Published in final edited form as:
Am J Obstet Gynecol. 2012 December ; 207(6): 509.e1–509.e10. doi:10.1016/j.ajog.2012.08.020.

Infertility patients' knowledge of the effects of obesity on reproductive health outcomes

Eden R. Cardozo, MD, **Lisa M. Neff, MD, MS**, **Maureen E. Brocks, BA**, **Geraldine E. Ekpo, MD**, **Tanaka J. Dune, MD**, **Randall B. Barnes, MD**, and **Erica E. Marsh, MD, MSCI**
Division of Reproductive Endocrinology and Infertility, Department of Obstetrics and Gynecology (Drs Cardozo, Ekpo, Dune, Barnes, and Marsh and Ms Brocks), and the Division of Endocrinology, Metabolism, and Molecular Medicine, Department of Medicine (Dr Neff), Feinberg School of Medicine, Northwestern University, Chicago, IL.

Abstract

OBJECTIVE—The objective of the study was to assess the infertility patient knowledge of reproductive outcomes affected by obesity.

STUDY DESIGN—This was a prospective survey study of 150 female infertility patients in an academic medical center. Subjects were administered the Rapid Estimate of Adult Literacy in Medicine–Short Form and a questionnaire on the health risks of obesity, and investigators obtained height and weight measurements.

RESULTS—Subjects' age ranged from 21 to 45 years (mean 34.8 ± 4.94 SD) and body mass index ranged from 17.9 to 62.9 kg/m^2 (mean 26.5 ± 7.54 SD). The following percentages of women were aware that obesity increases the risk of infertility (82.7%), irregular periods (70.0%), miscarriage (60.7%), cesarean section (48.7%), breast cancer (38.7%), birth defects (29.3%), stillbirth (22.7%), and endometrial cancer (20.7%).

CONCLUSION—Among women with infertility, there is limited knowledge of reproductive outcomes affected by obesity. Public education is needed to increase awareness. Women undergoing fertility treatment are motivated for reproductive success and may be uniquely receptive to obesity education and weight loss intervention.

Keywords

body mass index; health literacy; infertility; obesity; reproductive outcomes

Obesity is a health issue of epidemic proportions worldwide and in the United States. The World Health Organization (WHO) defines normal weight as a body mass index (BMI) of 18.5-24.9 kg/m^2, overweight as a BMI of 25-29.9 kg/m^2, and obesity as a BMI of 30 kg/m^2 or greater.[1,2] In 2008, it was estimated that up to 10% of all medical spending in the United States ($147 billion) was attributable to the medical burden of obesity.[3] It is predicted that

Reprints: Erica Marsh, MD, MSCI, Feinberg School of Medicine, Northwestern University, 676 North St Clair, Suite 1845, Chicago, IL 60611. erica-marsh@northwestern.edu..

Cite this article as: Cardozo ER, Neff LM, Brocks ME, et al. Infertility patients' knowledge of the effects of obesity on reproductive health outcomes. Am J Obstet Gynecol 2012;207:509.e1-10.

The authors report no conflict of interest.

Presented, as preliminary findings, as a poster at the 67th annual meeting of the American Society for Reproductive Medicine, Orlando, FL, Oct. 15-19, 2011.

by the year 2030, there will be 65 million more obese adults in the United States and the resultant medical costs will increase by $48 billion to $66 billion per year.[4]

Obesity is a particularly important concern in the health of women because 64.1% of women in the United States are overweight or obese.[5] The association between increased weight and cardiometabolic disease is widely recognized, but obesity also plays a significant role in the development of reproductive disorders by increasing the risk of infertility,[6-11] breast cancer,[12] and endometrial cancer.[13,14]

Obesity is also associated with a number of pregnancy complications including miscarriage,[8,15] stillbirth,[16] birth defects,[17] and cesarean section.[18] The effects of maternal obesity extend beyond the pregnancy because there is increasing evidence of an association between maternal obesity during pregnancy and childhood obesity in offspring.[19] Interventions targeting maternal obesity therefore present a unique opportunity to reduce the risk of obesity and related metabolic derangements in future generations.

