Published in final edited form as:

Patient Educ Couns. 2017 June ; 100(6): 1103–1110. doi:10.1016/j.pec.2016.12.030.

Providing prenatal care to pregnant women with overweight or obesity: Differences in provider communication and ratings of the patient-provider relationship by patient body weight

Katie O. Washington Cole, BS^a, Kimberly A. Gudzone, MD, MPH^b, Sara N. Bleich, PhD^c, Lawrence J. Cheskin, MD^d, Wendy L. Bennett, MD, MPH^b, Lisa A. Cooper, MD, MPH^b, and Debra L. Roter, DrPH^d

^aDepartment of Health, Behavior and Society, Johns Hopkins University Bloomberg School of Public Health; 624 N. Broadway, Room 750; Baltimore, Maryland, USA 21205

^bDepartment of Medicine, Johns Hopkins University School of Medicine, Baltimore, MD, USA

^cDepartment of Health Policy and Management; Johns Hopkins University Bloomberg School of Public Health, Baltimore, MD, USA

^dDepartment of Health, Behavior and Society, Johns Hopkins University Bloomberg School of Public Health, Baltimore, MD, USA

Abstract

Objective—To examine the association of women's body weight with provider communication during prenatal care.

Methods—We coded audio recordings of prenatal visits between 22 providers and 117 of their patients using the Roter Interaction Analysis System. Multivariate, multilevel Poisson models were used to examine the relationship between patient pre-pregnancy body mass index and provider communication.

Results—Compared to women with normal weight, providers asked fewer lifestyle questions (IRR 0.66, 95% CI 0.44 – 0.99, $p = 0.04$) and gave less lifestyle information (IRR 0.51, 95% CI 0.32 – 0.82, $p = 0.01$) to women with overweight and obesity, respectively. Providers used fewer approval (IRR 0.68, 95% CI 0.51 – 0.91, $p = 0.01$) and concern statements (IRR 0.68, 95% CI 0.53 – 0.86, $p = 0.002$) when caring for women with overweight and fewer self-disclosure statements caring for women with obesity (IRR 0.40, 95% CI 0.19 – 0.84 $p = 0.02$).

telephone (219) 487-3790; katiowashington@jhu.edu.

Author contributions: All authors contributed to the study design and conception, as well as data interpretation. DLR was responsible for data acquisition in the parent study. KOWC was responsible for data analysis and drafting the manuscript. KAG, SNB, LJC, WLB, LAC, and DLR critically revised the manuscript for important intellectual content. All authors gave final approval of the version of the manuscript for submission.

Disclosures: The authors have no relevant financial relationships to disclose.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Conclusion—Less lifestyle and rapport building communication for women with obesity may weaken patient-provider relationship during routine prenatal care.

Practice implications—Interventions to increase use of patient-centered communication – especially for women with overweight and obesity – may improve prenatal care quality.

Keywords

Interaction analysis; obesity; weight bias; patient-provider communication; pregnancy

1.0 Introduction

Pregnancy may be a unique opportunity to deliver preventive health services as women may be in frequent contact with the healthcare system and more motivated for health behavior change [1, 2]. However, a number of studies suggest that provider weight bias – both implicit and explicit – may act as an unacknowledged barrier to high quality care for pregnant women with overweight or obesity [3, 4]. In a survey of 620 providers, researchers found that providers associated obesity with a number of negative words, including “lazy,” “non-compliant,” “weak-willed,” “awkward” and “sloppy” [5]. Separately, several studies using the Implicit Association Test have shown that health professionals may exhibit implicit anti-fat bias [6, 7]. Moreover, in a study that asked providers to rate their actual patients on a number of measures after a medical visit, researchers found that providers believed that patients with obesity were less adherent to medications than patients with normal weight, irrespective of patient scores on a validated adherence question scale [8]. In a similar study, researchers found that providers reported less respect for patients with obesity compared to patients with normal weight [9].

Several studies suggest that the expression of negative attitudes towards women with overweight and obesity in prenatal care may differ from other healthcare contexts. In qualitative studies, pregnant women with obesity reported that their prenatal care providers were judgmental and accusatory when discussing body weight, and provided little helpful information about nutrition, physical activity, or the need for extra diagnostic testing [10, 11]. A number of studies have shown that women with obesity are significantly less likely to obtain a number of recommended women’s health services, including breast cancer and cervical cancer screening [12–16]. In a focus group study, medical students reported that they most frequently heard derogatory humor about patients with overweight and obesity in obstetrics and gynecology [17].

