancy maternal obesity influence the **gestational age** at which a woman destined to develop preeclampsia will be diagnosed.
 - The **timing (EGA)** at which preeclampsia is diagnosed is a strong predictor of not only maternal disease severity but also fetal/neonatal outcomes

Young et al, Obesity, Feb 2016



Young et al

- retrospective cohort study of primiparous women with singleton gestations
- Deliveries from January 2003 to April 2014.
- Cases were stratified by delivery occurring either at 37 weeks or < 37 weeks.
- Pre-pregnancy maternal obesity was defined as a body mass index (BMI) 30 kg/ m2 .



Obesity — Maternal Obesity and Preterm Preeclampsia Young et al.

TABLE 2 Stratification of risk of term and preterm preeclampsia risk by pre-pregnancy BMI

Pre-pregnancy weight category	Preterm preeclampsia	Term preeclampsia	Relative risk of preterm preeclampsia	95% CI	P-value
BMI 18.5-24.9 kg/m ² (N = 1,088)	335 (30.9%)	748 (69.1%)	1.00	Referent	—
BMI 25.0-29.9 kg/m ² (N = 630)	208 (33.0%)	422 (67.0%)	2.07	1.72-2.49	<0.001
BMI 30.0-34.9 kg/m ² (N = 383)	137 (35.6%)	246 (64.4%)	3.37	2.72-4.16	<0.001
BMI 35.0-39.9 kg/m ² (N = 153)	59 (38.5%)	94 (61.5%)	3.48	2.62-4.62	<0.001
BMI ≥ 40 kg/m ² (N = 119)	54 (45.4%)	65 (54.6%)	5.23	3.86-7.09	<0.001



Degree of obesity at delivery and risk of preeclampsia with severe features

Jennifer K. Durst MD, Methodius G. Tuuli MD, MPH, Molly J. Stout MD, MSCI, George A. Macones MD, MSCE and Alison G. Cahill MD, MSCI
American Journal of Obstetrics and Gynecology, 2016-05-01, Volume 214, Issue 5, Pages 651.e1-651.e5, Copyright © 2016 Elsevier Inc.

Background

The risk of preeclampsia increases as maternal body mass index (BMI) increases. The link between increasing maternal BMI and preeclampsia with severe features is less well-established.



Durst et al, AJOG 2016

- Retrospective cohort
- Deliveries 2004-2008 with known BMI at admission to L and D
- N=10,218



Durst et al, AJOG 2016

- Demographics
 - Obese and morbidly obese women more likely to be:
 - older
 - African-American
 - multiparous.
 - greater rates of diabetes and chronic hypertension.
 - Normal-weight women were more likely to:
 - use tobacco and illicit drugs
 - The groups were similar with regards to payor status and alcohol use



Severe Preeclampsia	Normal weight—Ref (BMI 18.5–24.9), n = 1473	Overweight (BMI 25–29.9), n = 3081	Obese (BMI 30–39.9), n = 4196	Morbidly obese (BMI > 40), n = 1446			
	n (%)	n (%)	aOR, 95% CI	n (%)	aOR, 95% CI		
Total cohort ^a	118 (8.0)	227 (7.4)	0.9 (0.7–1.2)	383 (9.1)	1.1 (0.9–1.4)	153 (10.6)	1.2 (0.9–1.5)
≥ 34 ^a	43 (2.9)	138 (4.5)	1.4 (1.0–2.1) ^c	262 (6.2)	2.0 (1.4–2.8) ^c	99 (6.8)	2.0 (1.3–2.9) ^c
< 34 ^a	75 (5.1)	89 (2.9)	1.0 (0.7–1.4)	121 (2.9)	1.3 (0.9–1.8)	54 (3.7)	1.6 (1.0–2.6) ^c
CHTN and SI severe preeclampsia ^b	5 (0.3)	16 (0.5)	1.4 (0.5–4.0)	43 (1.0)	2.7 (1.1–6.8) ^c	41 (2.8)	6.6 (2.6–16.8) ^c

aOR, adjusted odds ratio; BMI, body mass index; CHTN, chronic hypertension; CI, confidence interval; SI, superimposed.

Durst et al. Severe preeclampsia in obese women. *Am J Obstet Gynecol* 2016.

a Adjusted for chronic hypertension, age, pregestational diabetes, and tobacco use

b Adjusted for age, pregestational diabetes, and tobacco use

c Statistically significant.

Maternal obesity, gestational hypertension, and preterm delivery.

(English) By: Madan J; Chen M; Goodman E; Davis J; Allan W; Dammann O, The Journal Of Maternal-Fetal & Neonatal Medicine: The Official Journal Of The European Association Of Perinatal Medicine, The Federation Of Asia And Oceania Perinatal Societies, The International Society Of Perinatal Obstetricians [J Matern Fetal Neonatal Med], ISSN: 1476-4954, 2010 Jan; Vol. 23 (1), pp. 82-8; Publisher: Informa Healthcare; PMID: 19903115;

Objective: To study maternal obesity as a risk factor for preterm delivery.

Methods: Maine State Birth Records Database from 1996 through 2006 was evaluated to investigate obese pregnant women compared with normal weight women regarding risk for preterm delivery. Multiple risk factors and outcomes were studied in univariable and multivariable models.

Results: Among 58,112 pregnant women, 8% (n = 4653) gave birth to preterm infants. Univariable analyses revealed a relationship between obesity and increased risk of prematurity. In multivariable regressions, the most important intermediate variable appears to be gestational hypertension/preeclampsia.

Conclusions: As maternal body mass index increases in pregnancy, the risk of preterm delivery and other maternal complications increases. The obesity-prematurity relationship is complex, with hypertensive disorders of pregnancy playing a crucial role. More detailed analyses of causal pathways are warranted.

What can we do??

- Preconception care
- Postpartum(fourth trimester)
- Interconception care

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Weight loss strategies

**ACOG Committee Opinion No. 423:
Motivational Interviewing: A Tool for Behavioral Change**

Obstetrics & Gynecology: [January 2009 - Volume 113 - Issue 1](#)

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Cochrane Review

Adegboye et al

- Randomised studies to assess the impact of dieting or exercise, or both, on women’s weight loss in the months after giving birth.
- Particular attention to breastfeeding women to be sure that breastfeeding was not compromised
- 14 studies, with **12 studies** involving **910 women**

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Cochrane Review

Adegboye et al

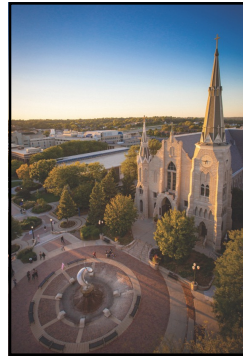
- **Findings:**
****Diet combined with exercise or diet alone compared with usual care**
VS.
Exercise alone compared with usual care

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Cochrane Review 2013

Adegboye et al

- There was not sufficient evidence to be sure that exercise or diet did not interfere with breastfeeding though it appeared not to in the included studies
- It seems **preferable** to lose weight through a combination of dieting and exercise, compared to dieting alone
- ****HOWEVER**, exercise is thought to improve circulation and heart fitness, and to preserve lean body mass.
- ****Further research is needed**



Conclusion

- Increased prevalence of obesity
- Increased hypertensive disease in pregnancy
- Increased prevalence of indicated preterm birth
- Possible benefit to even small weight loss before next pregnancy
- "Fourth trimester"