The population of women seeking care in an infertility clinic is of particular interest because they uniformly present for preconception medical care and are highly motivated. Furthermore, an obesity intervention would be expected to have a positive impact on the ability of these patients to achieve pregnancy and improve their obstetric outcomes. Fertility providers are becoming increasingly aware of the adverse reproductive outcomes associated with obesity and the potential for preconception intervention, resulting in debate over whether access to fertility treatments should be restricted in patients over a certain BMI.[20-22] The possible societal impact of weight loss intervention prior to pregnancy in this population is significant: according to the Centers for Disease Control and Prevention, 146,244 assisted reproductive technology cycles were performed in the United States during 2009, resulting in the live birth of 60,190 infants.[23]

Although there is abundant public information available on the effect of overweight and obesity on cardiometabolic and reproductive health, there are very few published studies that assess patient understanding and awareness of these risks, particularly as they pertain to women's reproductive health. While several studies demonstrate the public's limited knowledge of obesity as it pertains to cancer risk and obstetric outcomes, [24-26] we found no published studies that examined the knowledge among infertility patients of the relationship between obesity and reproductive health.

The purpose of this study was to assess the knowledge of BMI and the general and reproductive health risks associated with obesity in a cohort of women seeking infertility treatment. We hypothesized that women are aware that excess body weight increases the risk for cardiometabolic diseases such as diabetes and hypertension but are less aware of the effect of excess body weight on reproductive outcomes such as infertility, miscarriage, and endometrial and breast cancer.

Materials and Methods

Subjects

A convenience sample of women seeking care in the Reproductive Endocrinology and Infertility clinic at Northwestern Memorial Hospital was recruited. Women were approached at the time of check-in and offered a card describing the study. All eligible participants were approached sequentially as they presented to the clinic over the course of 13 months, subject to investigator availability. A total of 211 women were approached for participation and 150 agreed to participate (71.1% capture rate). Participation was restricted to English-speaking,

nonpregnant women between the ages of 18 and 45 years, with no additional inclusion or exclusion criteria including BMI.

Surveys

Participants completed the Rapid Estimate of Adult Literacy in Medicine–Short Form (REALM-SF), a validated 7-itemwordrecognition test to assess patient health literacy.[27] The REALM-SF was verbally administered to participants by a study investigator in a private setting. The highest possible REALM-SF score is 7, which is equivalent to a high school reading level andimplies that awomanwill likely be able to read and understand most patient education materials. A REALM-SFscore of 4-6 is equivalent to a seventh- to eighth-grade reading level and implies that a woman may struggle with most patient education materials.

Subjects then completed a questionnaire on the health risks of obesity developed by the investigators based on current literature and terminology from the WHO. A hard copy of the questionnaire (Appendix, Supplementary Figure) was distributed directly to patients who consented to participate. Demographic factors including age, race, education level, and annual household income were collected. The questionnaire assessed 3 principal components: self-perception of height and weight; knowledge of BMI; and knowledge of the effects of obesity on general, cardiometabolic, and reproductive health outcomes.

Participants' knowledge of the relationship between excess weight and various health outcomes was assessed by asking, "Does excess body weight (weighing more than you should) increase the risk of the conditions listed below?" Response choices included "yes," "no," and "not sure." Conditions not associated with obesity, such as eczema, lactose intolerance, and tuberculosis, were added as distractors. Participants who responded "yes" (that excess weight increased the risk of the condition) were considered as having knowledge that obesity is associated with an increased risk of that condition.

Survey results were entered into a database. Data entry was confirmed by random review of 20% of the entered surveys by one of the investigators (M.E.B.).

Clinical measurements

Height was measured in inches with a scale-mounted stadiometer. Weight was measured in pounds with a balancebeam scale. Measured height and weight were converted to metric units and used to calculate participants' BMI. The BMI of each participant was calculated from measured height and weight as well as from self-reported height and weight. Participants were categorized into BMI groups based on the WHO classifications[1] using their measured BMI. Selfreported height, weight, and BMI were compared with measured values.

Institutional review board status

This prospective study was reviewed and approved by the Northwestern University Institutional Review Board. Written informed consent was required and obtained from all of the study participants.

Statistical analysis

A sample size of 96 surveys was calculated to be sufficient to result in survey responses having a 95% confidence interval of ± 10%. All demographic and clinical measurements are reported asmean ± SD.The χ^2 test was used to determine the interaction between the demographic variables and patients' knowledge of the effect of obesity on specific conditions as well as the interaction between patientBMIclassification and demographic variables. Pearson's correlation was used to determine the association between the self-

reported vs actual weight and height. A $^{P} < .05$ was considered to be statistically significant. All statistical analyses were performed in SPSS (PASW version 18) software (SPSS Inc, Chicago. IL).

