Published in final edited form as:

Am J Perinatol. 2013 May ; 30(5): 401–406. doi:10.1055/s-0032-1326984.

Is obesity an independent barrier to obtaining prenatal care?

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Abstract

Objective—Obesity is a demonstrated barrier to obtaining healthcare. Its impact on obtaining prenatal care (PNC) is unknown. Our objective was to determine if obesity is an independent barrier to accessing early and adequate PNC.

Study Design—We performed a retrospective cohort study of women who initiated PNC and delivered at our institution in 2005. BMI was categorized by World Health Organization guidelines: underweight ($<18.5\text{kg/m}^2$), normal weight ($18.5\text{--}24.9\text{kg/m}^2$), overweight ($25.0\text{--}29.9\text{kg/m}^2$), and obese ($\geq 30\text{kg/m}^2$). Maternal history and delivery information were obtained through chart abstraction. Differences in gestational age at first visit (GA-1) and adequate PNC were evaluated by BMI category. Data were compared using χ^2 and non-parametric analyses.

Results—410 women were evaluated. Overall, the median GA-1 was 11.1 weeks and 69% had adequate PNC. There was no difference in GA-1 or adequate PNC by BMI category ($p=0.17$ and $p=0.66$, respectively). When BMI groups were dichotomized into obese and non-obese women, there was no difference in GA-1 or adequate PNC, $p=0.41$.

Conclusion—In our population, obesity is not an independent barrier to receiving early and adequate PNC. Future work is warranted in evaluating the association between obesity and PNC and the perceived barriers to obtaining care.

Keywords

Obesity; access; adequate prenatal care

INTRODUCTION

Obesity is a nationwide epidemic in the United States. More than 60% of adults in the United States aged 20 years and older (over 120 million people) are obese or overweight.¹ The percentage of young people who are overweight continues to increase and has more than tripled in the past 25 years². In 2008, the World Health Organization (WHO) estimated that 1.5 billion adults were overweight and 300 million women were obese.³

There are a number of studies that have concluded that obesity acts as an independent barrier to healthcare for both men and women. It has been demonstrated that obese individuals receive fewer preventive healthcare measures than normal weight patients including gynecological examinations, breast evaluations, and Pap smear testing.^{4,5} Additionally, the medical complications of obesity including heart disease, hypertension, diabetes, and osteoarthritis are well known. As a result of the lack of preventive care and increase in complications, obese men and women have more physician visits, more prescriptions, and incur more health care costs than non-obese persons.⁶ Similar to long-term health outcomes, the association between obesity and adverse pregnancy outcomes is well described. Maternal obesity is associated with an increased risk of gestational diabetes, preeclampsia, labor dystocia, cesarean delivery, and intrauterine fetal demise.^{7–10} Recent 2009 Institute of Medicine (IOM) guidelines recommend a more narrow range of weight gain in pregnancy given the known risks associated with obesity both during pregnancy and long term, including weight retention and future obesity.¹¹

Although studies have addressed race and socioeconomic status as barriers to prenatal care and general healthcare^{12,13} and others have documented an association between obesity and fewer preventive health visits,^{4–6} there is a paucity of information about obesity acting as an independent barrier to obtaining prenatal care. Care during pregnancy allows for counseling and increased surveillance which may decrease pregnancy related adverse outcomes. Pregnancy is also an opportune time to engage women in improving their overall health.¹⁴ Our objective was to determine if obesity is an independent barrier to accessing early and adequate prenatal care. Our hypothesis is that obese women are more likely to initiate prenatal care at a later gestational age and have fewer prenatal visits than non-obese women.

MATERIALS AND METHODS

A retrospective cohort study was performed with approval from the Montefiore Medical Center Institutional Review Board (MMC IRB# 05-05-149E). A convenience sample was chosen and this cohort was defined by (1) all women who initiated their prenatal care at the Comprehensive Family Care Clinic (CFCC) of Montefiore Medical Center and (2) delivered after 24 weeks gestational age at Jack D. Weiler Hospital in 2005. CFCC is affiliated with our institution and is a federally qualified community health center for ongoing care as well as a referral center that maintains a database of all outpatient prenatal visits.

