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Weight-loss interventions performed to reduce the risk of obesity-related complications

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Abstract

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by

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MSPH, Walden University, 2008

BS, Montclair State University, 1999

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Community Health Promotion and Education

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Abstract

The management of obesity before a woman conceives is one of the most effective efforts a woman can take in decreasing her risk of obesity-related complications during pregnancy. Evidence supports the idea that maternal obesity influences maternal and fetal outcomes, leading to maternal and fetal morbidities. Physicians acknowledge the importance of screening women for obesity, but many do not refer patients for weight-loss therapy. In this study, the health belief model was used to explore the associations between participants' obesity risk of complications during pregnancy, the number of weight-loss interventions they attempted to implement prior to pregnancy, and how they viewed the success of their interventions. Participants were a random sample of 95 obese pregnant women older than 19 years participating in the supplemental WIC program in an urban community in Newark, New Jersey. A quantitative nonexperimental correlational study using descriptive and inferential statistics was used to analyze the data. The results of this study indicated that obese pregnant women did not perceive the risks associated with obesity as a problem, nor was there an association among the types of weight-loss methods attempted, the overall success of their weight-loss interventions, and ethnicity. Women who tried exercise and dietary restrictions or exercise only were more likely to experience success than those who tried other methods or combinations of methods ($p = 0.012$). The data provided can lead to better informed strategies by health care professionals to develop standards in healthcare, particularly obstetrics and gynecology offices and clinics, to help obese women be more compliant with treatment recommendations for reducing the risks of obesity-related health problems.

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Dedication

I would like to dedicate this dissertation to my family and friends for their love, support, and encouragement. This has been a long journey as I tried to balance work, school, and time with my family. I am grateful to my family for their acts of kindness and my friends for their words of encouragement. To my grandmother, thanks for your countless prayers, and my mother, thanks for being there for me to share it all. May my perseverance be an example of what GOD can do when He shows up and shows out!

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Now to Him, who is able to do exceedingly and abundantly more than I could ever ask or imagine, according to the power that works in me. I would like to thank God for all that He has done for me and is waiting to do through me.

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Chapter 1: Introduction to the Study

Background

According to the Centers for Disease Control and Prevention (CDC, 2012b), obesity rates in the United States have increased over the past 20 years. The Surgeon General (2010) reported several contributing factors, such as genetics, metabolism, poor dietary habits, cultural changes in food preparation, and a lack of physical activity as reasons for the increase in weight. Obesity rates in adults have doubled since 1980 regardless of age, sex, race, ethnicity, socioeconomic status, education, or geographic region (CDC, 2011). According to the CDC (2006b), in 2002, approximately 50% of women of childbearing age (between 18 and 44) were either overweight or obese. The 2003-2004 National Health and Nutrition Examination Survey (CDC, 2005) reported that non-Hispanic Black women were twice as likely to be obese than non-Hispanic White women (CDC, 2006a). NHANES 2005-2008 (CDC, 2007, 2009) also reported that higher income women are less likely to be obese than low-income women, but most obese women are not low income (Ogden, Lamb, Carroll, & Flegal, 2010). Obesity in pregnancy affects women who had obesity prior to pregnancy and those who became obese from an excessive amount of weight gain during pregnancy.

The Institute of Medicine (IOM, 2009) reported that the recommended weight women should gain during pregnancy is based on their pre-pregnancy body mass index (BMI). The expected total weight gain based on pre-pregnancy BMI is divided into four categories: underweight, normal weight, overweight, and obese. Women who are underweight are considered to have a BMI below 18.5 and are expected to gain between

28 and 40 pounds; normal weight women are considered to have a BMI of 18.5-24.9 and are expected to gain between 25 and 35 pounds; overweight women are considered to have a BMI of 25.0-29.9 and are expected to gain between 15 and 25 pounds; and obese women are considered to have a BMI of over 30.0 and are expected to gain between 11 and 20 pounds.

These weight gain guidelines presented by the IOM (2009) are the only known guidelines specific to pregnant women during pregnancy that allow for normal fetal growth and development and help reduce the risk of pregnancy complications. Siega-Riz and King (2009) reported epidemiological evidence suggesting that women are more likely to gain weight within the IOM guidelines if their healthcare provider suggests expected weight gain recommendations to them. A woman who exceeds the recommended weight for her stated pre-pregnancy weight or starts the pregnancy already obese is at increased risk for maternal and fetal complications (Massiah & Kumar, 2008).

The March of Dimes (2001) and the American College of Obstetricians and Gynecologists (ACOG, 2005) discussed ways for obstetricians and gynecologists (OB/GYNs) to screen and assess nonpregnant women's risk for obesity-related morbidity and provide weight management guidelines. According to the March of Dimes, the management of obesity before a woman conceives is one of the most effective efforts she can take to decrease her risk of obesity-related complications during pregnancy. The March of Dimes advises women to discuss with their healthcare providers what healthy weight they should achieve before trying to conceive. Surgical interventions such as gastric bypass and lap-band surgeries have been successful for obese women of

childbearing age, resulting in decreases in rates of gestational diabetes, macrosomia, and cesarean delivery and maintenance of adequate weight gain during pregnancy (Siega-Riz, Siega-Riz, & Laraia, 2006).

Cogswell, Power, Sharma, and Schulkin (2010) found that in 2005 and 2007, the majority of OB/GYNs were screening adult women for obesity. These providers used BMI as a tool to counsel their adult nonpregnant patients, mostly on weight control and physical activity. Many doctors did not refer patients for behavioral weight loss therapy or prescribe weight loss medications due to doubts about their ability to help their patients lose weight or follow their advice on diet and physical activity. As a result, the lack of confidence and reassurance of OB/GYNs to help obese women lose weight may affect how pregnant women perceive the severity of their pregnancy risk (Cogswell et al., 2010).

If healthcare providers do not aggressively take action to give their patients advice about weight loss, healthier eating habits, and physical activity, patients will be less willing to work on these areas or make changes (Jackson, Doescher, Saver, & Hart, 2005). Therefore, less reinforcement and reassurance may alter a patient's perception that the problem is not severe or that a great deal of intervention is not needed. The American Dietetic Association and the American Society for Nutrition recognized the need for further research to fill knowledge gaps concerning the role of maternal diet and physical activity before and during pregnancy in metabolic disorders before standards of clinical and dietary care can be established (Siega-Riz & King, 2009).

The goal of this study was to determine how obese pregnant women perceive their risk of complications due to obesity. These data could assist healthcare providers in better caring for and managing obese women's weight by helping them to reduce complications associated with obesity. Even though data exist that describe what OB/GYNs are doing to assess and manage obesity, there is a gap in the literature regarding how receptive obese women are to these efforts, how they view the information provided by their healthcare providers, and how they perceive their obesity risk during pregnancy.

Some people may be more receptive to behavioral changes due to their level of motivation. For example, humanistic theorist Carl Rogers contended that motivation comes from a human need for enjoyment and satisfaction, which lead to positive feelings of efficacy (Kaplan, 2009). Most educational theory includes not only educational material but also encourages intrinsic motivation that makes people feel as though the decisions or actions they take determine their future. In such scenarios, neither punishment nor reward engages a person to thrive.

Behavioral theorist B. F. Skinner maintained that punishments and rewards are effective sources of extrinsic motivation (Kaplan, 2009). He argued that motivation comes from engagement that is promoted by the attainment of tangible rewards or the avoidance of tangible and intangible punishments (Kaplan, 2009). Subsequently, a positive behavior results in a positive reward, whereas a negative behavior results in a negative consequence. Some motivation can be gained extrinsically from knowing what harm obesity can cause to oneself and one's fetus.

Although this supposition regarding the connection between motivation and knowledge may apply to some people, according to Kominiarek, Vonderheid, and Endres (2010), having knowledge does not necessarily lead to a greater susceptibility to intervention. Incorporating data into a larger theoretical structure may offer a better understanding of the progression of behavioral change. Understanding the perspective of the population of obese women on this topic could have an impact on the development of patient-specific interventions by healthcare professionals to better prepare women to have healthier, more positive pregnancies and fetal outcomes such as a decrease in congenital malformations, macrosomia, and stillbirths.

To better understand the perceptions of obese women regarding their knowledge of obesity-related pregnancy complications, I used a quantitative, nonexperimental methodology with a cross-sectional randomized sample of obese women. Obtaining data on pregnant women's perceived risk of obesity during pregnancy from a WIC clinic was crucial in generating insights that could have an impact on the expansion of client-specific interventions by health care professionals. Details referring to how data were collected and measured are further described in Chapter 3 of this study.

Problem Statement

Maternal obesity during pregnancy is a public health issue because it not only affects women, but also can directly or indirectly lead to childhood obesity and diabetes in children (Bouret, 2010; Galtier-Dereure, Boegner, & Bringer, 2000; Leddy, Power, & Schulkin, 2008; Levin, 2009). Evidence supports the idea that maternal obesity influences maternal and fetal outcomes to a greater degree than the actual weight gain during

pregnancy itself (Catalano, 2007). This influence, therefore, makes obesity during pregnancy a common high-risk state because of the maternal and fetal morbidities that can occur.

During pregnancy, obese women are at increased risk of maternal and fetal complications, such as miscarriages and stillbirths, gestational diabetes mellitus, hypertension, preeclampsia, congenital malformations (especially neurological disorders; as well as heart defects and multiple anomalies), preterm delivery, cesarean delivery, macrosomia, birth trauma, and thromboembolic disorders (Chaung, Velott, & Weisman, 2009; Sarwer, Allison, Gibbons, Markowitz, & Nelson, 2006). Maternal obesity also increases the risk for perinatal mortality and long-term complications, such as the development of obesity in infants (Galtier-Dereure et al., 2000). Obesity in pregnancy is also linked to a greater use of health care services and extended hospital stays (Galtier-Dereure et al., 2000).

During pregnancy, most women agree that it is beneficial to make dietary and lifestyle changes so that they can have a healthy pregnancy and newborn, but research continues to indicate that maternal and fetal comorbidities are increased among obese women versus nonobese women (Galtier-Dereure et al., 2000; Leddy et al., 2008). Because obesity is frequent for women of child-bearing age, members of this population of patients may not see themselves as at risk for health complications. For example, Kominiarek et al. (2010) revealed that about 51% of all participants (obese and nonobese pregnant women) did not know that obesity increases risks of complications in

pregnancy. In addition, only a few women reported discussing the risks of maternal obesity with their provider prior to participation in the study.

Purpose of the Study

The purpose of this quantitative correlational study was to determine the perceived risk of pregnancy complications due to obesity among obese pregnant women. By conducting this study, I wanted to evaluate obesity-related risks of complications during pregnancy based on the success of participants' weight-loss interventions prior to pregnancy, as obese women's exposure to weight-loss, dietary, and exercise wellness information was limited by healthcare providers. This study was intended to aid in the reduction of childhood and adult obesity, particularly by encouraging healthy behaviors during pregnancy and beyond. Therefore, the research questions described the concerns I had regarding the weight-loss methods obese women performed before pregnancy as related to their perceived risk of obesity-associated complications during pregnancy.

Nature of the Study

To better understand the perceptions of obese women regarding their perceived risk of obesity-related pregnancy complications, I used a quantitative, correlational nonexperimental methodology, using a cross-sectional randomized sample of obese women. Data were gathered from an urban Special Supplemental Nutrition Program for pregnant, breastfeeding, and nonbreastfeeding postpartum participants of the Women, Infants and Children (WIC) up to age 5 who were at nutritional risk.

This quantitative, nonexperimental study examined obese women's perceived risk of pregnancy complications due to obesity, the interventions performed prior to

pregnancy to reduce their risk for complications during pregnancy, and how they viewed the overall success of their interventions. I used a survey to measure the dependent variables of BMI and interventions performed prior to pregnancy, as well as the independent variable of perceived risk. Descriptive and inferential statistics were used to analyze the data, which included features of central tendencies and chi-square goodness-of-fit test.

Research Questions

The overarching question of this research was as follows: Do obese pregnant women perform weight-loss interventions prior to pregnancy to reduce the risk of pregnancy-related complications due to obesity? The subquestions were the following:

1. What is the association between obese pregnant women's perception of the risks associated with obesity in pregnancy and the type of weight-loss methods they attempted to implement prior to pregnancy?
2. What is the association between obese women's perception of the risks associated with obesity in pregnancy and their perception of how successful they were with their intervention efforts overall?
3. What is the association between the types of weight-loss interventions obese women attempt to implement prior to pregnancy and their perception of how successful they were with their intervention efforts?
4. What is the association between the ethnicity of obese pregnant women and the number of weight-loss interventions attempted prior to pregnancy?

Hypotheses

The following were the hypotheses of the study:

$H_0$1: There is no association between obese pregnant women's perception of the risks associated with obesity during pregnancy and the types of weight-loss methods attempted.

H_A1: There is a positive association between obese pregnant women's perception of the risks associated with obesity during pregnancy and the types of weight-loss methods attempted.

$H_0$2: There is no association between obese pregnant women's perception of the risks associated with obesity during pregnancy and their perception of how successful they were with their weight-loss intervention overall.

H_A2: There is a positive association between obese pregnant women's perception of the risks associated with obesity in pregnancy and their perception of how successful they were with their weight-loss intervention overall.

$H_0$3: There is no association between the type of weight-loss methods attempted by obese women prior to pregnancy and their perception of how successful they were with their weight-loss efforts.

H_A3: There is a positive association between the type of weight-loss methods attempted by obese women prior to pregnancy and their perception of how successful they were with their weight-loss efforts.

$H_0$4: There is no association between the ethnicity of obese pregnant women and the type of weight-loss methods attempted prior to pregnancy.

H_A4: There is a positive association between the ethnicity of obese pregnant women and the type of weight-loss methods attempted prior to pregnancy.