Results

Demographics

A total of 150 women (71.1% of the 211 who were initially approached) completed the study. Detailed demographic data are summarized in the Table. The study population ranged in age from 21 to 45 years (mean 34.8 ± 4.94 years), and 54.7% of study participants identified themselves as white and 26.7% as black. Most of the participants (86.6%) had at least 4 years of college education and 54% of participants reported a total annual household income of greater than $100,000. Almost all of participants (96.0%) had a REALM-SF score of 7. The BMI of study participants ranged from 17.9 to 62.9 kg/m^2 (mean 26.5 ± 7.54 kg/m^2). Fifty-four percent of the subjects had a normal BMI, 19.3% were overweight, and 24% were obese.

Correlation of BMI classification with demographics

There was a statistically significant correlation between being overweight and race (P = .031) and between being obese and race (P = .029), with white subjects less likely to be overweight or obese. A statistically significant correlation was found between being overweight and income (P = .003) and between being obese and income (P = .001), with subjects who earned a total annual income of greater than $100,000 less likely to be overweight or obese. A statistically significant correlation was found between being obese and education (P = .003), with subjects having at least 4 years of college education less likely to be obese.

BMI knowledge

Whenasked, “What percentage of women in the United States do you think weigh more than they should” only 36.2% of subjects correctly identified the range of 61–80% (Figure 1, A). Of the 150 participants, 145 (96.7%) had heard of the term “BMI.” Of these, 42 (29%) thought they knew their own BMI, and 17 (40.4%) of these women correctly knew their own BMI within ± 1 kg/m^2] (Figure 1, B). Therefore, only 11.3% of all participants actually knew their own BMI. When asked “Which BMI range is considered ideal?” only 47.3% were able to identify the correct range of 18.5–24.9 kg/m^2 (Figure 1, C).

Validity of self-report

Weasked participants to self-report their current height (in inches) and weight (in pounds), after which height and weight were measured by study personnel. There was high correlation between self-reported and actual weight (R^2 = 0.99 and $^{P} < .0001$; Figure 2, A) and height (R^2 = 0.91 and $P < .0001$; Figure 2, B).

Self-perception of current weight

We asked, “When you think about your current weight, do you consider yourself underweight, normal weight, overweight, or very overweight?” Of those who were actually underweight (n = 4), 2 (50%) identified themselves as underweight and 2 (50%) as normal weight. Of those who were actually normal weight (n = 109), 69 (63.3%) identified themselves as normal weight, 2 (1.8%) as underweight, and 38 (34.8%) as overweight. Of those who were actually overweight (n = 16), 14 (87.5%) thought they were overweight and 2 (12.5%) thought they were very over-weight. Of those who were actually obese (n = 20), 14 (70%) thought they were very over weight and 6 (30%) thought they were overweight.

Knowledge of the effects of obesity on general health and cardiometabolic and reproductive outcomes

Figure 3 shows the percentages of women who were aware that obesity increases the risk of the following: high blood pressure (94.7%); diabetes (93.3%); heart disease (92.7%); high cholesterol (92.0%); and arthritis(49.3%). Figure 3 also shows the percentages of women who were aware that obesity increases the risk of the following: infertility (82.7%); irregular periods (70.0%); miscarriage (60.7%); cesarean section (48.7%); breast cancer (38.7%); birth defects (29.3%); stillbirth (22.7%); and endometrial cancer (20.7%). Women incorrectly thought that obesity increases the risk of the following: early menopause (37.6%); osteoporosis (35.8%); iron deficiency anemia (19.3%); eczema (12.8%); cystic fibrosis (12.2%); lactose intolerance (10.8%); and tuberculosis (6.0%).

Correlation of demographics and BMI with knowledge of the health effects of obesity

We found a statistically significant correlation between education and knowledge of the effect of obesity on the risk of diabetes ($P = .039$), hypertension ($P = .019$), infertility ($P = .003$), and breast cancer ($P = .017$), with higher educational level associated with correct response. No statistically significant correlation was found between race or income and knowledge of the effect of obesity on any of the health outcomes.