We used the following as BMI categories as defined by the World Health Organization: underweight (BMI <18.5kg/m²), normal weight (BMI 18.5–24.9kg/m²), overweight (BMI 25.0–29.9 kg/m²), and obese (BMI ≥ 30 kg/m²).³ The measured and documented weight at

the first prenatal visit and reported height were used to calculate BMI given that self reported pre-pregnancy weight was frequently inaccurate and was not universally available. The following data were abstracted from the CFCC database: age, race, height, weight, parity, gestational age at first prenatal visit (GA-1), and number of prenatal visits. Medical comorbidity was defined as a dichotomous outcome and included any of the following: gestational and pre-gestational diabetes mellitus, chronic hypertension, seizure disorder, systemic lupus erythematosus, thyroid disease, sickle cell disease, human immunodeficiency virus infection, renal, and liver disease. Delivery data were obtained from delivery log books maintained on the labor and delivery unit immediately after delivery.

The expected number of visits was calculated based on the American College of Obstetricians and Gynecologists standard for prenatal care. The number of expected visits was calculated using the construct that there is one prenatal visit every four weeks until the gestational age of 28 weeks, then every two weeks until 36 weeks, and then weekly. The Kotelchuck Index, also called the Adequacy of Prenatal Care Utilization Index,¹⁵ was then used to evaluate the adequacy of visits. The Kotelchuck Index was calculated by dividing the number of actual prenatal visits by the expected number of visits. The expected number of visits was calculated using the formula: $((28 - \text{\#wks at 1}^{\text{st}} \text{ visit})/4) + 4 + (\text{\#wks at delivery} - 36)$, accounting for the gestational age at delivery. Adequacy was defined as attending 80% of visits.

Statistical analyses were performed using STATA IC version 11.0 (College Station, Texas). Non-parametric data were compared using Mann-Whitney U and Kruskal-Wallis tests where appropriate. Categorical variables were compared using χ^2 analysis. Multivariate logistic regression models were used to control for covariates including the biologically plausible confounders of maternal age, race, and medical comorbidities (a dichotomous outcome previously defined). Statistical significance was set at $p=0.05$.

RESULTS

There were 615 women identified as receiving prenatal care at CFCC and delivering at our institution in 2005. Of those, 205 women were excluded as they initiated their prenatal care at an outside institution and therefore 410 women were included in the study. The median patient age at first visit was 26.1 years old, with a significant difference in age between the four BMI categories. Of the 240 women with documented race in their prenatal chart, 125 (52.1%) were Hispanic, 107 (44.6%) were African American, and 8 (3.4%) were “other” which included Asian and Caucasian. Overall, the median gestational age at delivery was 39.3 weeks which was statistically different between BMI categories. Overall, 25.6% of patients had medical comorbidities and the presence of medical comorbidities differed by BMI categories. Table 1 demonstrates demographic characteristics by BMI category.

Within the entire cohort, 69% of patients had an “adequate” number of prenatal visits. The median GA-1 was 11.1 weeks and the median BMI at first visit was 27.3kg/m². When comparing the four BMI categories, the median GA-1 was similar ($p=0.17$) and there was no difference in the number of women initiating care in the first trimester ($p=0.09$). Further, there was no difference in total number of visits ($p=0.37$) or percent of adequate number of visits ($p=0.66$) among the four BMI categories (Table 2).

When BMI categories were collapsed and dichotomized, there was no significant difference in GA-1 when comparing the obese women (BMI $\geq 30\text{kg/m}^2$) to non-obese women (BMI $<30\text{kg/m}^2$), 11.6 versus 11.0 weeks, $p=0.11$. Additionally, when comparing obese versus non-obese women, there was no difference in percent of adequate number of visits (69.1 versus 69.4%, $p=0.41$).