Theoretical Framework

The theoretical construct used in this study was the health belief model. The health belief model was originally developed as a programmatic method to explain and predict preventive health behavior (Ulin, Robinson, & Tolley, 2005). In later years, the health belief model was reexamined to include general health motivation for the purpose of distinguishing behaviors associated with illnesses from health behavior. The health belief model was used to forecast health-related behavior in terms of certain belief patterns (Ulin et al., 2005). Emphasis was placed on explaining and forecasting preventive health behavior. For example, a person's motivation to undertake a health behavior can be divided into three main categories: individual perceptions, modifying behaviors, and likelihood of action (Ulin et al., 2005).

By using the health belief model, I was able to explore the potential associations between participants' obesity risk of complications during pregnancy and the number of weight-loss interventions they attempted to implement prior to pregnancy and how they viewed the success of their interventions. By providing a survey, I was able to sample the population and make a correlation that would support or disprove the alternative hypotheses that related to obese women's behaviors.

Definitions of Terms

Body mass index: According to the CDC (2012a), BMI is an indicator of body fatness, although it does not directly measure body fat. It reflects one's potential for

health risks associated with being overweight and obese. It is often used as a means to measure one's ratio of weight for height and then place one into a category that indicates risk of health problems and comorbid factors (see Table 1). The formula for calculating BMI is weight in kilograms divided by height in meters squared (weight in kg / height in m^2).

Table 1

International Classification of Adult Underweight, Overweight, and Obesity According to BMI

Classification	BMI (kg/m²)
Underweight	<18.5
Severe thinness	<16.0
Moderate thinness	16.0-16.99
Mild thinness	17.0-18.49
Normal range	18.5-24.99
Overweight	>25.0
Pre-obese	25.0-29.99
Obese	>30.0
Obese Class I	30.0-34.99
Obese Class II	35.0-39.99
Obese Class III	≥40.0

Note. Adapted from "BMI Classification," by The World Health Organization, 2004, retrieved from http://apps.who.int/bmi/index.jsp?introPage=intro_3.html

Intervention: A behavioral change (likely dietary or physical) that is done to reduce an obese woman's risk of obesity-related complications.

Perceived risks: Risks understood to be associated with being obese during pregnancy. These risks include but are not limited to birth defects, diabetes, high blood pressure, cesarean delivery, infections, stillborn births or miscarriages, and fetal growth abnormalities.

Obesity: According to the CDC (2010), obesity is a label for ranges of weight that are greater than what is generally considered healthy for a given height, or a BMI of 30 or greater. According to the World Health Organization (2004), obesity can be further categorized by BMI into Class 1 (30-34.9 kg/m²), Class 2 (35-39.9 kg/m²), and Class 3 (≥40 kg/m²), also described as *morbid obesity* (see Table 1).

Perception: The act of having insight, awareness, or understanding about obesity risks during pregnancy.

Pregnancy complications: The conditions or pathological processes potentially associated with being obese and pregnant. These complications can range from minor discomforts to serious diseases that require medical interventions.

Assumptions

It was assumed that all participants had an intrauterine pregnancy that was confirmed via a positive pregnancy test and reported their pre-pregnancy weight to the best of their knowledge. I acknowledge that not every participant before conceiving may have had annual check-ups with her doctor to be screened for obesity or told she needed to make lifestyle changes. For that reason, if a woman performed any weight-loss interventions, it might not have been due to her doctor telling her that she was obese and needed to make lifestyle changes but might have been related to other motivating factors.

Several inferential statistical tests were used to test the proposed hypotheses. Several assumptions related to the data and sample. All statistical measures had the assumption that the data were from a random sample. A chi-square goodness-of-fit test assessed Hypotheses 1, 2, 3, and 4 and assumed that there were no outliers.

Limitations

I did not ask for medical documentation that the participants were pregnant. Also, if a participant was obese but was not aware of her pre-pregnancy weight, then she automatically did not meet the criteria for the study. I relied on participants' self-reported pre-pregnancy weight because the WIC nutritionists did not assess the participants prior

to pregnancy. Participants' self-reports of weight and height for the computation of BMI may have affected their eligibility criteria for the study. Reliance on self-reported pre-pregnancy weight therefore weakened the validity of the study. The cause of a participant's obesity may have been excessive caloric intake. It was not required for participants to have nutrition counseling as part of their participation in this study. However, a requirement of the WIC program is that all participants receive nutrition education; therefore, nutrition guidelines were given to each participant during her pregnancy.

The outcome of this study was limited to the research design and analysis to answer the research questions. Socioeconomic factors played a significant role in limiting the generalizability of the results, because the population of patients the WIC clinic serves is mostly composed of low-income and minority women. Therefore, the results of this study are generalizable to populations of obese, low-income, and minority women who are over the age of 19 years.

A limitation of the health belief model is that factors other than health beliefs can influence wellness practices, such as cultural factors, socioeconomic status, race, ethnicity, and previous experiences. According to Kominiarek et al. (2010), these factors may influence the responses of participants because weight and obesity can have a wide variety of meanings in cultural and economic groups. For this reason, a questionnaire was the instrument to gather data from participants rather than an interview. The questionnaire was limited to inquiring about specific questions and did not probe for greater details.

Delimitations

The survey instrument used in this study was multiple choice and thus did not give the participants a chance to explain or elaborate on their answers. This design may have resulted in missed information regarding the participants' perceptions. The design of the survey only generalized about the overall success of participants' interventions and did not specify which intervention methods participants were successful or unsuccessful with. This study was limited to women receiving prenatal care from a single WIC clinic in an urban community in Newark, New Jersey.

Significance of the Study

The knowledge of obese pregnant women that emerges from this study may aid in decreasing complications associated with obesity risk to the mother during pregnancy. Decreasing excessive weight gain and the prevalence of obesity during pregnancy may reduce the incidence of obesity and obesity-related complications in children, which could contribute to family wellness and healthier communities.

According to Chaung et al. (2009), some women who had not been pregnant before did not think a change in diet or behavioral modification was needed before or during pregnancy because they did not feel their medical condition required special attention. Many women lacked significant understanding of the problem and motivation to make preconception health changes. Several researchers, including Sarwer et al. (2006) and King (2006), examined maternal obesity and the risk of complications to the mother and fetus from different angles: preconception, during pregnancy, and after delivery. However, few researchers have examined whether obese women understand the risks of

obesity in pregnancy, and it appears that none have examined the connection between women's knowledge and their perception of risk during pregnancy. It was not clear if obese women lack knowledge regarding the risks and if that leads to unhealthy behaviors.

Filling the Literature Gap

Several factors influence an individual's attitude in making behavioral changes. The results of this study add to the body of literature that could be advantageous in laying the groundwork that would help pregnant women adhere to treatment recommendations regarding obesity. Also, the outcome of this study highlights for health care providers the additional roles they need to take to bring forth more successful weight loss and healthy lifestyle changes that will promote improved health among women.

Jackson et al. (2005) discussed the importance of healthcare providers giving counsel on weight loss and ways to improve diet and exercise, as women are more apt to work on these areas when their healthcare providers give them advice on weight loss. Identifying women's perceptions and knowledge regarding obesity and pregnancy provided a basis for future studies aimed at designing and implementing ongoing interventions and strategies to help obese women improve their health.

Professional Applications

The goal of this study from a professional perspective was to inform healthcare providers about pregnant women's perspective on knowledge of obesity and its potential threat to health and well-being for the mother and child and the effect lack of knowledge has on reproduction, fertility, and pregnancy outcomes amongst obese women. With greater patient involvement and commitment to a treatment plan, healthcare costs

associated with obesity and related complications may decline. Ideally, the results of this study indicated the benefits of healthcare providers providing referrals for weight management counseling.

Positive Social Change Implications

The implications for positive social change include the possibility of generating information valuable for healthcare professionals (nurses, public health educators, doctors, and dietitians). This knowledge could enhance awareness of good nutritional habits, weight loss, and physical activity before, during, and after pregnancy as a measure to promote good maternal and fetal outcomes. The results of this study could aid healthcare providers in better understanding how receptive obese women may be to receiving information provided to them from their healthcare providers and how they perceive the severity of their obesity risk. The data provided could lead to better informed strategies by researchers, policy makers, and clinicians to create standards in healthcare, particularly in obstetrics and gynecology offices, clinics, and programs.

Summary

A quantitative, nonexperimental study was the methodology to investigate the knowledge of pregnant women related to the perceived risks obesity poses during pregnancy to mother and fetus. Approximately 95 pregnant obese women were sampled by using a homogeneous probability process. A random sampling method allowed the participants to be selected based on shared characteristics. All participants were pregnant and enrolled in the WIC program.

The use of the health belief model provided a better understanding of the perceptions that may have affected the knowledge and attitudes of obese pregnant women. Kominiarek et al. (2010) created a scale for measuring pregnant women's perceived risk associated with pregnancy and obesity. They used the instrument to compare the perceptions of obese and nonobese women. For this study, I used the Kaminiarek et al. instrument in a novel way. Participants in the study were obese patients. I asked obese patients about the number of weight-loss interventions they had attempted. I then determined if there was a correlation between perceived risk as measured by the scale and number of weight-loss interventions as reported by the participants.

In Chapter 2, a review of the literature provides additional insight on previous research completed regarding this topic. Chapter 3 provides details on the appropriateness of the research design and methodology. Chapter 4 includes how the data were recorded as well as the findings. Chapter 5 covers a brief interpretation of the findings and the implications they may have for positive for social change.

Chapter 2: Literature Review

Introduction

The purpose of this study was to determine how obese pregnant women perceive their risk of complications due to obesity and to evaluate their perceptions based on the overall success of their weight-loss interventions prior to pregnancy. The literature currently lacks significant input from obese pregnant women on how they perceive their risk of pregnancy complications due to obesity. This chapter reviews the maternal and fetal complications of obesity, knowledge and perceptions of perceived threat and susceptibility by women and professionals, and the validity of using the health belief model as a tool to measure perceptions.

Research Strategy

The literature review began with a review of search methods and terms that used specific words and phrases to obtain the background data for the research. The search terms were *management of obesity before pregnancy and during pregnancy*, *maternal obesity*, *obesity risk, pregnancy*, *weight loss*, *perception*, *self-efficacy*, *quantitative studies*, and *health belief model*. These terms were coupled in various combinations organized around the concept of maternal obesity.

Professional journals, books, dissertations, government resources, and primary and secondary source materials concerned with knowledge of obesity among women and health care providers, obesity risk, and the health belief model provided the material for the literature review. The research strategy for the review of the literature began with Internet searches through the Walden University Library, the Rutgers George F. Smith

Library of the Health Sciences, Academic Search Complete, and ERIC. The chapter ends with a summary of pertinent findings obtained from the literature regarding the perception of obesity risk by women and healthcare providers.

In accordance with the research questions posed in Chapter 1, the literature review includes a three-part discussion of (a) maternal and fetal complications of obesity, (b) perceived threat and susceptibility and how healthcare professionals and women perceive the health effects of obesity, and (c) the appropriateness of the research methodologies and health belief model in studying the topic. Only relevant sources were summarized that were pertinent to the research questions.

Although the existing literature was extensive on the management of obese women from obstetricians' and gynecologists' points of view, minimal work has addressed how women perceive their obesity risk. This section presents a review of current management and prevention practices for obesity by obstetricians and gynecologists, maternal and fetal complications associated with obesity, women and healthcare providers' perceptions of obesity during pregnancy, motivation as a factor in perceived barriers in making behavioral changes, and the health belief model as the research framework most commonly used to explore this topic.

Maternal and Fetal Complications of Obesity

Chapter 1 briefly reviews the complications associated with maternal obesity, but Chapter 2 presents the severity of this problem among women, their offspring, and healthcare professionals based on previous research. When obesity is not adequately

managed prior to pregnancy, women are more vulnerable to complications once pregnant. The cycle of obesity and its related complications creates a public health problem.

Evidence from the ACOG (2005) indicated that the majority of OB/GYNs did not refer nonpregnant patients for weight-loss therapy or prescribe weight-loss medications because of doubt about their capability to help their patients lose weight or follow their instructions on diet and physical activity**.** As a result, when a woman already obese initiates pregnancy, she and the fetus were more at risk for complications during pregnancy, during labor, and after birth (Grundy, Woodstock & Attwood, 2008; Sarwer et al., 2006).

Obese pregnant and postpartum women require clinical care beyond that offered to women of normal weight due to the wide range of medical and obstetric complications they experience, including added costs and care of resources from health care providers (Grundy et al., 2008; Sarwer et al., 2006). These conditions include complications before, during, and after pregnancy, including increased rates of induction of labor, forceps delivery, cesarean delivery, macrosomia, failed epidural of women attempting vaginal delivery, wound infection and dehiscence, increased pain after delivery, hemorrhage, postpartum endometritis, deep vein thrombosis, increased cost and inadequate resources, and infant birth trauma and admission to the neonatal intensive care unit (Grundy et al., 2008). In addition to the complications obesity has for the mother and fetus, increased medical and surgical interventions are needed to manage the consequences of obesity in pregnancy (Grundy, 2008, p. 2110).

An overview of international and national studies acknowledged maternal obesity to be a very important obstetric concern for the fetus. Stothard, Tennant, Bell, and Rankin (2009) examined articles on maternal obesity and risk of birth defects in the offspring from a variety of studies from nine different countries, including the United States, that indicated that obese mothers had a high chance of a pregnancy affected by a neural tube defect, cardiovascular anomaly, anencephaly, septal anomaly, cleft palate, anorectal atresia, or hydrocephaly compared with mothers of normal weight. These complications are just some of the problems fetuses face when a mother is obese.

In comparison to the ACOG (2005) findings on pre-pregnancy women, Herring et al. (2010) also reported that obstetric providers were not insistent in their treatment and management of obesity. In addition, obstetrical providers were not fully compliant with clinical practice recommendations for pregnant women in defining obesity correctly, or recommending weight gain ranges consistent with the IOM guidelines. To improve obstetric-provider compliance with the management of their obese pregnant patients, Herring et al. suggested a need for education around BMI definitions and weight gain guidelines, as well as continuing education related to the assessment and management of obese pregnant patients. This was one recommendation to improve obstetric provider knowledge and self-efficacy, but further work is needed to determine whether such provider interventions will lead to changes in gestational weight gain and related behaviors resulting in better maternal and offspring health (Herring et al., 2010).