We found no statistically significant correlation between being overweight or obese and having knowledge of any of the health outcomes (general, cardiometabolic, or reproductive) affected by obesity.

Comment

The goal of this study was to assess the knowledge of BMI and the effects of obesity on reproductive outcomes among women in an infertility clinic. Our study is unique in that it directly compared knowledge of cardiometabolic risks, general health risks, and reproductive risks, including pregnancy outcomes and cancer. We found that even among a highly educated, high-income, highly health literate population of women, there was less knowledge of the effects of obesity on reproductive outcomes than on cardiometabolic outcomes and limited knowledge of the effects of obesity on reproductive outcomes including birth defects, stillbirth, and breast and endometrial cancers.

As predicted, the majority of women were aware of the cardiometabolic health risks of obesity but were largely unaware of the reproductive consequences. Most women accurately knew their height and weight and correctly identified themselves as of normal weight, overweight, or obese. However, although most had heard of the term BMI, few knew their own BMI (to within a range of ± 1 kg/m^2). Therefore, although women were aware of their height and weight, there was little understanding of how these 2 measurements relate to BMI.

Our findings are consistent with previous studies[24,26] that showed that the public was far more aware of the cardio-metabolic risks compared with other health risks associated with obesity, including cancer. This is concerning, given that obesity results in a 2- to 5-fold relative risk of developing endometrial cancer,[13,14,28] and weight gain can result in up to 1.45 times increased risk of developing postmenopausal breast cancer.[12] These findings emphasize that public education about the various health risks of obesity is lacking, even in a highly educated, highly health-literate population.

A survey of pregnant Australian women by Dekker Nitert et al[25] showed that more than 70% were aware that obesity results in increased pregnancy complications, a much higher awareness of the pregnancy related complications of obesity than found in our study

population, which may imply that Australia has been more successful than the United States in educating the public about the reproductive health risks of obesity.

In our study population, education level was correlated only with knowledge that obesity increases the risk of diabetes, hypertension, infertility, and breast cancer. This is similar to the findings of Soliman et al,[26] who found that women with higher education and higher household income were more likely to be aware of the association between obesity and breast cancer but not of the association between obesity and endometrial cancer risk. On the other hand, an Australian survey found that educational status was consistently associated with higher knowledge of risks of obesity in pregnancy.[25] Again, this may indicate the need for better public health education in the United States, even among a highly educated population.

We found no statistically significant correlation between BMI classification (overweight or obese) and knowledge of any of the health outcomes associated with obesity. Ideally, overweight and obese women would be more aware of the risks of obesity on general and reproductive health outcomes because they are personally impacted by these risks; however, our data indicate that over-weight and obese patients are not being preferentially educated about the risks of obesity on health outcomes.

Given the known negative impact of maternal obesity on maternal and fetal outcomes,[29] a 2008 committee opinion by the American College of Obstetrics and Gynecology emphasized the importance of preconception counseling regarding the maternal and fetal risks of obesity in pregnancy.[30] The infertility population represents a unique opportunity for education because they uniformly present for preconception consultation and medical care. It is essential that physicians recognize this opportunity for intervention, calculate the BMI when patients present for infertility care, and educate patients regarding the risks of obesity on their reproductive outcomes.

There was not enough variation in our REALM-SF scores to correlate health literacy with knowledge of the risks of obesityoneachcondition.However,ourstudy populationwasclearlyaveryhealthliterate population, which further emphasizes that this lack of knowledge is not a result of inadequate health literacy but of inadequate public education on the part of individual medical providers, the medical community, and the government.

Our study found a very high correlation between the self-reported and measured height and weight. Prior studies assessing the validity of self-reported height and weight have shown a trend of women overreporting height and under-reporting weight.[31] The accuracy of self-report in our population may represent a population of women who are very aware of their health because they were actively seeking pregnancy. The participants also may have self-reported more accurately because they were informed upon enrollment that height and weight would be measured. Although it is always ideal for a study to measure height and weight, the finding that the self-report of height and weight is accurate in this population is important because future studies in this setting may be able to save time and resources by not requiring the study personnel to measure height and weight to obtain accurate results instead relying on self-reported values.