Although there was no association between BMI categories and adequate number of prenatal visits, multivariable logistic regression was performed to control for confounders of maternal age, medical comorbidities, and race. The results remained unchanged after controlling for these confounders. However, in this model, women with medical comorbidities had a higher odds of adequate number of visits compared to those without medical comorbidities (AOR 3.08 [1.84–5.18], $p<0.001$). When comparing adequacy of visits in the strata of women with medical comorbidities, there was no significant difference between the BMI categories ($p=0.31$) although the rates of adequate prenatal care visits were higher in these women than in women without medical comorbidities (100% for BMI $<24.5\text{kg/m}^2$; 84.4% for BMI 25–29.9 kg/m^2 ; 83.3% for BMI $\geq 30\text{kg/m}^2$).

DISCUSSION

The obesity epidemic is a public health issue of critical importance. This is one of the first studies to assess whether obesity is a potential barrier to prenatal care as measured through the number of prenatal visits and the gestational age of initiating prenatal care. Despite obesity being a barrier to obtaining various non-obstetrical healthcare services, our study showed that obesity was not an independent barrier to receiving an adequate number of prenatal visits. There was a statistical significance between gestational age at delivery; however, all BMI categories had a median gestational age of 39 weeks and therefore this finding is not clinically significant.

There are possible explanations for why obesity is not a barrier to receiving prenatal care when it has been demonstrated to be a barrier to utilizing other aspects of healthcare. Body image, both prior to pregnancy and during pregnancy, may play a role. Dawson showed that Caucasian women are more likely than African-American women of similar weight to perceive themselves as overweight.¹⁶ Interestingly, in previous studies which found obesity to be a barrier to obtaining preventive services, there was a larger representation of Caucasians.^{4,5} Our study population, which is similar to city demographics in the Bronx,¹⁷ is approximately one third African-American and $<2\%$ Caucasian. Whereas some women may be reluctant to obtain care secondary to embarrassment or fear of being criticized for their weight, our population may not view weight in the same way. Fox and Yamaguchi suggested that normal weight women tend to have a negative body image once they are pregnant whereas overweight women tend to have a more positive body image when they are pregnant.¹⁸ This could also explain why prenatal care is unaffected by increasing BMI whereas obesity is a barrier to other areas of care. Furthermore, pregnancy is unique in that the care you are receiving affects both maternal and fetal health. It is plausible that societal and family pressures and personal commitment to obtain care may supersede any other barriers when fetal health may be affected.

This study has several strengths. It is the first study to evaluate obesity as a barrier to obtaining prenatal care, an important public health question. The prevalence of overweight and obese women in this study (68%) is reflective of the national average (64%),¹ which is important to note when generalizing these results. Given that self-reported pre-pregnancy weight may be very inaccurate, we used a documented measured weight at first prenatal visit to more accurately reflect initial BMI. Furthermore, we used a known method, the Kotelchuck Index,¹⁵ for calculating adequate number of prenatal visits.

An additional strength of our study is the large sample size from a high risk population. To assess our statistical power, a post hoc power analysis was performed. In order to determine the power we had to detect a difference between GA-1 among the four BMI categories, we assumed the normal weight category to be the reference group, with mean GA-1 of 12.5 weeks. The largest standard deviation, 6.1 weeks in the overweight category, was used for

the calculation. Additionally, given the small number of women in the underweight category, we used a ratio of 12:1 to be able to account for comparing our larger n (obese group) to a smaller n (underweight group). Assuming a type 1 error of 5%, we had 80% power to detect a 1.8 fold difference from the baseline mean in the reference group of normal weight.

Our study was not without limitations. Our study population represents an urban population and may not be comparable to other communities. As a retrospective study, not all data were available through chart abstraction. The number of and reasons for missed appointments are not known. Additionally, we cannot rule out underassessment of adequate visits. Specifically, we cannot be certain that patients did not receive intervening care at another facility during pregnancy. However, given that the average number of visits is equivalent to the expected number of visits and that initiation of care and delivery were in our institution, this is less likely to affect the results. The Kotelchuk Index was initially created to evaluate low-risk pregnancies and approximately 26% of our population was identified as having a medical comorbidity. Therefore, this index may inaccurately reflect an adequate number of visits given that our population should have had a higher number of visits than a low-risk population. However, there is no current recommendation suggesting a higher number of visits in patients with comorbidities.