Evidence from Jackson et al. (2005) showed that obese patients were less likely to put the effort toward losing weight, improving diet, and increasing exercise when they

did not receive advice to do so from their healthcare providers. Therefore, these women were not challenged or motivated to lose weight because the problem was not considered severe.

Fetal and Childhood Development of Obesity

In addition to the maternal and fetal complications of obesity, physicians are aware of the effects of nutrition in fetal development and the continued cycle of obesity. Hales et al. explained that nutrition during pregnancy plays an important role in the health and wellbeing of the newborn, which carries over into childhood and adulthood, and possibly into the next generation (as cited in Anderson, 2001, p. 497).

Fetal Physiological Adaptations

Bouret (2010), King (2006), and Levin (2009) have sought to examine the link between maternal obesity and the continued cycle of obesity in offspring. Findings point to physiological changes that occur during pregnancy that lead to obesity in children of an obese mother. For example, adipose (fat) tissue, which is important in the storage of fat-soluble steroids such as androgens, plays an important role in the regulation of the availability of sex hormone.

As a result, estrogen production is directly correlated with body fat percentage. Fat cells are made as the fetus develops during the third trimester of pregnancy. During this time, fetal growth and development depend on maternal metabolic changes that are driven by hormones of the placenta, such as estrogen, which is affected by maternal obesity (Leddy et al., 2008).

Because obese women have higher basal metabolic rates, maternal fat gain is lower, possibly due to altered leptin function and insulin resistance late in pregnancy. This process causes postprandial increases in glucose, lipids, and amino acids, thereby increasing fetal size, fat stores, and risk for postnatal disease, including diabetes mellitus, obesity, and hyperlipidemia (King, 2006). Because "fetuses adapt to the supply of nutrients crossing the placenta whether in deficit or over abundance, and these adaptations may permanently change their physiology and metabolism" (Leddy et al., 2008, para. 23), maternal obesity can have a long-lasting effect. These programmed changes that occur in utero, during infancy, and even during early childhood can affect body growth and body composition, resulting in the start of different diseases, such as heart disease, hypertension, obesity, and noninsulin dependent diabetes, which can develop later in life (Leddy et al. 2008). These co morbidities are evidence of how maternal obesity contributes to a cycle of obesity among families.

Although King (2006) presented one concept of how maternal obesity affects obesity in the offspring, Bouret (2010) reported that the developmental encoding of the fetal brain pathways is another possible cause for obesity. The hypothalamus is a region of the brain that is responsible for feeding regulation, maintaining energy balance (one's body weight), and glucose homeostasis throughout life. The hypothalamus is most affected in utero and during infancy. These time periods are important for avoiding exposure to metabolic abuse that may lead to abnormal hypothalamic development.

Studies involving animal models, particularly rats, have shown that when high-fat and high-carbohydrate diets are consumed throughout pregnancy and lactation, they

cause an increase in the production of leptin, a hormone produced in fat cells that corresponds with the hypothalamus regarding how much fat is stored in the body. This increase in leptin causes hunger, overeating, and slow metabolism (Levin, 2009; Srinivasan et al., 2008). As a result, the brain does not register the amount of leptin hormone correctly, which causes an accumulation of body fat and a slower metabolism, leading to obesity in the offspring.

When the link between obese mother rats and the development of adult onset obesity is examined, it appears that the likely reason for this is adaptations at the cellular, molecular, and biochemical levels that occur in the fetal hypothalamus. For example, this occurs when the composition of the diet is altered by physiological changes occurring during important periods of organ development that can permanently change the molecular structure of cells that prompt offspring to develop adult obesity. Although these studies were done with rats, there is reason to believe that the mechanism is the same in humans.

Childhood Obesity

Whitaker (2004) followed women enrolled in the Special Supplemental Nutrition Program for Women, Infants, And Children (WIC), who were participants in the program from the first trimester of pregnancy until their children were 24-59 months of age. Children whose mothers were obese in the first trimester of pregnancy (BMI $\geq$ 30 kg/m^2) had an increase prevalence of obesity at ages 2 (15.1%), 3 (20.6%), and 4 (41.2%) years, which was 2.4 to 2.7 times the prevalence of obesity among children born to normal-weight mothers (BMI $\geq$ 18.5 and $<$ 25 kg/m^2). In addition, children 2 (28.4%), 3 (36.9%),

and 4 (41.2%) years of age born to obese mothers had a prevalence of BMI for age at the 85th percentile based on pediatric growth charts.

After adjusting for all covariates, including birth weight, the association between the mother's BMI level in the first trimester of pregnancy and the child's obesity at all preschool ages was strong and increased with increasing maternal BMI. Whitaker's (2004) study detailed children's increased risk of physiologic obesity and highlighted how early in life children born to obese mothers begin to show their vulnerability for obesity and expected risk for mortality in adulthood.

Therefore, more maternal and fetal complications occur in obese mothers than nonobese mothers, so the question turns to what obese women need to do to reduce their risk for complications during and after pregnancy. The topics identified in the headings and subheadings in the rest of the chapter support what the current literature indicates regarding women's knowledge and motivation predictors to change, as well as the theory best used to understand individuals' behavioral changes.

Perceived Susceptibility

During pregnancy, most women make dietary and lifestyle changes so that they can have a healthy newborn, but Galtier-Dereure et al. (2000), Leddy et al. (2008), and Sarwer et al. (2006) found that maternal and fetal complications are higher among obese women. Therefore, a closer examination of obese women and their healthcare providers was needed to dissect how aware obese women are of their obesity-related risks. Chaung et al. (2009) addressed the issue of how little was known about whether women with chronic medical conditions such as obesity, diabetes, and hypertension understood their

pregnancy-related risks, how these conditions influenced intent for pregnancy, and how conditions influenced pregnancy avoidance and/or pregnancy planning behaviors. Chaung et al. found that some doctors seemed to notify their obese patients of reproductive age about the risk of pregnancy-related complications due to obesity, but these obese women did not perceive obesity as a risk, nor did it influence their pregnancy intentions.

Some women who had never been pregnant before did not think a need existed for diet or lifestyle changes before or during pregnancy, because they did not think that their condition required concern (Chaung et al. 2009). The women were aware of the instructions their physicians were providing but lacked significant understanding of the problem and motivation to make health changes. Subsequently, women were not fully aware of potential reproductive health and pregnancy-related dangers of their medical condition, which may have led to uninformed decisions about future pregnancy, pregnancy avoidance, and preconception planning. Because the sample size of the Chaung et al. (2009) study was small, it limited the generalizability of the results to all women with obesity, diabetes, and hypertension who were highly educated. These limitations meant that even the limited knowledge observed in regard to pregnancy risks could be overestimated.

Moreover, Chaung et al. (2009) concluded by focusing on the need to address these gaps in knowledge to achieve the goal of avoiding unintended pregnancy and adverse pregnancy outcomes. On the other hand, Helsehurst et al. (2007) concluded by acknowledging that there is a normalization of being overweight and obese, which may

make some obese pregnant women not see obesity as an issue. Therefore, they may lack awareness about the effects of being obese, the complications obesity causes, the restrictions in caring for an obese patient, and the potential effects obesity has on pregnancy outcomes.

Perceived Severity

In the United Kingdom, the prevalence of obesity in the general population is also a major public health concern due to increased health dangers (Helsehurst, Lang, Rankin, Wilkinson, & Summerbell 2007). Helsehurst et al. (2007) determined that mothers were unaware of the issues and dangers of being obese and pregnant. Healthcare professionals understood the dangers of being obese and pregnant, but frequently mothers were unaware of these issues.

Further investigation focused on gaining a detailed understanding of healthcare professionals' perceptions of the impact of caring for obese pregnant women on maternity services. Because no policies or standards of practice were in place, the staff in the maternity units did not know how to discuss the subject of obesity or how to offer helpful information without the mothers having some kind of negative or awkward feelings about what was said (Helsehurst et al., 2007).

The staff were uncomfortable initiating the conversations on the subject of how obesity might affect a patient's pregnancy. When they did address this sensitive subject, the staff reported feeling blamed or victimizing the mothers. Feelings of blame for confronting the mothers became a vicious cycle, and the message of the complications of obesity did not get across to the mothers (Helsehurst et al., 2007).

Helsehurst et al. (2007) and Chaung et al. (2009) reported some sensitive feelings of obese women as they were being approached by healthcare professionals about the subject of weight loss. Chaung et al. also reported obese women expressing hostility toward their doctors regarding weight-loss counseling. Patients' perception of the weight of the doctor affected their reception of weight-loss counseling. The doctor's size influenced the acceptability of weight-loss advice, which varied among obese women (Chaung et al., 2009). Finally, Helsehurst et al. demonstrated that pre-pregnancy counseling increased favorable pregnancy outcomes. An important factor in the desire to lose weight may be an awareness or understanding of the health dangers associated with being obese. Helsehurst et al. acknowledged the need for further research to address the issues healthcare professionals had with obese pregnant women and how to help patients maintain a level of self-worth without feeling victimized.

Perceived Benefit

Although weight gain guidelines were available for pregnant women, no additional systematic guidelines were in place to reinforce how obese women could decrease their chances of obesity-related complications before or during pregnancy. Since it is not advised for pregnant women to lose weight during pregnancy, the best pregnancy plan for obese women was to work toward a healthy weight making better dietary choices and increasing physical activity. Artal, Cantanzaro, Gavard, Mostello, and Friganza (2007), Oken et al. (2006), and Wolf, Legarth, Vangsgaard, Toubro, and Astrup (2008) suggested that improvements in glucose metabolism and delivery outcomes were achievable for obese women who controlled their weight gain and remained physically

active in pregnancy. These improvements were likely be due to the frequent interactions pregnant women had with the healthcare system, which put obstetrical providers in a position to address the issues of weight gain and exercise with their obese pregnant patients.

According to Power, Cogswell, and Schulkin (2006), only 58% of OB/GYNs participating in a national survey reported counseling pregnant patients about weight gain during pregnancy most of the time, and even fewer (35.7%) altered their recommendations based on their patients pre-pregnancy BMI (as cited by Herring et al., 2010). The perceived seriousness by OB/GYNs affected how obese women followed advice given by their healthcare providers. Cogswell, Scanlon, Fein, and Schieve (1999) and Stotland et al. (2005) showed that women who received advice from their providers regarding gestational weight gain were more likely to gain weight within recommended ranges. In addition, Cogswell et al. indicated that OB/GYNs were using BMI as a tool to screen and determine obesity risk in their nonpregnant patients. They did not, however, refer their patients for behavioral weight loss therapy or prescribe weight loss medications due to an increased doubt about their ability to help their patients lose weight or follow advice on diet and physical activity. This failure to actively address weight loss needs with patients could have affected women's perceived susceptibility to obesity-related complications during pregnancy. Herring et al. (2010) confirmed that obese women were less likely to make changes regarding exercise, diet, and weight loss when their healthcare providers do not provide advice on improving their health. According to Herring et al. the majority (83%) of obstetricians, nurse practitioners, and certified

midwives agreed with the statement, “Obesity is an important health problem during pregnancy,” and a similar proportion (84%) indicated that once an obese woman is pregnant, she still has the ability to change the risks of pregnancy complications from obesity (Herring et al., 2010, p. 67). Obstetrical providers were aware of the disadvantages of obesity on health, especially during pregnancy (Ely, Befort, Banitt, Gibson, & Sullivan, 2009; Thomas, Moseley, Stallings, Nichols-English, & Wagner, 2008).

Barriers Perceived by Women and Health Professionals

Several factors had contributed to the lack of compliance to treatment among obese women. Race, ethnicity, and socioeconomic status influenced women’s perception of weight and obesity because they have a variety of meanings in cultural and economic groups (Kominiarek et al., 2010). Weight perception differs by culture, with African American women less likely to consider themselves overweight or obese compared to White women (Stevens, Kumanyika & Keil, 1994). A survey conducted with African American and Caucasian women showed a lack of family support, time, money, and support from doctors as obstacles to weight-loss (Thomas et al., 2008).

Many women reported physicians instructed them to lose weight because it contributes to medical conditions but did not provide specific guidelines, referrals, or follow up for weight-loss. This finding is consistent with Cogswell et al. (2010) study wherein many physicians were screening patients for obesity, but not referring them for behavioral weight-loss therapy or weight-loss medications. When women were placed into focus groups, Thomas et al. (2008) identified the following themes common to

African American women as barriers or issues related to weight-loss: (a) limited access to exercise facilities and stores to purchase healthy foods, (b) engaging in activities that involve sweating or messing up their hair, (c) the inability to find attractive clothing that fits, (d) disagreement with ideal body weights, and (e) satisfaction with larger size. The most common issues found among Caucasian women were related to wanting weight-loss support from other obese individuals (Thomas et al., 2008, p. 178). The findings from Thomas et al. study were consistent with other studies that suggested African American women perceive larger body size as more attractive and receive less social pressure for thinness, which could reduce an individual's motivation to lose weight (Thomas et al., 2008, p. 179).

Another study that linked the lack of support and resources as a barrier to weight-loss emerged from Ely et al. (2009) study on weight management among rural Kansas women. The researchers explored weight control beliefs, attitudes, knowledge, practices, and the relationship of these women and their primary care providers around weight control using focus groups. Ely et al. identified five broad themes that emerged from the focus groups:

Lack of support from primary care providers.

Primary care offices as community resources.

Lack of resources for promoting dietary change but adequate resources for physical activity.

The importance of group support and togetherness.

A need for more intensive weight management treatments.

The results included, but were not limited to, a need for more specific guidelines on weight-loss treatment support groups, encouragement, resources for dietary guidelines, professional assistance, accountability, and nearby locations to commercial weight control programs (Ely et al., 2009). Once again, a concern was raised regarding ways to address environmental and behavioral barriers to change.

Although these themes were specific to women in western Kansas, women in nonrural environments also experienced similar thoughts and ideas regarding a lack of support for weight control from health care providers (Ely et al., 2009). These women reported that accountability and guidance from healthcare providers were critical in promoting weight control success. Moreover, any program that incorporated diet and exercise must include a considerable amount of support to maintain weight-loss in the long term. A person may lose weight initially, and then subsequently regain weight, if they do not adhere strictly to recommended guidelines. Factors such as motivation to change and support from physicians played a significant role in how an individual perceived the benefits of maintaining a healthy weight (Ely et al., 2009).