This study is novel in that it addresses an important and common issue, patients' knowledge of the reproductive risks of obesity, which has not been previously explored in the infertility population. The assessment of overall health literacy with the REALM-SF allows us to extrapolate that this knowledge deficit is not simply because of low health literacy. Another strength of our study is that height and weight were measured and not only self-reported.

Limitations of our study include the fact that our demographics do not parallel the demographics of women in the United States, and thus, the results may not be generalizable to the population as a whole. However, our demographics are consistent with the population of women seeking infertility treatment in the United States because they are more likely to be white, highly educated, and of higher socioeconomic status.[32] Therefore, these results may be generalizable to the population of women seeking infertility treatment, although it should be considered that knowledge of the effects of obesity on reproductive outcome may vary by region of the country and urban vs rural setting. Additional research conducted in diverse locations nationwide would be needed to clarify this.

Another limitation arises from the fact that most but not all participants were recruitedattheirfirstclinicvisit.Therefore,it is possible that some prior counseling by providers may have influenced participant's knowledge of the risks of obesity on reproductive outcomes. Finally, given the high education and health literacy level of participants, as well as the fact that those participating were actively seeking pregnancy, our participants might be expected to have a higher level of knowledge regarding the association between obesity and reproductive outcomes than the general population.

The importance of this lack of knowledge in the infertility population lies in the unique opportunity for obesity intervention. Research has shown that women seeking pregnancy are willing to adopt healthier habits based on clinical and pub lic health information to improve pregnancy outcomes.[33] This could be further capitalized upon in the population of women seeking care in an infertility clinic because preconception medical care is a requirement of treatment and they are highly motivated to achieve successful reproductive outcomes.

An obesity intervention would be expected to have a positive impact on the ability of these individual patients to achieve pregnancy and improve their obstetric outcomes, an important goal, given the large and increasing number of women undergoing fertility treatments yearly.[23] Furthermore, in light of the impactofmaternalobesityonchildhoodobesity,[19] a weight management intervention in this population could have an impacton the health of future generations.

In summary, we found that infertility patients at our institution are less aware of the effect of obesity on reproductive outcomes than the cardiometabolic consequences. This is particularly concerning, given the demographic profile of our study participants. Given the known benefits of weight loss on fertility and pregnancy outcomes and the high level of motivation of women undergoing fertility treatment, this population may provide a unique opportunity for obesity education intervention.

Acknowledgments

This study was supported by the Feinberg School of Medicine-Northwestern University, Northwestern Memorial Hospital, the Robert Wood Johnson Foundation (E.E.M.), and National Institutes of Health grant K12HD050121 Women's Reproductive Health Research Scholar Program at Northwestern University (E.E.M.).

REFERENCES

1. World Health Organization. [Feb. 1, 2012] Obesity and overweight. Fact sheet no. 311. Available at: http://www.who.int/mediacentre/factsheets/fs311/en/.
2. World Health Organization. [Feb. 1, 2012] Global Database on Body Mass Index. BMI classification. Available at: www.who.int/bmi/index.jsp?introPage=intro_3.html.
3. Finkelstein EA, Trogdon JG, Cohen JW, Dietz W. Annual medical spending attributable to obesity: payer-and service-specific estimates. Health Aff (Millwood). 2009; 28:w822–31.