Despite American College of Obstetricians and Gynecologists (ACOG) recommendations to provide nonjudgmental, compassionate and partnership-oriented care to all patients, irrespective of body weight [18], two studies using medical visit recordings have shown that these negative attitudes and perceptions may affect how providers communicate with patients [19, 20]. Gudzone and colleagues found that providers used significantly fewer rapport-building communication behaviors when providing care to patients with overweight and obesity, without any increased attention to biomedical, lifestyle or psychosocial content [19]. Bertakis and Azari found that providers spent more time discussing exercise and the technical aspects of the medical visit, while spending less time on health education [20].

Because patient-centered communication (including lifestyle and psychosocial communication, rapport building, activating and partnering communication) may enhance history-taking, diagnosis, shared decision-making and patient behavior change [21–25], differences in communication by patient body weight may diminish the quality of prenatal care for women with overweight or obesity [12, 15, 16, 18, 26]. However, we are not aware of any studies using empirical data from prenatal encounters to determine whether such communication differences exist.

The objective of the current study was to use audio recordings of routine prenatal visits to examine the association between provider communication and patient body weight. A secondary objective of the study was to examine the association between provider ratings of the patient-provider relationship and patient body weight. We hypothesized that providers would use less psychosocial, lifestyle, rapport building, activating and partnering communication when providing prenatal care to pregnant women with overweight or obesity compared to those with normal weight. We also hypothesized that providers would use more biomedical communication when providing prenatal care to pregnant women with overweight and obesity compared to those with normal weight. Finally, we also hypothesized that providers would rate patients less positively when providing prenatal care to pregnant women with overweight or obesity compared to those with normal weight.

2.0 Methods

We conducted a cross-sectional, secondary data analysis using audio recordings, surveys and medical record reviews collected as part of a trial of a patient communication intervention, described in detail elsewhere [27]. In the parent study, 23 providers and 130 of their patients were recruited from a single urban teaching hospital's obstetric outpatient clinic in Baltimore, MD. Providers were nurse practitioners, resident physicians, and attending physicians.

Women were recruited from consenting providers' panels, and consented to have a single prenatal visit recorded. We used 50 audio recordings of prenatal visits from the pre-intervention cohort (June – December 2009) and 80 audio recordings of prenatal visits from the intervention cohort, in which patients received one of two communication skills programs prior to their prenatal visits (June 2010 – January 2011). The first intervention was a computer-based communication activation program designed to encourage patients to engage actively in their prenatal visits. The second intervention was a facilitated review of relevant sections of *Baby Basics: Your Month by Month Guide to a Healthy Pregnancy* [28]. Women randomized to the computer-based intervention were more verbally active, less verbally dominated by providers, demonstrated greater use of communication skills targeted by the intervention, and experienced visits that were more patient-centered [27]. Providers were not aware of the patients' randomization assignments. The Johns Hopkins University Institutional Review Board approved the study procedures.

For the current study, patients who did not have height or pre-pregnancy weight recorded ($n = 3$) or who were underweight ($\text{BMI} < 18.5 \text{ kg/m}^2$; $n = 7$) were excluded. Patients who did not complete a questionnaire for depression screening were also excluded ($n = 3$), as

depressive symptoms were a covariate in the final models (Section 2.2). The final sample for the current study included 22 obstetric providers and 117 of their patients.

2.1 Measures

The independent variable for the study was patient pre-pregnancy body mass index (BMI), which was calculated using the height and weight reported in the medical record. As recommended by the American College of Obstetrics and Gynecology (ACOG), we used the calculated BMI to categorize patient participants into one of three groups: normal weight (18.5 – 24.9 kg/m²), overweight (25.0 – 29.9 kg/m²), or obese (≥ 30 kg/m²).

The dependent variables for this study were counts of provider communication used during prenatal visits. We considered domains of communication consistent with prior literature: 1) data gathering, 2) education and counseling, 3) activating and partnering, and 4) building a relationship [24, 29]. The Roter Interaction Analysis System (RIAS), a valid and reliable system applied to medical dialogue, was used to code the prenatal visits [30]. Trained RIAS coders assigned each complete thought, expressed by the patient or provider, to 1 of 37 mutually exclusive and exhaustive categories representing the functions of the medical dialogue. A 10% random subset of the audio recordings was double coded to establish inter-coder reliability of RIAS coding. Pearson correlation coefficients averaged 0.90 across provider categories and 0.91 for patient categories. RIAS coders were not aware of the study hypotheses.