In pursuing whether obese individuals have knowledge of appropriate nutrition and physical activity, O'Brien and Davies (2006) found a disconnection between nutrition knowledge and BMI. They concluded that knowledge about nutrition was not sufficient to improve dietary behavior. Obese individuals compared to those with a healthy weight had comparable levels of nutrition knowledge, which suggested other reasons existed why those who were overweight and obese had higher BMIs. As a result,

O'Brien and Davies' recommendations included integrating dietary behavior changes that specially targeted personal, behavioral, and environmental barriers to change.

Healthcare professionals' adherence to ACOG recommendations about diet and physical activity counseling for obese pregnant women was more common than compliance with recommendations regarding obesity assessment or referrals (Herring et al., 2010). More nurses than physicians reported that they usually discussed diet and physical activity with their obese pregnant patients. These results were also consistent with Cogswell et al. (2010) assessment of the prevention and management of obesity in nonpregnant obese women. Barriers that kept OB/GYNs from effectively counseling and treating their obese patients' risk for obesity-related morbidities included a lack of time, inadequate reimbursement, and pessimism about their ability to help patients lose weight or follow their advice on diet and physical activity. Pre-pregnancy counseling is one of the contributing factors for women achieving and maintaining a healthy weight prior to pregnancy. Yet, if a woman is obese and obesity-related health issues were not addressed, the issue of obesity became a problem during pregnancy as well (Cogswell et al., 2010).

Perceived Self-Efficacy by Obese Women

Self-efficacy refers to belief in an individual's ability to carry out a task and possession of the knowledge, skill, and ability to enact a particular behavior. Women perceive obesity and their ability to lose weight differently according to their ethnic backgrounds. Therefore, compliance with weight-loss treatments varied among women for a range of reasons. Psychosocial factors such as self-efficacy played an important role in weight gain, and the success of weight-loss and maintenance. Elfhag and Rossner

(2007), Martin, Dutton, and Brantley (2004), and Schwarzer and Fuchs (1995) have proposed the use of the Weight Efficacy Lifestyle Questionnaire (WEL) to predict weight-loss success with higher self-efficacy, which was associated with more weight-loss during treatment.

Shin et al. (2011) revealed overweight and obese postmenopausal White women with a BMI of 26-40 kg/m^2 revealed women with higher scores on the WEL scale and higher scores on 4 of 5 self-efficacy subscales at baseline and over time lost more weight during treatment and follow up. A limitation of this study was that it could be generalized for White women of relatively higher socioeconomic status and educational levels. The use of the WEL only captures the resistance of unhealthy eating choices and not the inclusion of positive or healthy eating behaviors.

On the other hand, when a culturally appropriate weight management program was developed for overweight and obese African American women, based on the health belief model, James, Pobee, Oxidine, Brown, and Joshi (2012) showed women with high levels of self-efficacy were likely to take the necessary actions to manage their weight. Although prior dieting experiences, access to credible information, and having adequate resources appeared to affect women's self-efficacy. James et al. acknowledged self-efficacy to be an integral part of weight management success, but noted a culturally tailored program could help increase self-efficacy and therefore, increase the likelihood to change. The health belief model in James et al.'s study was useful in allowing the researchers to use the themes generated from each theoretical construct to develop weight management materials for African American women.

Clark and Ogden (1999) examined self-efficacy by looking at primigravid women at 24-28 weeks gestation and nonpregnant women. They showed that pregnant women having decreased levels of dietary restraint were less dissatisfied with their body shape and showed higher eating self-efficacy than nonpregnant women. Compared to months prior to pregnancy, pregnant women reported having less restraint in their eating behavior and actually ate more. Pregnant women were significantly less hungry and had less difficulty controlling their food intake than nonpregnant eaters (Clark & Ogden, 1999).

Research Methods

This study used a quantitative survey research method. Quantitative research involves with testing a theory through hypotheses and the collection of data to support or refute those hypotheses (Creswell, 2003). The data collected were gauged using an instrument that measured attitudes or rates behaviors that was analyzed using statistical procedures and hypotheses testing (Creswell, 2003). According to Babbie (2007), quantitative data offer the advantage of numbers over words as measures of some quality. Numbers also carry a disadvantage, which is the loss of richness of meaning, but a quantitative methodology best explains, verifies, and predicts individual behavior through associative relationships.

Specifically, a correlational design using a survey was used to measure and look for relationships between variables (Creswell, 2003). Correlational relationships can either be positive or negative, and an interval scale should be used for the measurement. Surveys provide data to explain these relationships in terms of cause and effect (Singleton & Straits, 2005). The advantages of using quantitative research include cost

efficiency, greater objectivity, generalizability, and reliability of data (Weinreich, 2006). A disadvantage of using a survey was susceptibility to reactivity, which may have resulted in respondents' lack of truthfulness in their response to questions that were limited to numerical descriptions rather than detailed narratives. Another disadvantage of using a survey, beyond the association between variables, was the criteria for inferring cause-and-effect relationships, which could not be established as easily as in experiments. Therefore, casual inferences from survey research generally have less confidence than inferences from experimental research (Singleton & Straits, 2005).

A number of studies have utilized quantitative research to examine health beliefs and behaviors. For example, Cogswell et al. (2010) utilized an exploratory study to examine if OB/GYNs were using BMI as a resource to screen and determine obesity in their nonpregnant patients and found that they were using BMI to screen and determine obesity, but were not referring their patients for weight loss therapy. The exploratory approach of Herring et al. (2010) involved a study of obstetric providers to determine their knowledge, attitudes, and practice patterns regarding obesity in pregnancy. The results revealed that the majority (83%) of obstetric providers knew obesity was an important health problem during pregnancy. A quantitative approach by Kominiarek et al. (2010) revealed, regardless of BMI category, patients required more knowledge about the dangers of obesity in pregnancy.

A variety of other methodologies have been used to assess obese pregnant women's knowledge, attitudes, and risks of being obese during pregnancy. Other methods have also been utilized to study health behaviors. Helsehurst et al. (2007)

designed a qualitative study using purposeful sampling and face-to-face semistructured interviews to gain a detailed understanding of healthcare professionals' perceptions on the affect of caring for obese pregnant women have on maternity services. An advantage of this methodology is that it allowed healthcare professionals to emotionally identify the difficulties faced with caring for obese pregnant women as it relates to the psychological impact of maternal obesity. A limitation of this study suggested the potential for participant bias because the recruitment of participants was carried out by a healthcare professional working at the maternity unit. Helsehurst et al. (2007) acknowledged the need for future quantifiable factors relating to service delivery, and the cost of additional services needed. My study included data that could improve healthcare providers' knowledge of the lifestyle interventions obese women performed prior to pregnancy in efforts to decrease their risk of obesity-related complications during pregnancy.

Kominiarek et al. (2010) conducted a cross-sectional quantitative face-to-face interview survey to evaluate obese and nonobese women's knowledge of the risks of maternal obesity. An advantage of this methodology was that it allowed for data to be compared numerically between obese and nonobese women because of the known differences in morbidity between the two groups and also potentially to identify individuals with greater educational needs. Descriptive statistics (mean and standard deviation), students' *t*-tests and χ^2 tests were used to arrive at these results. This study was limited to a convenience sample based on the interviewers' availability. Kominiarek et al. acknowledged that factors such as race, ethnicity, and socioeconomic status may influence responses because weight and obesity can have different meanings to members

of cultural and economic groups. Kominiarek et al. did not evaluate appropriate weight gain during pregnancy, the risks of excessive weight gain, or whether or not women have the ability to lose and maintain weight.

Kominiarek et al. (2010) acknowledged that it was more challenging to address obesity during pregnancy, given the contraindications of losing weight and the lack of exercise programs during pregnancy. The importance of preconception counseling with the goal of optimizing weight and nutrition before pregnancy was ideal. Prior to Kominiarek et al. study little was known about obese women's perception of risk during pregnancy, but evidence from the study added to the body of literature whether how obese women perceive obesity during pregnancy.

Chaung et al. (2009) conducted a qualitative study using focus group interviews to explore the knowledge and attitudes of women with chronic medical conditions such as obesity, diabetes, and hypertension and how they perceived their pregnancy-associated risks, or make reproductive health decisions. A benefit of using a qualitative study was exploring how women with chronic medical conditions had different influences on pregnancy intention among reproductive age women. Several limitations were associated with Chaung et al. study. The focus group methodology and small sample size limited generalizability to all women with obesity, diabetes, and hypertension and not all chronic conditions that affect pregnancy risk. Chaung et al. acknowledged the need for more preconception health promotion in reproductive age women with chronic conditions in order to achieve the goal of avoiding unintended pregnancy and adverse pregnancy

outcomes. The present study purposely added to the data of information specific to obese pregnant women.

Research Methodology Using the Health Belief Model

According to Ulin et al. (2005), the health belief model was useful in providing guidance for understanding how individuals perceive the personal benefits or value of avoiding illness or getting well and their expectations that a specific action can prevent illness. In order to dissect the problem, the health belief model was the theoretical framework used to investigate obese women's perceived risk associated with obesity in pregnancy as related to the number of weight loss interventions and their perceived success of their interventions. Daddario (2007) proposed that the health belief model provides a comprehensive framework for understanding the psychosocial factors associated with the effects of beliefs on health and the decision process in making behavioral changes. According to Baranowski, Cullen, Nicklas, Thompson, and Baranowski (as cited in Daddario, 2007), the health belief model includes four key components: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and self-efficacy. *Perceived susceptibility* is a person's perception of the risk for becoming ill or developing a health condition. *Perceived severity* is a person's perception of the impact an illness or condition will have. *Perceived benefit* is a person's perception of the good that might come from reducing threat of disease by initiating certain behaviors. *Perceived barriers* are a person's perception of the difficulties in performing the specific behaviors of interest and the negative things that could happen from

performing those behaviors. *Self-efficacy* is a person's perception of his or her ability to perform a behavior.

Daddario's (2007) review of five studies found the health belief model to be the most effective and appropriate tool in successful weight management. These studies all used portions of the health belief model to support behavioral changes needed for weight management. In addition to motivation to change and support from physicians, the more other variables individuals have to stimulate their knowledge of the dangers of a specific condition, the greater the increase in their perceived seriousness, susceptibility, or both according to Baranowski et al. (as cited in Daddario, 2007, p. 364).

Nevertheless, Daddario (2007) highlighted the importance of ensuring that the patient understands the seriousness of obesity and its relation to the comorbidities it can cause. For example, in applying the health belief model individuals was willing to change their behavior if they believe that their health was at risk and their current behavior could lead to detrimental consequences, according to Lambert et al. (as cited in Daddario, 2007, p. 365). Thus, the individuals must believe that the benefits of making positive behavior changes outweigh the barriers they may face while attempting to make the changes. The health belief model is still useful in to explaining and predicting health behaviors by focusing on the attitudes and beliefs of individuals.

In this study, I seeked to prove the null hypothesis, but if the results were in favor of the alternative hypothesis either result could help healthcare providers as well as myself to better understand the actions obese women take to prevent or control an obesity-related complication during pregnancy. The health belief model was used in this

study to determine if obese women perceived the complications of obesity during pregnancy to (a) have serious consequences, (b) perform interventions to reduce their susceptibility of complications, and (c) believe they were successful in carrying out the intervention they performed. The results of these factors highlighted three out of five components of the health belief model, which are perceived susceptibility, perceived severity, and self-efficacy.

Summary

In summary, the literature reviewed in this chapter offered insight into how maternal obesity continues to be a problem, especially when the role of physiological adaptations was entered into the equation. As evidence showed, physiological adaptations occurred in fetuses of obese mothers and caused the cycle of obesity to continue. I highlighted the multifaceted aspects of obesity, noting that was not just an issue of poor nutritional intake, an overconsumption of calories, or a lack of exercise.

The problem of obesity is a public health issue that is not affected by just individual men, women, and children, but society as a whole. The cost of healthcare included additional care and services given to obese individuals, which was a concern for the health and well-being of the entire community. Healthcare providers bear the responsibility of providing education and better awareness to patients about the dangers associated with obesity. With the proper nutrition, education, and physical activity awareness, society could make a significant change in a positive direction in reducing the incidence of obesity.

Literature related to maternal obesity and pregnancy consistently indicated that there was a relationship between maternal pre-pregnancy weight and increased complications during pregnancy. Ultimately achieving and maintaining a healthy weight should be the goal advocated by healthcare providers, and the findings of this study may help healthcare workers in knowing how to better serve and care for pregnant women. The significance of the study concluded that obese pregnant women might become better educated about their risks of pregnancy-related complications. A quantitative methodology was best to explain individuals' behaviors. If a relationship existed, a correlation between variables appeared. To do this, participants answered specific questions in a structured format in an attempt to prove or disapprove the alternative hypotheses.

In Chapter 3, the methodology, a description of the setting and sample, instrumentation and materials was used for data collection, statistical methods, and data analysis, and ethical measures to protect participants are identified. The research design included details regarding how the sample was identified, recruited, and surveyed. The research design also included how and when the data were analyzed. The selection of the research design tied into the chosen framework as an explanatory approach used to look at obese women's attitude and knowledge.

Chapter 3: Research Method

Introduction

Chapter 3 includes a detailed description of the research design to examine women's knowledge and perception of knowledge of the risks associated with obesity during pregnancy for themselves and their baby. Also included is a description of the setting and sample that addresses the population characteristics, eligibility criteria, and sampling method. Descriptions of the instrumentation and materials used for data collection, statistical methods, and data analysis are also provided. Finally, measures to ensure participants' right and protection are included.