4. Wang YC, McPherson K, Marsh T, Gort-maker SL, Brown M. Health and economic burden of the projected obesity trends in the USA and the UK. Lancet. 2011; 378:815–25. [PubMed: 21872750]
5. Flegal KM, Carroll MD, Ogden CL, Curtin LR. Prevalence and trends in obesity among US adults, 1999-2008. JAMA. 2010; 303:235–41.
6. Obesity and reproduction: an educational bulletin. Fertil Steril. 2008; 90:S21–9. [PubMed: 19007633]
7. Fedorcsak P, Dale PO, Storeng R, et al. Impact of overweight and underweight on assisted reproduction treatment. Hum Reprod. 2004; 19:2523–8.
8. Maheshwari A, Stofberg L, Bhattacharya S. Effect of overweight and obesity on assisted reproductive technology—a systematic review. Hum Reprod Update. 2007; 13:433–44.
9. Rich-Edwards JW, Goldman MB, Willett WC, et al. Adolescent body mass index and infertility caused by ovulatory disorder. Am J Obstet Gynecol. 1994; 171:171–7.
10. Wang JX, Davies M, Norman RJ. Body mass and probability of pregnancy during assisted reproduction treatment: retrospective study. BMJ. 2000; 321:1320–1.
11. Marsh, E.; Barnes, R. Obesity and conception.. In: Rees, M.; Karoshi, M.; Keith, L., editors. Obesity and pregnancy. Royal Society of Medicine Press Ltd; London (United Kingdom): 2008.
12. Eliassen AH, Colditz GA, Rosner B, Willett WC, Hankinson SE. Adult weight change and risk of postmenopausal breast cancer. JAMA. 2006; 296:193–201.
13. Ballard-Barbash R, Swanson CA. Body weight: estimation of risk for breast and endometrial cancers. Am J Clin Nutr. 1996; 63:437S–41S.
14. Modesitt SC, van Nagell JR Jr. The impact of obesity on the incidence and treatment of gynecologic cancers: a review. Obstet Gynecol Surv. 2005; 60:683–92.
15. Metwally M, Ong KJ, Ledger WL, Li TC. Does high body mass index increase the risk of miscarriage after spontaneous and assisted conception? A meta-analysis of the evidence. Fertil Steril. 2008; 90:714–26.
16. Chu SY, Kim SY, Lau J, et al. Maternal obesity and risk of stillbirth: a metaanalysis. Am J Obstet Gynecol. 2007; 197:223–8.
17. Stothard KJ, Tennant PW, Bell R, Rankin J. Maternal overweight and obesity and the risk of congenital anomalies: a systematic review and meta-analysis. JAMA. 2009; 301:636–50.
18. Poobalan AS, Aucott LS, Gurung T, Smith WC, Bhattacharya S. Obesity as an independent risk factor for elective and emergency caesarean delivery in nulliparous women—systematic review and meta-analysis of cohort studies. Obes Rev. 2009; 10:28–35. [PubMed: 19021871]
19. Whitaker RC. Predicting preschooler obesity at birth: the role of maternal obesity in early pregnancy. Pediatrics. 2004; 114:e29–36.
20. Vahratian A, Smith YR. Should access to fertility-related services be conditional on body mass index? Hum Reprod. 2009; 24:1532–7.
21. Pandey S, Maheshwari A, Bhattacharya S. Should access to fertility treatment be determined by female body mass index? Hum Re-prod. 2010; 25:815–20.
22. Harris ID, Python J, Roth L, Alvero R, Murray S, Schlaff WD. Physicians' perspectives and practices regarding the fertility management of obese patients. Fertil Steril. 2011; 96:991–2.
23. Centers for Disease Control and Prevention ASfRM, Society for Assisted Reproductive Technology. , editor. 2009 assisted reproductive technology success rates: national summary and fertility clinic reports. US Department of Health and Human Services; Atlanta, GA: 2011.
24. Lake; Snell; Perry; Associates. [Feb. 1, 2012] Obesity as a public health issue: a look at solutions. Available at: http://www.phsi.harvard.edu/health_reform/poll_results.pdf.
25. Dekker Nitert M, Foxcroft KF, Lust K, et al. Overweight and obesity knowledge prior to pregnancy: a survey study. BMC Pregnancy Childbirth. 2011; 11:96.
26. Soliman PT, Bassett RL Jr, Wilson EB, et al. Limited public knowledge of obesity and endometrial cancer risk: what women know. Obstet Gynecol. 2008; 112:835–42.
27. Arozullah AM, Yarnold PR, Bennett CL, et al. Development and validation of a short-form, rapid estimate of adult literacy in medicine. Med Care. 2007; 45:1026–33.

28. American College of Obstetricians and Gynecologists. ACOG practice bulletin. Clinical management guidelines for obstetrician-gynecologists, no. 65, August 2005: management of endometrial cancer. Obstet Gynecol. 2005; 106:413–25.

29. Rasmussen KM, Kjolhede CL. Maternal obesity: a problem for both mother and child. Obesity (Silver Spring). 2008; 16:929–31.

30. American College of Obstetricians and Gynecologists. ACOG committee opinion no. 315, September 2005. Obesity in pregnancy. Obstet Gynecol. 2005; 106:671–5.

31. Gorber SC, Tremblay M, Moher D, Gorber B. A comparison of direct vs. self-report measures for assessing height, weight and body mass index: a systematic review. Obes Rev. 2007; 8:307–26.