In summary, it is important and encouraging to find that weight did not act as an independent barrier to accessing an adequate number of prenatal visits. It is important to acknowledge that the number and adequacy of prenatal care visits as measured by the Kotelchuk index, does not equate to effective prenatal care. The level of care, the proper identification of medical comorbidities, medical treatments, patient perception of the care they receive, and many other factors would need to be identified in order to appropriately judge the quality and effectiveness of overall care. Nonetheless, it is encouraging that obese women received the same amount of care and initiated care at a similar gestational age as non-obese women.

We found that, overall, 69% of our patients had an adequate number of prenatal visits, which is similar to the national average of 70.7%.¹⁹ It is however, important to note that 30% of patients overall do not have an adequate number of prenatal visits, both in our population and nationwide. This is of great public health concern and further research must be focused on identifying what barriers exist in preventing patients from receiving the appropriate amount of prenatal care. Specifically, it would be interesting to look at insurance status prior to pregnancy and partner involvement as a factor contributing to accessing prenatal care. Further studies should assess patient attitudes and perceived barriers in obtaining medical care. It is also of great importance to address obesity as a barrier to receiving prenatal care in a broader population of patients nationwide to determine if suburban, rural, or more affluent communities show different trends in prenatal care visits among obese women.

Acknowledgments

None

Abbreviations

PNC	prenatal care
BMI	body mass index
IOM	Institute of Medicine

GA-1 gestational age at first visit
CFCC Comprehensive Family Care Center

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Figure 1.

Table 1

Demographics

	Underweight (n=10)	Normal weight (n=122)	Overweight (n=126)	Obese (n=152)	p value
Median maternal age at 1st PNV *	21.2 (18.2–24.3)	24.9 (20.6–29.5)	26.1 (22.8–30.3)	27.4 (23.5–31.5)	<0.001
Median BMI *	17.9 (16.3–18.2)	22.3 (20.8–23.8)	27.0 (26.0–28.7)	35.5 (32.4–40.6)	<0.001
Race: **					0.29
AA	40.4 (4)	25 (20.5)	28 (22.2)	50 (32.9)	
Hispanic	0	44 (36.1)	38 (30.2)	43 (28.3)	
Other	10 (1)	4 (3.3)	1 (0.8)	2 (1.3)	
Unknown	50 (5)	40.2 (49)	59 (46.8)	57 (37.5)	
Parity	1.0	1.2	1.2	1.2	0.75
Median GA at delivery – weeks *	40.5 (39.6–40.9)	39.6 (38.6–40.4)	39.4 (37.9–40.3)	39.2 (37.3–40.1)	0.04
Medical comorbidities **	10.0 (1)	14.8 (18)	25.4 (32)	35.5 (54)	0.001

* Interquartile ranges presented

** Percentage (n)

PNV: prenatal visit, BMI: body mass index, AA: African American, GA: gestational age

Table 2

Outcomes by weight categories

	Underweight (n=10)	Normal weight (n=122)	Overweight (n=126)	Obese (n=152)	p value
Median GA at 1 st PNV – weeks *	9.1 (7.9–10.7)	10.6 (9.1–14.7)	11.7 (8.4–16.1)	11.6 (9.2–15.4)	0.17
Initiated care in the 1 st trimester **	90.0 (9)	59.8 (73)	52.4 (66)	53.3 (81)	0.09
Median no. of total PNV *	11.0 (8.0–12.0)	10.0 (8.0–13.0)	9.0 (7.0–12.0)	10.0 (8.0–13.0)	0.37
Adequate no. of PNV - %	60.0	73.0	66.7	69.1	0.66

* Interquartile ranges used

** Percentage (n)

GA: gestational age, PNV: prenatal visit, no: number