Research Design

The purpose of the study was to test hypotheses about the population based on the sample data by using a quantitative, correlational methodology. Leedy and Ormrod (2001) defined quantitative methodologies as those relating to numeric and statistical measurements so that the resulting data can be compared in numerical format. Quantitative research requires the researcher to identify and quantify variables of interest, select or design a reliable and valid survey instrument, collect numeric data, and analyze the data using the appropriate statistical procedure (Maxwell, 1996). One of the most frequently used quantitative research tools is the survey (Leedy & Ormrod, 2001). A survey questionnaire was used to gather data from pregnant women regarding their knowledge and perception of the risks associated with obesity during pregnancy for themselves and their baby.

Research Questions

The overarching research question was as follows: Do obese pregnant women perform weight-loss interventions prior to pregnancy to reduce the risk of pregnancy-related complications due to obesity? The four research questions were the following:

1. What is the association between obese pregnant women's perception of the risks associated with obesity in pregnancy and the type of weight-loss methods they attempted to implement prior to pregnancy?
2. What is the association between obese women's perception of the risks associated with obesity in pregnancy and their perception of how successful they were with their intervention efforts overall?
3. What is the association between the types of weight-loss interventions obese women attempt to implement prior to pregnancy and their perception of how successful they were with their intervention efforts?
4. What is the association between the ethnicity of obese pregnant women and the number of weight-loss interventions attempted prior to pregnancy?

Hypotheses

The following are hypotheses related to the study:

$H_0$1: There is no association between obese pregnant women's perception of the risks associated with obesity during pregnancy and the types of weight-loss methods attempted.

H_A1: There is a positive association between obese pregnant women's perception of the risks associated with obesity during pregnancy and the types of weight-loss methods attempted.

$H_0 2$: There is no association between obese pregnant women's perception of the risks associated with obesity during pregnancy and their perception of how successful they were with their weight-loss intervention overall.

$H_A 2$: There is a positive association between obese pregnant women's perception of the risks associated with obesity in pregnancy and their perception of how successful they were with their weight-loss intervention overall.

$H_0 3$: There is no association between the type of weight-loss methods attempted by obese women prior to pregnancy and their perception of how successful they were with their weight-loss efforts.

$H_A 3$: There is a positive association between the type of weight-loss methods attempted by obese women prior to pregnancy and their perception of how successful they were with their weight-loss efforts.

$H_0 4$: There is no association between the ethnicity of obese pregnant women and the type of weight-loss methods attempted prior to pregnancy.

$H_A 4$: There is a positive association between the ethnicity of obese pregnant women and the type of weight-loss methods attempted prior to pregnancy.

Sample Selection

Population and Sampling Frame

The population of interest in this study was pregnant women in the northeastern United States who lived in New Jersey. The sampling frame was from a single WIC clinic in an urban community in Newark, New Jersey. This clinic served women who resided in three counties within New Jersey. A summary of the prenatal care enrollment data from January 2009 to December 2009 indicated that among these women, 58.9% were Black non-Hispanic, 37.3% were Hispanic, 2.4% were White, 0.7% were Asian/Pacific Islander, and 0.7% were classified as *other*.

Sample. The participants in this study were a random sample of pregnant women older than 19 years. Participants were randomly chosen at initial enrollment certification or at recertification. One of the requirements for participating in the WIC program was to already have a confirmed positive pregnancy test. Therefore, I did not ask for medical documentation that the participants were pregnant. Age, height, and pre-pregnancy weight were self-reported to determine BMI prior to pregnancy. Although pre-pregnancy weight can be inaccurate, there was no way to accurately know a participant's actual pre-pregnancy weight because participants were not assessed by the WIC staff prior to pregnancy. Height and weight were the basis to calculate the participants' BMI, such that the BMI was based on the participants' reported height (m^2) and pre-pregnancy weight (kg). If a participant did not know her height, she was taken to the lab area to be measured.

Participants were randomly selected to participate in the study. Randomization allowed me to generalize about the population (Creswell, 2003). Once they registered with the WIC clerk, obese and nonobese participants were told the purpose of the study and asked if they wanted to participate in the study. Obese and nonobese women were asked to participate to avoid any biases on my behalf. Participants were recruited 2-3 days per week for randomization. This randomizing was done until 95 participants meeting the criteria for the study were determined.

I explained to all patients that their consent to participate would not affect their services with WIC in any way. The clerk informed me whether the participant was pregnant so that nonpregnant women did not get included in the study. Once I was notified which participants were pregnant, I briefly explained to them the purpose of the study, the importance of reading the consent form (see Appendix A), and the option to not participate. In addition, I told patients that whether they chose to participate in the study or not would not have an effect on their WIC services in any way. If a patient consented to participate in the study, she completed the survey (see Appendix B). Once the survey was completed, only women who met the criteria for the study were included. Criteria for excluding a participant from the study included unknown pre-pregnancy weight, BMI less than 30, and history of bariatric surgery. Women who were less than 20 years old were excluded to avoid possible complications regarding consent with the adolescent population.

Role of Researcher

My role as the researcher in this study was to explain the purpose of the study and provide consent forms and surveys to WIC participants. I had been employed at the same facility for 12 years as a registered dietitian working at the outpatient OB/GYN clinic. The OB/GYN clinic and the WIC clinic are separate entities and departments within the same facility. Because of my daily contact with pregnant women, I designed the study with the intention to draw out information from participants in a nonthreatening way. In addition, all Health Insurance Portability and Accountability Act (HIPPA) guidelines regarding participants' privacy and my access to health-related data were upheld. I had already successfully completed a HIPPA review course provided by the facility to confirm my understanding and expected compliance to federal regulations. I obtained permission from the WIC director as well as the Rutgers University institutional review board (approval identification number: Pro 2013003057) to conduct the study.

Sampling Size

I determined the sample size using the sample size calculator at http://www.surveysystem.com/sscalc.htm at 10% error and 95% confidence level. Computing the sample size at a +/-10% and 95% confidence level, the sampling program produced 95 participants to ensure a proper sample size.

Historical records revealed that an average of 7,596 obstetric clients were enrolled during a 12-month period. Data collection continued until the suggested sample size of 95 was reached. Obtaining at a minimum of 95 obese women helped to ensure the validity of the research and that there were enough obese women to test Hypotheses 1-4.

Instrumentation and Materials

The survey instrument for this study was similar to that used by Kominiarek et al. (2010; see Appendix B), with questions added to include the types of interventions women performed and the success of their weight-loss interventions prior to pregnancy. The survey instrument included questions about the participant's age, knowledge about obesity risk to mother and fetus, whether any interventions were performed prior to pregnancy, and whether the women perceived the intervention as successful.

The sample population Kominiarek et al. (2010) used was very similar to the sample I used as well. Kominiarek et al. reported that the sample came from a prenatal clinic from a Midwestern large hospital in an urban setting that served primarily low-income ethnic minority women with high-risk pregnancies. The sample for the study came from the WIC clinic, which was associated with a hospital that served primarily low-income and ethnic minority women with high- and low-risk pregnancies.

Although a portion of the Kominiarek et al. (2010) survey did collect data, the data were different from in their original study, in which Kominiarek et al. surveyed two groups of women (obese and nonobese) and then compared their perceptions. For this study, obese and nonobese women were surveyed, but only obese women with a BMI ≥30 who met the criteria for the study were included in the data analysis. In addition to completing the Kominiarek et al. survey, participants were provided information about weight-loss interventions they used. The data determined whether a correlation existed between women's perceptions regarding the effects of obesity during pregnancy and the number of measures they took to lose weight.

The survey included one question about whether participants were aware of the general risks of obesity during pregnancy. Seven true/false questions on the survey measured patients' knowledge of obesity-related pregnancy risks, including the specific risks of hypertension, diabetes, cesarean delivery, infectious morbidity, fetal growth problems, birth defects, and stillbirth. In addition, I included a question about the appropriate caloric intake during pregnancy and another question about the effect of obesity on infant gender. If the participant responded, "don't know," the response was recorded that way, but for the data analysis, the *don't know* responses were categorized as incorrect answers (Kominiarek et al., 2010).

I used a previously administered survey. The instrument was already reportedly valid. I chose to use already valid questions to ensure validity of the data collection tool. Kominiarek et al. (2010) found that: content validity was supported as experts in obstetrics reached consensus based on a review of the literature regarding each risk factor included in the survey. A professional expert in survey design for low-literacy ethnic minority and pregnant women also reviewed the interview items for structural and content validity (Kominiarek et al., 2010, p. 453). In addition to this, a survey design expert reviewed the data collection tool to confirm the content validity of all additional questions.

Reliability of the tool was not reported by Kominiarek et al. (2010) but was included in this study. The participants received the survey while they were in the waiting room waiting to be seen by the nutritionist. To assess the reliability of the instrument, the Cronbach's alpha coefficient was calculated. Cronbach's alpha coefficient

is a measure of the reliability of an instrument that assesses whether the participants were consistent in their responses to the survey questions.

The final survey and consent form were offered in English and Spanish to participants. The WIC office served clients who were English and Spanish speaking; therefore, I had Jacqueline Julio-Martinez, who was better in writing Spanish, to translate the survey and consent form in Spanish. A back-translated version provided by Google Translate was also submitted to the Walden University Institutional Review Board for approval.

Data Collection

Data collection began as soon as the Walden Institutional Review Board and Rutgers University Institutional Review Board applications received approval. Then I explained to each participant the purpose of the study. Data collection began upon approval from the Walden and Rutgers University Institutional Review Boards and continued until the needed number of participants was reached.

Participants completed the survey in the waiting room of the WIC office during initial enrollment certification and recertification. The survey took approximately 4 minutes or less to complete. After completing the survey, the participants gave me the survey, which was kept in a locked office or in my home in a locked security box.

Data Analysis

I inputted the data into SPSS version 21 for data analysis. The data analysis included both descriptive and inferential statistics. The descriptive statistics that were reported included pre-pregnancy weight, height, and prior weight loss surgery. The

dependent variables of the study were BMI, knowledge, and interventions performed prior to pregnancy, and the independent variable was perceived risk. Pre-pregnancy weight according to BMI class had a value as a nominal measurement, whereas knowledge based on Questions 1, 2, 3, 5, 6, and 8 of Part II of the survey had a value as an interval measurement, interventions performed prior to pregnancy had a ordinal measurement, and lastly how successful the obese pregnant women perceived their weight-loss intervention efforts to have been had a nominal measurement.

Descriptive Statistics: Central Tendency

In this study, I used descriptive statistics to explain the basic features of the data in a sensible way. For example, *central tendency* refers to an estimate of the center of a distribution of values (Trochim & Donnelly, 2007). One estimate of central tendency is the mean. The mean describes the average number value by adding all the values and dividing by the number of values. Features of central tendency were used mostly to describe participants' BMI and age, whereas ethnicity had a nominal value.

Another description of central tendency is dispersion, which refers to the spread of values around the central tendency, resulting in measures of the range and standard deviation. *Range* refers to the most frequently occurring value in the set of scores, and *standard deviation* refers to the spread of scores around their average in a single sample (Trochim & Donnelly, 2007). Furthermore, the distribution was the summary of the frequency of individual values or ranges of values for a variable (Trochim & Donnelly, 2007, p. 265).

Inferential Statistics: Hypotheses Analysis

Hypothesis 1 analyses involved using a chi-square goodness-of-fit test to assess whether a significant association existed between two nominal or ordinal variables. The first variable, an ordinal variable, was the types of weight-loss methods attempted by obese pregnant women. The obese pregnant women's response to Question 9 was used to determine the types of weight loss methods attempted. Four options for the responses for Question 9 were *none, exercise, dietary restrictions*, and *weight loss medication*. Thus, the response range for type of weight-loss interventions attempted was from 0 to 3. The second variable, a nominal variable, was the obese pregnant women's perception of the risks associated with obesity during pregnancy, determined by calculating the number of correct answers for Survey Questions 1, 2, 3, 5, 6, and 8 for each participant. If the number of correct answers was three or less, the woman did not be perceive obesity during pregnancy to be a risk; however, if the number of correct answers was greater than three, the woman did perceive obesity during pregnancy to be a risk category. Greater than three responses correct indicated a greater than 50% belief that these complications can occur if a woman is obese.

Hypothesis 2 analyses involved a chi-square goodness-of-fit test used to assess whether a significant association existed between two nominal or ordinal variables. The first variable, a nominal variable, was how successful the obese pregnant women perceived their weight-loss intervention efforts, determined by their response to Question 11. Four options for the responses to Question 11 were *no intervention taken, not successful, somewhat successful, and successful*. The *no intervention taken* responses

were excluded from the results, because they did not help to prove or disprove the null hypothesis.

The second variable, a nominal variable, was obese pregnant women's perception of the risks associated with obesity during pregnancy, which was determined by calculating the number of correct answers for Survey Questions 1, 2, 3, 5, 6, and 8 for each participant. If the number of correct answers was 3 or fewer, the woman was categorized as not perceiving obesity during pregnancy to be a risk; however, if the number of correct answers was greater than 3, the woman was categorized as perceiving obesity during pregnancy to be a risk.

Hypothesis 3 analyses involved using a chi-square goodness-of-fit test to assess whether a significant association existed between two ordinal variables. The first variable, an ordinal variable, was the types of weight loss methods attempted by obese pregnant women. The obese pregnant women's response to Question 9 determined the types of weight-loss methods attempted with four options: *none, exercise, dietary restrictions, and weight loss medication*. A response of *none* was excluded from the analysis. Thus, the response range for the number of attempted weight-loss interventions was from 1 to 3.

The second variable, an ordinal variable, was which interventions were obese women most successful with, determined by their response to Question 10. The four options for the responses were *none, exercise, dietary restrictions, and weight loss medication*. Responses of *none* were excluded from the analysis. Thus, the response range for the number of attempted weight-loss interventions was from 1 to 3.

Hypothesis 4 analyses involved a chi-square goodness-of-fit test to assess whether there was a significant association that existed between two nominal or ordinal variables. The first variable, an ordinal variable, was the number of weight-loss interventions attempted by obese pregnant women. The obese pregnant women's response to Question 9 determined the number of attempted weight-loss interventions with four options: *none, exercise, dietary restrictions,* and *weight loss medication*. Responses of *none* were excluded from the analysis. Thus, the response range for number of attempted weight-loss interventions was from 1 to 3.