32. Simonsen SE, Baksh L, Stanford JB. Infertility treatment in a population-based sample: 2004-2005. Matern Child Health J. 2012; 16:877–86.

33. Louis GM, Cooney MA, Lynch CD, Handal A. Periconception window: advising the pregnancy-planning couple. Fertil Steril. 2008; 89:e119–21. [PubMed: 18308052]

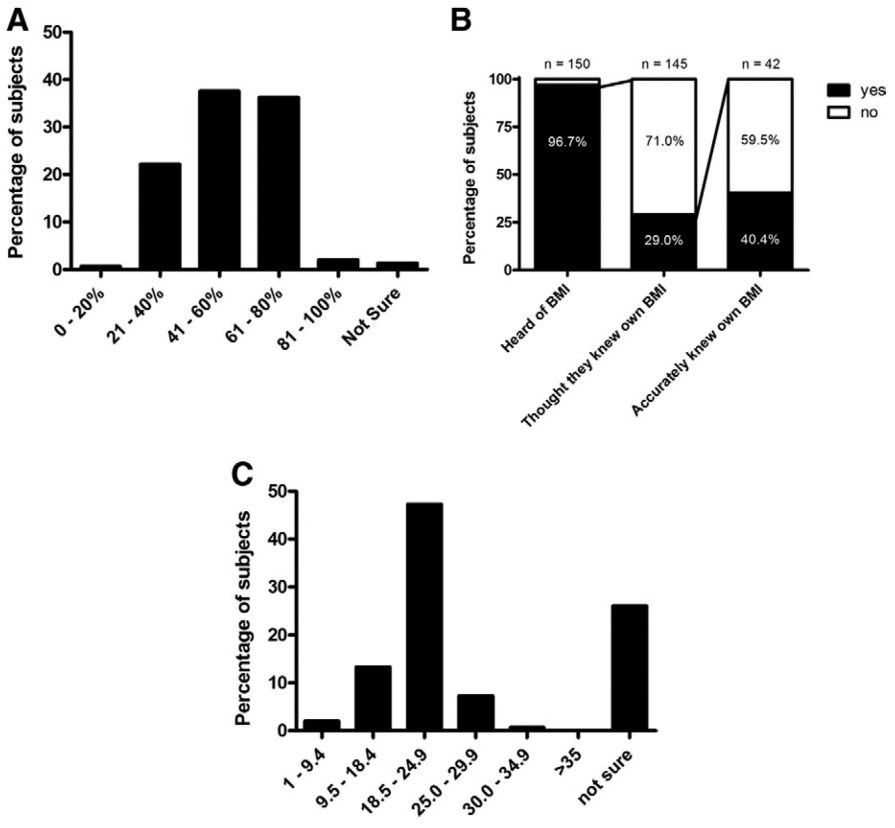

FIGURE 1. Participant knowledge of BMI

A, Percentage of participants who selected each answer choice to the question, "What percentage of women the United States do you think weigh more than they should?" **B**, Percentage of participants who had heard of term BMI, thought they knew the irown BMI, and accurately knew their own BMI. **C**, Percentage of participants who selected each answer choice to the question, "Which BMI range is considered ideal"

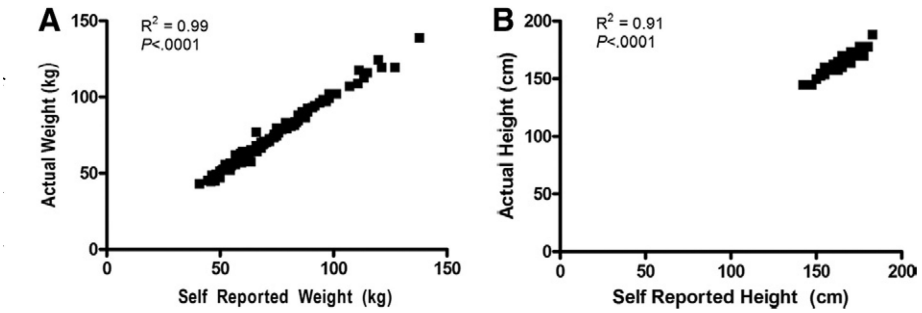

FIGURE 2. Correlation between self-reported and actual height and weight (n = 150)
A, Self-reported vs actual weight (kilograms). **B**, Self-reported vs actual height (centimeters).