The second variable, a nominal variable, identified a participant's ethnicity determined by her response to Question 5 of Part 1. Based on the WIC program's prenatal enrollment data, participants were categorized as Black non-Hispanic, White, Asian/Pacific Islander, and other.

Measures Taken for Protection of Participants

The option to decline participation was on the consent form. Participants were instructed to leave their names off the survey so that each survey remained confidential and anonymous. Participants had the option to leave the study, even after they consented to be a participant without penalty.

Before the study was initiated, the Walden University Institutional Review Board approved the study, including the English and Spanish consent forms and surveys presented in appendices A and B. I brought all data to my home once collected. I was the only person who had access to the data. I stored the data analysis on a separate flash drive. The data will be kept for 6 years after the completion of the study. Results of the

study will be shared as requested but not limited to the participants, healthcare providers, the administrator of the WIC clinic, and Rutgers University.

Summary

IOM's (2009) goal in working with obese pregnant women was to reduce the risk of adverse pregnancy outcomes. The challenge of addressing obesity during pregnancy was greater due to contraindications to weight-loss and limitations of exercise during pregnancy. Therefore, this study examined the relationship between women's knowledge and their perception of risk during pregnancy. To examine this relationship, I investigated women's knowledge and perception of knowledge regarding the risk of obesity for themselves and their babies, the types of interventions before pregnancy to reduce the risk for obese-related complications during pregnancy, and how women perceived the success of their interventions. The purpose of this chapter was to explain the study's methods, including a description of the population, eligibility criteria, sampling selection, data collection, protection of participants, and data analysis techniques. After data collection was completed, SPSS was used to analyze the data.

Chapter 4 includes a presentation of the findings. These findings were presented as whether the analyzed data indicated the hypotheses should be supported or rejected. Additionally, Chapter 4 provides answers to the research questions based on the findings.

Chapter 4: Results

Introduction

This chapter addresses the research questions and the results of the statistical analyses described in the previous chapter. The results in Chapter 4 are divided into two sections: preliminary analyses (including the demographic characteristics of the participants and descriptive statistics for perceptions of risk, weight-loss methods attempted, and intervention success) and the results from the inferential analyses performed to answer the four research questions of the study and tests of the hypotheses. The Statistical Package for the Social Sciences (SPSS) Version 21.0 was used for all descriptive and inferential analyses. The following research questions were answered as they pertained to the study participants:

1. What is the association between obese pregnant women's perception of the risks associated with obesity in pregnancy and the type of weight-loss methods they attempted to implement prior to pregnancy?
2. What is the association between obese women's perception of the risks associated with obesity in pregnancy and their perception of how successful they were with their intervention efforts overall?
3. What is the association between the types of weight-loss interventions obese women attempt to implement prior to pregnancy and their perception of how successful they were with their intervention efforts?
4. What is the association between the ethnicity of obese pregnant women and the number of weight-loss interventions attempted prior to pregnancy?

Research Design

Participants were recruited from one WIC office in Newark, New Jersey. Data were collected 2-3 days per week for 4 months. On some days, anywhere from 0-6 participants were recruited who met the criteria for the study, with an average of six participants each week. Once the surveys were collected from a participant, the BMI was computed, and Part I of the survey was reviewed to determine if she met the inclusion criteria of the study. If she met the criteria of the study, then her responses from the survey were transferred to a spreadsheet and her consent form and survey were placed in a separate envelope from those who did not meet the criteria of the study. The information from the surveys was organized based on participants' age, ethnicity, BMI, perceived risk of obesity, types of interventions performed, intervention success, and overall success. Only numerical data were used to correspond to each of the above categories. The data were cross-referenced four times to assure that there were no discrepancies between the data on the survey and the information inputted onto the spreadsheet and SPSS.

Preliminary Analyses

A total of 293 surveys were completed; 95 participants met the inclusion criteria, and one participant withdrew from the study. The inclusion criteria required a participant to be greater than 19 years of age, to have no history of weight-loss surgery, and to have a pre-pregnancy BMI of 30 or greater. Ninety-five participant surveys were used for this study, with 20 participants (21%) choosing not to respond to the question about ethnicity. Participants who did indicate their ethnicity were 39 (52%) Black non-Hispanic, 30

(40%) Hispanic, two (2.6%) White, two (2.6%) biracial, one (1.33%) Middle Eastern, and one (1.33%) other. This sample of participants is reflective of the population, where 58.9% are Black non-Hispanic, 37.3% are Hispanic, 2.4% are White, 0.7% are Asian/Pacific Islander, and 0.7% are other. The mean age of the sample was 28 years with a range of 20-39 years, difference of 19 years, and standard deviation of 5.02. The mean BMI was 35.733, with a range of 30.0 to 61.0, difference of 31.0, and standard deviation of 5.48. Table 2 summarizes information about the participants' age and BMI based on ethnicity.

Table 2

The Age and BMI Characteristics of the Sample by Ethnicity

		Age			BMI		
	N	*M*	*SD*	Range	*M*	*SD*	Range
Black non-Hispanic	39	27.82	4.81	20 to 39	35.49	4.21	30.0 to 48.1
Hispanic	30	28.00	5.00	20 to 38	36.04	6.19	30.2 to 61.0
Caucasian	2	29.00	7.07	24 to 34	34.05	3.46	31.6 to 36.5
Biracial	2	26.00	7.07	21 to 31	48.60	12.45	39.8 to 57.4
Middle Eastern	1	23.00	-	-	30.20	-	-
Other	1	35.00	-	-	33.90	-	-

Note. Overall, $N = 75$. *M* = mean; *SD* = standard deviation.

One unforeseen issue that needed clarification during the data collection phase was with Questions 9, 10, and 11 on the survey. Some participants did not respond to these questions well, as their responses did not correspond to one another. For example, a participant may have indicated that she tried to reduce her risk of obesity-related complications through dietary restrictions and exercise but indicated that she was successful with weight-loss medication, an option that she did not previously choose. When those ambiguous surveys appeared, I simply asked for clarification from the

participant.

A Cronbach's alpha was run on the instrument to determine its reliability in measuring how closely related two or more variables are to one another. Reliability for all of the questions in Part II of the survey, including the questions identified by Kominiarek et al. (2010) and the last three questions designed by myself, was 0.73. A Cronbach's alpha value of .70 or above was considered acceptable, thus revealing adequate reliability for the entire instrument. The Cronbach's alpha for the last three survey questions designed by myself indicated that the types of weight-loss methods, the success of these interventions, and the overall perceived success revealed an even higher Cronbach's alpha of 0.84. All constructs were reliable for the instrument used in this study.

Four variables were used in testing the null hypotheses of this study: perception of the risks associated with obesity in pregnancy, types of weight-loss methods they attempted to implement prior to pregnancy, perception of how successful they were with their intervention efforts overall, and ethnicity. Descriptive statistics for ethnicity were provided above, and Table 3 shows descriptive statistics for the other three variables. Most of the participants (63.2%) indicated that they perceived obesity to carry risks for pregnancy. Over one-third (34.7%) had not tried any weight loss methods, while 32.6% attempted exercise and 18.9% attempted exercise and dietary restrictions. The most common response concerning the success of the weight-loss attempts was that they were somewhat successful (34.7%).

Table 3

Descriptive Statistics for Perception of Risks, Weight-Loss Methods Attempted, and Success With Weight-Loss Methods

	n	*%*
Perception of risk		
No	60	63.2
Yes	35	36.8
Weight-loss methods attempted		
None	33	34.7
Exercise only	31	32.6
Dietary restrictions only	6	6.3
Weight-loss medications only	2	2.1
Exercise and dietary restrictions	18	18.9
Exercise, dietary restriction, and weight-loss medication	4	4.2
Exercise and weight-loss medication	1	1.1
Success with weight-loss methods		
No intervention	33	34.7
Not successful	7	7.4
Somewhat successful	33	34.7
Successful	22	23.2

Inferential Analyses

The results from the analyses for the four research questions of this study are included in this section, including testing of the four null hypotheses. The first research question of this study was as follows: What is the association between obese pregnant women's perception of the risks associated with obesity in pregnancy and the type of weight-loss methods they attempted to implement prior to pregnancy? The corresponding null hypothesis was the following:

$H_0$1: There is no association between obese pregnant women's perception of the risks associated with obesity during pregnancy and the types of weight-loss methods attempted.

Table 4 shows that the cross tabulation of perception of risk and types of weight-loss methods selected differed based on perception of risks associated with pregnancy, and phi coefficient was computed to indicate the size of the relationship between two nominal variables. The chi-square test was not statistically significant, χ^2 (6) = 3.22, p = .780, phi = .18. Therefore, the null hypothesis was not rejected. The answer to the first research question of this study was therefore that there was no association between obese pregnant women's perception of the risks associated with obesity during pregnancy and the types of weight-loss methods attempted.

Table 4

Cross Tabulation of Perceived Risk and Weight-Loss Methods Attempted

	Obesity is not a risk		Obesity is a risk		Total sample	
	n	%	*n*	%	*n*	%
None	21	35.0%	12	34.3%	33	34.7%
Exercise only	21	35.0%	10	28.6%	31	32.6%
Dietary restrictions only	3	5.0%	3	8.6%	6	6.3%
Weight-loss medications only	2	3.3%	0	0.0%	2	2.1%
Exercise and dietary restrictions	10	16.7%	8	22.9%	18	18.9%
Exercise, dietary restriction, and weight-loss medication	2	3.3%	2	5.7%	4	4.2%
Exercise and weight-loss medication	1	1.7%	0	0.0%	1	1.1%
Total	60	100.0%	35	100.0%	95	100.0%

Note. Percentages sum to 100% for each column.

The second research question of this study was the following: What is the association between obese women's perception of the risks associated with obesity in pregnancy and their perception of how successful they were with their weight-loss intervention overall? The null hypothesis for this research was the following:

$H_0$2: There is no association between obese pregnant women's perception of the risks associated with obesity during pregnancy and their perception of how successful they were with their weight-loss intervention overall.

The cross tabulation between perception of risk and success at weight-loss methods is shown in Table 5. The chi-square test was not statistically significant, χ^2 (3) = 1.43, p = .701, phi = .12. The null hypothesis was not rejected. Therefore, the answer to the second research question of this study was that there was no association between obese pregnant women's perception of the risks associated with obesity during pregnancy and their perception of how successful they were with their weight-loss intervention overall.

Table 5

Cross Tabulation of Perceived Risk and Success With Weight-Loss Methods

	Obesity is not a risk		Obesity is a risk		Total sample	
Success with weight-loss methods	*n*	%	*n*	%	*n*	%
No intervention	21	35.0%	12	34.3%	33	34.7%
Not successful	3	5.0%	4	11.4%	7	7.4%
Somewhat successful	22	36.7%	11	31.4%	33	34.7%
Successful	14	23.3%	8	22.9%	22	23.2%
	60	100.0%	35	100.0%	95	100.0%

Note. Percentages sum to 100% for each column.

The third research question of this study was as follows: What is the association between the types of weight-loss interventions obese women attempt to implement prior to pregnancy and their perception of how successful they were with their weight-loss efforts? The corresponding null hypothesis was the following:

$H_0$3: There is no association between the type of weight-loss methods attempted by obese women prior to pregnancy and their perception of how successful they were with their weight-loss efforts.

Table 6 shows the cross tabulation between type of weight-loss methods attempted and success with weight-loss efforts. The chi-square test was statistically significant, χ^2 (10) = 22.68, p = .012, phi = .61. Based on the chi-square test, the null hypothesis was rejected, and the answer to the third question was that there was an association between the type of weight-loss methods attempted by obese women prior to

pregnancy and their perception of how successful they were with their weight-loss efforts. Examining the percentages in Table 6 shows that those who tried exercise and dietary restrictions (44.4%) and exercise only (41.9%) were more likely to experience success than those who tried other methods or combinations of methods for which the success rates were between 0.0% and 25.0%.

Table 6

Cross Tabulation of Weight-Loss Methods Attempted and Success With Weight-Loss Methods: Cross Tabulation of Perceived Risk and Weight-Loss Methods Attempted

	Not successful		Somewhat successful		Successful		Total sample	
	n	%	*n*	%	*n*	%	*n*	%
Exercise only	2	6.5%	16	51.6%	13	41.9%	31	100.0%
Dietary restrictions only	1	16.7%	5	83.3%	0	0.0%	6	100.0%
Weight-loss medications only	2	100.0%	0	0.0%	0	0.0%	2	100.0%
Exercise and dietary restrictions	1	5.6%	9	50.0%	8	44.4%	18	100.0%
Exercise, dietary restriction, and weight-loss medication	1	25.0%	2	50.0%	1	25.0%	4	100.0%
Exercise and weight-loss medication	0	0.0%	1	100.0%	0	0.0%	1	100.0%
Total	7	11.3%	33	53.2%	22	35.5%	62	100.0%

Note. Individuals who attempted no weight-loss activities were not included in this analysis. Percentages sum to 100% for each row.

The fourth and final research question of this study was the following: What is the association between the ethnicity of obese pregnant women and the number of weight-loss interventions attempted prior to pregnancy? The corresponding null hypothesis was as follows:

$H_0$4: There is no association between the ethnicity of obese pregnant women and the type of weight-loss methods attempted prior to pregnancy.

For this analysis, three ethnic groups were compared: African Americans (n = 39), Hispanics (n = 30), and others (n = 26). Table 7 shows the cross tabulation of ethnicity and weight-loss methods attempted. The chi-square test was not statistically significant, χ^2 (12) = 11.63, p = .476, phi = .35. Therefore, the null hypothesis was not rejected, and it was concluded that there was no relationship between ethnicity and weight-loss method attempted.

Table 7

Cross Tabulation of Ethnicity and Weight-Loss Methods Attempted

	African American		Hispanic		Other		Total sample	
Weight-loss method attempted	*n*	%	*n*	%	*n*	%	*n*	%
None	14	35.9%	11	36.7%	8	30.8%	33	34.7%
Exercise only	12	30.8%	10	33.3%	9	34.6%	31	32.6%
Dietary restrictions only	4	10.3%	2	6.7%	0	0.0%	6	6.3%
Weight loss medications only	0	0.0%	0	0.0%	2	7.7%	2	2.1%
Exercise and dietary restrictions	8	20.5%	5	16.7%	5	19.2%	18	18.9%
Exercise, dietary restriction, and weight loss medication	1	2.6%	2	6.7%	1	3.8%	4	4.2%
Exercise and weight loss medication	0	0.0%	0	0.0%	1	3.8%	1	1.1%
Total	39	100.0%	30	100.0%	26	100.0%	95	100.0%

Note. Percentages sum to 100% for each column.

Summary

This study sought to determine whether obese women perceived obesity to be a risk during pregnancy, what weight loss interventions were preformed prior to pregnancy to reduce the risk of pregnancy-related complications due to obesity, and the overall perceived success of their weight loss efforts. Using SPSS, this research accepted the null hypotheses that there were no association between obese pregnant women's perception of the risks associated with obesity and the types of weight loss methods attempted. The results from the analyses performed for the four research questions of this study indicated that:

1. There was no association between obese pregnant women's perception of the risks associated with obesity during pregnancy and the types of weight-loss methods attempted.
2. There was no association between obese pregnant women's perception of the risks associated with obesity during pregnancy and their perception of how successful they were with their weight-loss interventions overall.
3. There was an association between the type of weight-loss methods attempted by obese women prior to pregnancy and their perception of how successful they were with their weight-loss efforts, with those who tried exercise and dietary restrictions or exercise only being more likely to experience success than those who tried other methods or combinations of methods.
4. There was no relationship between ethnicity and weight-loss method attempted.

The next chapter summarized the study and drew conclusions for the data presented in Chapter 4. Thus answering the research questions with the corresponding hypothesis and compared the current study findings with data from past research presented in Chapter 2. Chapter 5 discussed the social change aspect and provided recommendations for action. Chapter 5 also reviewed the limitations of the study, and the possible implications for further study.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

A woman who initiates a pregnancy already obese is at greater risk for maternal and fetal complications (Massiah & Kumar, 2008). The IOM (2009) presented the only known guidelines that allow for normal fetal growth and development to help reduce the risk of pregnancy complications. These guidelines include information on weight gain guidelines recommended to all women despite BMI in promoting a healthy pregnancy.

This chapter contains the results and analyses drawn from the data and addresses the research questions posed in this study. This chapter also compares the literature review with the research findings, identifies implications for social change, and explains the limitations of the study.

The findings in this study represented a small portion of the number of individuals who were enrolled for WIC prenatal services at the main office location associated with the Rutgers WIC program. The purpose of this study was to determine the perceived risk of pregnancy complications due to obesity among pregnant women. The mission of the study was to have a better understanding of the perceptions of obese women regarding their perceived risk of obesity-related pregnancy complications by evaluating if perception of obesity, ethnicity, types of interventions, and overall success were significant.

The sample was chosen because the WIC office enrolled pregnant women to receive their prenatal services of nutrition counseling and food assistance as a service in promoting optimum maternal and fetal outcomes. Participants were recruited from one

WIC program in Newark, NJ. This WIC site also has three other satellite sites, but the participants were recruited only from the main office. A total of 293 participants completed the survey, but only 95 individuals met the inclusion criteria for the study. Two hundred and ninety-three consent forms and surveys were given over a period of 4 months. After the surveys and consent forms were collected, BMI was computed, and Part I of the survey was reviewed to determine if any individuals had a history of weight-loss surgery and an age of less than 20 years. If a participant did not meet the criteria of the study, the consent form and survey were placed in an envelope with the intention to be counted as a participant who volunteered to partake in the study but did not meet the criteria of the study.

Conclusions and Literature Review Comparisons

The overarching question of this research was as follows: Do obese pregnant women perform weight-loss interventions prior to pregnancy to reduce the risk of pregnancy-related complications due to obesity? This question was divided into four research questions that examined obese women's perceived risk of pregnancy complications due to obesity, the interventions performed prior to pregnancy, and how they viewed the overall success of their interventions.

Research Question 1: What is the association between obese pregnant women's perception of the risks associated with obesity in pregnancy and the type of weight-loss methods they attempted to implement prior to pregnancy?

The null hypothesis was accepted, indicating that there was no association between obese pregnant women's perception of the risks associated with obesity and the

types of weight-loss methods attempted. The outcome of the data indicated that there was a negative association with a negligible chance of this occurring by chance.

These results are consistent with a study conducted by Chaung et al. (2009), which indicated that obese women had little knowledge about how to properly manage their weight prior to pregnancy. In fact, many women denied being overweight as a factor that increased pregnancy-related risks. Although most obese women agreed that weight-loss before pregnancy would be ideal, it was mostly to avoid the discomfort of extra weight gained during pregnancy. Receptivity to weight-loss counseling often depended on how they perceived the weight of their doctor. Their doctor's size influenced the acceptability of the weight-loss advice, which varied among obese women. Many obese women also expressed hostility toward their doctors when they failed to give them adequate information on how to lose weight (Chaung et al., 2009). This hypothesis supports the evidence provided in the literature review that obese women need additional support and reinforcement from healthcare providers in providing them with the resources needed to help them optimize their health to later maximize maternal and fetal outcomes during pregnancy.

Research Question 2 was the following: What is the association between obese women's perception of the risks associated with obesity in pregnancy and their perception of how successful they were with their intervention efforts overall?

The null hypothesis was accepted, indicating that there was not an association between obese pregnant women's perception of the risks associated with obesity and the

overall success of their weight-loss interventions. The outcome of the data showed there to be a negligible chance for there to be an association between these variables.

Chaung et al. (2009) concluded that obese women had knowledge deficits about pregnancy-related risks as they related to their intent to engage in preconception health promotion. Many women did not perceive being overweight or obese to be a factor in pregnancy because normal-weight women had pregnancy-related complications as well. On the other hand, evidence supported by Shin et al. (2011) and James et al. (2012) revealed that women who viewed themselves and the management of their weight as important also viewed the efficacy of their ability to lose weight even higher. Subsequently, when obese women do not perceive obesity to be a problem, it is not expected for them to intentionally participate in weight-loss interventions or view their efforts as successful.

Research Question 3 was as follows: What is the association between the types of weight-loss interventions obese women attempt to implement prior to pregnancy and their perception of how successful they were with their intervention efforts?

The null hypothesis was rejected, indicating that there is positive association between the type of weight-loss methods attempted by obese women prior to pregnancy and their perception of how successful they were with their weight-loss efforts.

The more aware a woman was of her overweight or obese status, the more likely she was to try weight-control behaviors (Duncan et al., 2011). Duncan et al. (2011) indicated that men and women who were overweight or obese who misperceived their weight were less likely to report that they wanted to lose weight and less likely to have

tried to lose weight within the past year compared to those who accurately perceived themselves as overweight. Therefore, those who were overweight or obese who misperceived their weight had less interest in or attempts at weight-loss and less physical activity.

Being able to address one's weight status is a public health issue and medically important to health care professionals, which could enhance the effectiveness of weight-loss and obesity-prevention efforts. As stated by Cogswell et al. (2010), many doctors did not refer patients for behavioral weight-loss therapy or prescribe weight-loss medications due to doubts about their ability to help their patients lose weight or follow their instructions on diet and physical activity. This lack of confidence and reassurance may affect how pregnant women perceive the severity of their pregnancy risk. Similarly, Jackson et al. (2005) stated that when healthcare providers did not aggressively take action to give their patients advice about weight loss and strategies for improving diet and exercise, patients were not challenged or motivated to work on these areas or make changes.

According to Bowerman et al. (2001), advice from physicians can heighten patients' awareness of health information; additional training of physicians in counseling skills can increase their confidence and self-efficacy in believing that they can make a difference in their patients' health behaviors. Also, the initiation of weight-loss efforts by physicians followed by a referral to a dietitian for follow-up counseling can help patients achieve weight loss (Bowerman et al., 2001).

Research Question 4 was the following: What is the association between the ethnicity of obese pregnant women and the number of weight-loss interventions attempted prior to pregnancy?

The null hypothesis was accepted, indicating that there was not an association between ethnicity and weight-loss intervention performed prior to pregnancy.

This finding is different than what was previously presented in Chapter 2. It is understood that women perceive obesity, their ability to lose weight, and be compliant to weight-loss guidelines differently. Ethnic or cultural influences play a vital role in motivating how women perceive and participate in weight-loss behaviors. Environmental barriers such as family and work responsibilities also affect women's ability to lose weight and comply with weight-loss guidelines (Walcott-McQuigg, 2005). Kominiarek et al. (2010) recognized that factors such as race, ethnicity, and socioeconomic status may influence the responses of participants as weight and obesity can have a variety of meanings within cultural and economic groups. These factors may be dependent on how prevalent diseases are within certain ethnic groups.

Recommendations for Action

Because obesity and weight takes on different meanings within cultural and economics groups, more culturally appropriate weight management programs are needed to support the health of communities. These programs need to be financially reasonable and accessible for the people that live within these communities. Informing pregnant women about the health implications of obesity and encouraging healthy behaviors is important. However, the bigger challenge would be to address obesity during pregnancy

given contraindications to weight-loss and exercise restrictions at this time. Therefore, addressing the issue of maternal obesity before pregnancy to optimize weight, promote healthier eating, and behavioral habits would be significant in helping to maximize a woman's future maternal and fetal outcomes during pregnancy.

Professional organizations need to be held more responsible to provide resources to their health care providers to make sure that they can adequately counsel their patients in promoting change. Health care professionals must display a level of confidence and self-efficacy in prompting women to be more motivated in making healthful changes. For example, providing additional training to physicians on improving their counseling skills can increase their level of confidence and self-efficacy in believing they can make a difference in their patient's health behaviors.

Recommendations for Further Study

In this study, Blacks and Hispanics were the two major ethnic groups surveyed. These two populations are the highest at risk for obesity in the United States. Therefore, future studies should address potential cultural differences in attitudes toward weight and obesity since cultural habits, personal, lifestyle, and environmental factors play a role in one's health belief practice. Clinics and health care facilities need to recognize the types of patients they serve, how they perceive their weight and how to address wellness related issues with them. Being aware of how a population perceives weight could be important in the design of behavioral weight-loss interventions. Health behavior theories such as the social cognitive theory could address interactions among personal and environmental factors and healthful lifestyle behaviors while, the health belief model

could help explain why individuals change or maintain specific health behaviors. Assessing the perceived susceptibility to a given condition is necessary in promoting healthful behavior change, developing culturally appropriate weight-loss materials, and intervention strategies for weight-loss.

This study was inclusive of women with planned and unplanned pregnancies, but additional research is needed to determine if there is a perceived difference in health when a pregnancy is planned. According to Finer and Zolna (2011), in 2006 there were 49% unplanned pregnancies in the US. Obese women who plan a pregnancy may take additional measures to have a more healthy pregnancy based on how they perceive their health and wellness in future pregnancies.

Implications for Social Change

An integral part of providing resources is having them accessible to those who need them most, with resources promoting healthier behaviors such as dietary changes and physical activity. Reducing the prevalence of obesity could reduce the cyclic effect it has on families and subsequently within communities. In order for change to take place there must be an emergent need from local, county, and state officials who see the need for wellness within their communities. This should be a part of their political agenda to improve their community. Political leaders and healthcare professionals must work together in supporting one another in designing and implementing interventions and strategies in promoting women's health. As previously stated, identifying women's perceptions about weight is the best way to develop strategies for effective weight loss.

Study Limitations

The population of the study was limited to one WIC office in Newark, New Jersey. I oftentimes needed to clarify the responses to the last three questions of the survey because some participants did not fully read and respond to the questions accordingly. Participants did not understand that one question was reflective of the previous question, therefore requiring me to explain the survey. The survey tool and consent form was checked using the SMOG readability test with an average of a 7.7 grade reading level. This was done because historically WIC participants are known to be socioeconomically challenged financially, which coincides with the Institute for Women's Policy Research (2012) data that indicates women with low literacy skills have overall low income earnings.

Another limitation of the study was that the results could not be generalized to be reflective of all pregnant women but of women with a lower socioeconomic background and women with planned and unplanned pregnancies. One of the requirements for WIC is to have a financial need due to limited income therefore; the results presented therein can only be reflective of women who are financially disabled during pregnancy.

A third limitation of the study was that participants self-reported their pre-pregnancy height and weight, which could have affected their eligibility requirements for this study. The results of this study were limited to women who were Black non-Hispanic and Hispanic, which matches 92% of the participants who indicated ethnicity on the survey. In addition to this, ethnicity was self-reported, which 75 out of 95 participants responded to which would have lead to a Type 1 error with Hypothesis 4.

The fourth limitation of the study was related to a woman's perception of obesity since several factors could potentially affect her beliefs about weight and health practices. This study did not probe a woman's reasons for performing or not performing weight loss interventions.

The final limitation of the study was related to the small sample size. Chi-square requires five or more responses per cell in which some cells had less than five responses. This may have lead to a type 2 error especially in hypotheses 1, 2, and 3.

Concluding Statement

Obesity is just one of many chronic disorders that can lead to comorbid conditions and complicate an individual's quality of life. Eliminating or reducing health disparities among women is one of the goals presented and tracked by the Healthy People 2020 objectives. It is pivotal for health care providers to be equipped with the knowledge and resources needed to assess, implement and reinforce healthy behaviors amongst their patients. Informing and motivating obese women with the information needed to make healthier decisions to improve their health aids in the process towards behavioral change.

This study indicated that a person's ethnicity do not play a vital role in how an individual perceives obesity complications during pregnancy. Contrary to this, evidence from the literature supports how cultural views on weight are a factor that drives how an individual will perceive weight. The negative association between obese pregnant women's perception of the risks associated with obesity, and the overall success of their intervention efforts revealed women needed to be more aware of their obesity risk. The literature presented offers a comprehensive view of the maternal and fetal complications

that can occur during pregnancy when obesity is present; therefore making the appropriate changes to improve health before, during, and after pregnancy is warranted.