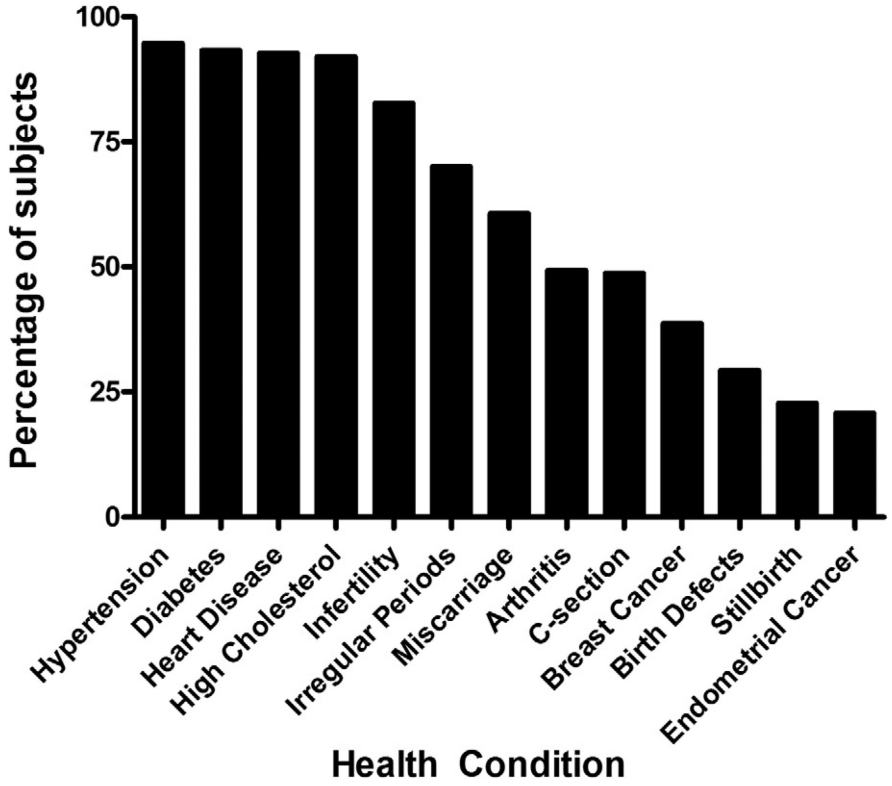

FIGURE 3.
Percentage of participants who indicated they are aware that obesity increases risk of specific health outcomes (n = 150)

TABLE

Participant demographics and health literacy as measured by the REALMI-SF[a]

Demographic	Value	
Age, y[b]	21–45	34.8 (4.94)
BMI, kg/m^2[b]	17.9–62.9	26.5 (7.54)
BMI category, prevalence %		
Underweight (BMI <18.5 kg/m^2)	2.7	
Normal range (BMI 18.5–24.9 kg/m^2)	54.0	
Overweight (BMI 25.0–29.9 kg/m^2)	19.3	
Obese class I (BMI 30.0-34.9 kg/m^2)	10.7	
Obese class II (BMI 35.0–39.9 kg/m^2)	7.3	
Obese class III (BMI >40.0 kg/m^2)	6.0	
Race, prevalence %		
White	54.7	
Black	26.7	
Hispanic	6.7	
Asian	8.7	
Other	3.3	
Education level, prevalence %		
Eighth grade or less	0.7	
High school or GED	2.7	
Some college	10.0	
4 year college degree	41.3	
Master's degree	36.0	
Doctoral degree	9.3	
Annual household income, prevalence %		
<$10,000	0.0	
$10,000 to <$25,000	3.3	
$25,000 to <$50,000	7.3	
$50,000 to <$75,000	20.7	
$75,000 to <$100,000	13.3	
$100,000 to <$150,000	19.3	
>$150,000	34.7	
REALM-SF score, prevalence %		
5	1.3	
6	2.7	
7	96.0	

GED, general educational development; *REALM-SF*, Rapid Estimate of Adult Literacy In Medicine–Short Form.

[a] Demographic data were collected for all 150 participants. REALM-SF scores were available for 149 participants because 1 participant refused to complete the assessment

[b] Data presented as range, mean (±SD).