This study provided additional leading information on narrowing the literature gap that existed in the current literature regarding the interventions obese women took prior to pregnancy to reduce their risk of obesity-related complications during pregnancy. This study revealed that there was no association between obese pregnant women's perception of the risks associated with obesity and the types of weight-loss methods implemented and their overall perception of how successful they were. This knowledge indicates healthcare professionals and policy makers must take additional measures to help define the importance of health and wellness to the individual women they serve.

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Appendix A: Consent Form

UNIVERSITY HOSPITAL
Newark, New Jersey

Dear Volunteer,

You are invited to take part in a research study of how you perceive obesity during pregnancy. The title of this study is "Weight-Loss Interventions Performed to Reduce the Risk of Obesity-Related Complications". The goal of this study is to provide better health care before and during pregnancy. Those who are 20 years and older, has never had weight loss surgery, and were overweight before the pregnancy will be included in this study. A total of 95 volunteers who meet these requirements will be selected for the study. Please read this form and ask any questions before agreeing to be part of the study.

This research study is given by Victoria Stewart, a student at Walden University and Dietitian at the University Hospital.

Background Information:
The purpose of this study is to look at what you know about how obesity can affect pregnant women and their babies, and determine the types of interventions you may have tried before pregnancy to reduce your risk for obesity-related problems during pregnancy.

Procedures:
If you agree to be in this study, you will be asked to check below that you have read and understood this consent form and agree to answer all the questions on the survey. You can change your mind, quit, withdraw, or not reply to the questions after you have agreed to participate. The survey will need to be completed during your WIC visit. It should take ~4 minutes to complete.

Voluntary Nature of the Study:
Your participation is voluntary; you may quit at any time. This means that everyone will respect your choice of whether or not you want to be in the study. No one at WIC will treat you differently if you decide not to be in the study and filling out this survey will not affect your prenatal care or WIC services in any way. There is no money reward for returning the survey.

Risk and Benefits of Being in the Study:
There are no harmful risks to participate in the study and no direct benefits to you. The results of this study can later assist health workers in better caring for women before and during pregnancy. If you are concerned about how your weight may affect your baby you will be given a free referral to speak to a healthcare worker.

Privacy:
If you decide to participate, the information you provide will be kept private. A number code will be used on the survey and consent form instead of your name and this information will only be kept for 6 years then destroyed. Data will not be used for any purposes outside of this project. The results of this study may be shared with the Institutional Review Board (a committee that

reviews human subjects research studies), officials of Walden University, Rutgers, the State University of New Jersey, the WIC program, and the Department of Health and Human Services, Office for Human Research Protections (a regulatory agency that oversees human subject research).

Questions and Concerns:
If you have any questions you may call Victoria at XXX-XXX-XXXX or e-mail her at XXXX@waldenu.edu. If you have questions about your rights as a participant, please call: IRB Director at (XXX) XXX-XXXX. You will be given a copy of this form to keep.

Statement of Consent:
____I have read the above information. I have asked questions and received answers. I agree to be in research study.

UNIVERSITY HOSPITAL
Newark, New Jersey

Queridos Voluntarios,

Usted está invitada a participar en un estudio de investigación de cómo usted percibe le obesidad durante el embarazo. El título de este estudio se "La Pérdida de Peso Intervención Realiza Para Reducir el Riesgo de Complicaciones Relacionadas con La Obesidad". La meta de este estudio es para proveer mejor cuidado de salud antes y durante el embarazo. Los que son mayores de 20 años, nunca ha tenido una cirugía de pérdida de peso y tenían sobrepeso antes del embarazo se incluyeron en este estudio. Un total de 95 voluntarios que cumplan con estos requisitos serán seleccionados para el estudio. Por favor leer este formulario y pregunte cualquier pregunta antes de dar el consentimiento para ser parte del estudio.

Este estudio de investigación está viene dada por Victoria Stewart, a estudiante de la Universidad de Walden y un dietista en el Hospital Universitario.

Información General:
El objetivo de este estudio es en qué es lo que sabemos acerca de cómo la obesidad puede afectar a las mujeres embarazadas y sus bebés, y determinar los tipos de intervenciones es posible que haya intentado antes del embarazo para reducir el riesgo de problemas relacionadas con la obesidad durante el embarazo.

Procedimientos:
Si usted acepta participar en este estudio, se le pedirá a consultar abajo que ha leído y entendido este consentimiento forma y de acuerdo a responder todas las preguntas de la encuesta. Usted puede cambiar tu mente, dejar, retirar o no responder a las preguntas después de que usted ha accedido a participar. La encuesta deberá ser completado durante su visita WIC. Debería tomar ~ 4 minutos para completar.

La naturaleza voluntaria del estudio:
Su participación es voluntaria; Usted puede renunciar en cualquier momento. Esto significa que todos respetarán su opción de si o no quieres estar en el estudio. Nadie en WIC tratará diferentemente si usted decide no participar en el estudio y llenar esta encuesta no afectará su atención prenatal o servicios WIC en cualquier forma. No hay ninguna recompensa de dinero por devolver la revisión.

Riesgos y beneficios de estar en el estudio:
No hay ningunos riesgos dañosos de participar en el estudio y hay beneficios directos para usted. Los resultados de este estudio pueden ayudar a profesionales de la salud en un mejor cuidado. Si estás preocupado por cómo su peso puede afectar a su bebé se le dará una remisión gratis para hablar con profesionales de la salud.

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Privacidad:
Si usted decide participar, la información que usted proporcione será confidencial. Un número de código se utilizará en el estudio y formulario de consentimiento en lugar de su nombre y la información sólo se mantuvo durante 6 años y luego destruidos. No se usarán para fines fuera de este proyecto. Los resultados de este estudio pueden ser compartidos con La Junta de Revisión Institucional (un comité que revisa los estudios de investigación con sujetos humanos), funcionarios de Universidad de Walden, Rutgers, la Universidad Estatal de Nueva Jersey, el programa de WIC, y el Departamento de Salud y Servicios y Humanos, Oficina de Protección de Estudios Humanos (in organismo regulador que supervisa la investigación con seres humanos).

Contactos y preguntas:
Preguntas e inquietudes: Si usted tiene alguna pregunta puede llamar Victoria al XXX-XXX-XXXX o correo electrónico a XXXX@waldenu.edu. Si tiene preguntas sobre sus derechos como participante, por favor llame a: Director de IRB en (XXX) XXX-XXXX. Se le entregará una copia de este formulario.

Declaración de Consentimiento:
____ I haber leído la información anterior. He hecho preguntas y recibió respuestas. Estoy de acuerdo en participar en el estudio de investigación.

Appendix B: Knowledge of Obesity Risk During Pregnancy

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Part I. Please answer the following questions:

1. Pre-pregnancy weight:_____ 2. Height:_____

3. Have you ever had surgery for weight loss? Yes_____ No_____

4. Age:_____ 5. Ethnicity:_____

Part II.
Check one answer only!

1) Obesity increases risk for birth defects
_____true _____false _____don't know

2) Obesity increases risk for diabetes
_____true _____false _____don't know

3) Obesity increases risk for high blood pressure
_____true _____false _____don't know

4) Pregnant women should not double the amount of food they eat
_____true _____false _____don't know

5) Obesity increases risk of having infections after a cesarean
_____true _____false _____don't know

6) Obesity increases risk of having a stillborn
_____true _____false _____don't know

7) Obesity does not affect infant gender
_____true _____false _____don't know

8) Obesity increases risk for fetal growth problems
_____true _____false _____don't know

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Check all that apply!
9) What are the types of interventions did you perform prior to pregnancy to reduce your risk of obesity-related complications during pregnancy?
_____none _____exercise _____dietary restrictions _____weight loss medication

10) Which intervention(s) were you most successful with?
_____none _____exercise _____dietary restrictions _____weight loss medication

Check one answer only!
11) Overall, how successful were you with the interventions you tried?
_____no interventions taken _____not successful _____somewhat successful
_____successful Code #_____

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Conociendo los Riesgos de la Obesidad Durante el Embarazo

Part I. Por favor conteste las siguientes preguntas:
1. Peso antes del embarazo: _____ 2. Altura: _____

3. ¿Se ha realizado cirugía para perder peso? Sí _____
No_____

4. Edad: _____ 5. Raza: _____

Parta II. ¡Escoja solo una respuesta!
1) La obesidad aumenta el riesgo de los defectos del nacimiento
_____verdadero _____falso _____no se´

2) La obesidad aumenta el riesgo de diabetes
_____verdadero _____falso _____no se´

3) La obesidad aumenta el riesgo de presión alta
_____verdadero _____falso _____no se´

4) La mujer embaraza no bebe aumentar le cantidad de comida que come
_____verdadero _____falso _____no se´

5) La obesidad aumenta el riesgo de tener infecciones después de una cesaría
_____verdadero _____falso _____no se´

6) La obesidad incrementa el riesgo de tener un bebe nacido muerto
_____verdadero _____falso _____no se´

7) La obesidad no afecta el género (sexo) del infante
_____verdadero _____falso _____no se´

8) La obesidad incrementa el riesgo de problemas de crecimiento del feto
_____verdadero _____falso _____no se´

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¡Marque todas las que aplique!
9) ¿Cuales son las tipos de intervenciones que usted hubiera hecho antes del embarazo para reducir los riesgos de la obesidad-relacionado con las complicaciones durante el embarazo?
___ninguna ___ejercicios ____dieta restringida ____pérdida de peso con medicamentos

10) ¿Qué intervención fue de mayor éxito para usted?
___ninguna ___ejercicios ____dieta restringida ____pérdida de peso con medicamentos

¡Escoger solo una respuesta!
11) ¿Que tanto logro de éxito tuvo usted can estas intervenciones que trato?
_____ninguna intervenciones tomado _____ningún éxito _____algún logro
_____objetivó logrado El Código_____

Appendix C: Letter of Permission

Dear Dr. Kominiarek,

My name is Victoria Watson and I am a doctoral candidate at Walden University. I am currently in the process of designing a survey for my study and I wanted to use a survey that had reliability and validity already established. Looking through your article "Maternal obesity: do patients understand the risks?" published in the *Journal of Perinatology*, I noticed that there are many questions on your survey that would coincide with my survey. May I please have permission to use portions of your survey for my study's survey? It would be greatly appreciated. Therefore, you will receive full credit for your part. If you have any questions or concerns I can be reached at XXX-XXX-XXXX or XXXX@waldenu.edu

Sincerely,

Victoria Watson, RD, MSPH

Curriculum Vitae

Victoria S. Stewart

SUMMARY

Healthcare leader proficient in patient care, demonstrated through the enhancement of patient services, community outreach, health fair exhibitions, and research initiatives. Organized, efficient, and flexible team player committed to executing challenging assignments and excelling in diverse environments.

PROFESSIONAL EXPERIENCE

University Hospital-formerly UMDNJ — Newark, NJ
Registered Dietitian — 2002- present

~ Performs nutrition assessment in the time frame consistent with the NJ State Health Code and policy and procedure for designated subunits, and triages clients into the appropriate level of care.

~ Evaluates and monitors clients' progress consistent with policy and procedure, and implements appropriate nutritional care collaboratively with primary care physician.

~ Counsels and educates patients and significant others on nutritional requirements and therapy to prevent and treat disease.

~ Maintain accurate nutritional records and communicates appropriate nutrition care to the primary physician.

~ Participates in organizational performance improvement activities to enhance the quality of nutritional care delivered to clients.

~ Prepares special exhibits and activities for staff and patients to promote healthy life style management, such as but not limited to: National Nutrition Month, UMDNJ's Biggest Loser etc...

~ Assists in the supervision of diet office procedures to ensure accurate processing of diet orders, menu modification and delivery of food and nutrition services.

~ Participates in the training of dietetic interns.

Sodexho Marriot Services at Saint Barnabas Medical Center — Livingston, NJ
Diet Technician — 2001

~ Performed patient assessments and follow up care to moderate risk clients.

~ Educated patients and significant others on nutrition interventions and food medication interactions.

~ Conducted group diet instructions for cardiac, psychiatry, and maternity patients on a weekly basis.

~ Collaborated with clinical dietitians and patient service managers in promoting patient satisfaction.

~ Participated in National Nutrition Month activities in promoting healthy eating and physical activity events.

~ Participated in community health promotions.

Sodexho Marriot Services at Clara Maass Medical Center — Belleville, NJ
Diet Technician — 1999-2001

~ Performed nutritional screening and limited assessments on cardiac, maternity, and orthopedic units.

~ Worked under the direction of the Registered Dietitian in providing nutrition intervention and obtaining customer satisfaction.

~ Conducted group diet instructions for psychiatry patients on a weekly basis.

~ Conducted menu modifications that were consistent with the diet prescribed by the physician.

~ Extensive use of computers to execute appropriate diet orders and communicated with the team members to assure meal efficiency.

EDUCATION

Walden University — Minneapolis, MN
Ph.D, Community Health Education and Promotion — 12/2014
Walden University — Minneapolis, MN
M.S.P.H., Community Health Education and Promotion — 5/2009
College of Saint Elizabeth — Morristown, NJ
Dietetic Internship Program — 5/2002
Montclair State University — Upper Montclair, NJ
B.S. Human Ecology Food and Nutrition: Dietetics — 12/1998

PROFESSIONAL HIGHLIGHTS

ServSafe Certified — June 2014
Saint Mark's Methodist Church- pre Mother's Day Health Fair — 2013, 2014
Served on UMDNJ Dietetic Internship Admission Committee, — 2010 - 2012
"Importance of Good Nutrition", Essex County Prosecutor's Office Project I Can Achieve 2007
"Eating Healthy for a Healthy Baby", UMDNJ- OB/GYN Associates — October, 2006
"Nutrition: Eating for Optimum Health", Kean University — March, 2004

MEMBERSHIP

Academy of Nutrition and Dietetics- formerly American Dietetic Association, Associate member (1999-2001, 2003-2004)

SPECIAL SKILLS

Microsoft Office specialist (Word, Access, Excel, PowerPoint, Windows ME & MS)
Expertise in LOGICIAN, EPIC HYPERSPACE, and CBORD