Table 1 provides detail about each of the communication domains, the RIAS codes included in the current study, and sample quotations. Data gathering communication includes open and closed ended biomedical (i.e. medical history, symptoms, therapeutic regimen, etc.), psychosocial (i.e. social relationships, psychological experiences) and lifestyle (i.e. health-related behaviors and habits) questions. Education and counseling includes all informative statements as well as provider statements providing advice in the biomedical, psychosocial and lifestyle domains. The activating and partnership domain includes participatory facilitators and procedural talk, especially those statements that encourage patient involvement in and contribution to the prenatal visit (i.e. checking for understanding, cues of interest, asking permission). The rapport-building domain includes exchanges that build social, emotional and positive rapport (i.e. statements of optimism, concern, empathy, approval).

As in previous studies [8, 9, 31], the secondary dependent variables were provider ratings of the patient-provider relationship, as measured by the following items on a 5-point Likert scale (strongly disagree to strongly agree) in brief post-visit paper surveys: 1) “This patient provided an accurate history of her medical condition,” 2) “This patient trusts me a great deal,” 3) “I understood what the patient wanted to know,” 4) “The patient had a good understanding of the most important information I gave her,” and 5) “All in all, I like the patient a lot.” Provider responses were dichotomized (Strongly Agree/Agree vs. Neutral/Disagree/Strongly Disagree) for the final multivariate regression analysis.

2.2 Statistical analyses

Bivariate descriptive analyses were used to characterize the sample with respect to patient and provider variables. ANOVA was used for continuous variables and chi-squared tests were used for dichotomous or categorical variables.

To account for clustering of patients by provider, Poisson regression models with generalized estimating equations (GEE) were used to examine the association between BMI category and provider communication. Incidence rate ratios were calculated to compare pregnant women with overweight or obesity to those with normal weight (reference group). Logistic regression models with generalized estimating equations (GEE) were used to examine the association between BMI category and provider ratings of patient-provider relationship, and predicted probabilities were calculated for each group. All models were fit with an exchangeable correlation structure and robust standard errors, which tend to produce accurate statistical inferences even if the correlation structure is incorrectly specified.

Final models were adjusted for covariates selected *a priori* based on association with elements of patient-provider communication in the literature [26, 32–35], including patient age (continuous), depressive symptoms (as measured by Edinburgh Depression Scale; EDS 10 vs. EDS > 10), co-morbidities (hypertension; diabetes) provider type (nurse practitioner or physician), provider race (Black, White, or Asian), visit length (continuous), gestational age (first, second or third trimester) and intervention assignment (non-intervention, treatment or comparison group). We did a sensitivity analysis adding resident training level, parity and patient race to the full model, which did not change the results.

3.0 Results

Patient and provider characteristics are summarized in Tables 2 and 3. The mean prenatal visit length was 24.8 minutes (SD 11.1 minutes). The majority of providers were female (95.5%), White (59.1%), and obstetrics and gynecology residents (81.8%). Overall, patients' mean age was 22.9 years (SD 5.2 years), mean pre-pregnancy BMI was 30.8 kg/m² (SD 7.0 kg/m²) and mean gestational age at recorded visit was 22.0 weeks (SD 7.9 weeks). A larger proportion of women with overweight and obesity had diabetes (pre-existing and gestational) and hypertension (chronic and pregnancy-induced) compared to women with normal weight ($p = 0.02$). There were no significant differences in patient age, race, education, insurance status, gestational age, visit length, intervention status, or depressive symptoms by pre-pregnancy BMI category.

Differences in provider communication by patient body weight are summarized in Table 4. Providers asked fewer lifestyle questions when providing prenatal care to women with overweight compared to women with normal weight (IRR 0.66, 95% CI 0.44 – 0.99, $p = 0.04$). Providers gave significantly less lifestyle information when providing care to women with obesity compared to women with normal weight (IRR 0.51, 95% CI 0.32 – 0.82, $p = 0.01$). Providers were significantly less likely to seek clarification (IRR 0.76, 95% CI 0.64 – 0.93, $p = 0.01$) and used significantly fewer concern statements (IRR 0.68, 95% CI 0.53 – 0.86, $p = 0.002$) and approval statements (IRR 0.68, 95% CI 0.51 – 0.91, $p = 0.01$) when providing care to women with overweight compared to patients with normal weight.

Providers used significantly fewer self-disclosure statements (IRR 0.40, 95% CI 0.19 – 0.84 $p = 0.02$) in providing care to women with obesity compared to women with normal weight. There were no significant differences in provider biomedical or psychosocial questions, information giving or counseling by patient BMI category ($p > 0.05$). There were no significant differences in patient communication behaviors by patient BMI category ($p > 0.05$, data not shown). Differences in provider ratings of patient-provider relationship are summarized in Table 5. Providers were significantly less likely to strongly agree or agree that women with obesity provided an accurate history (predicted probability = 0.51, 95% CI = 0.41 – 0.61) compared to women with normal weight (predicted probability = 0.81, 95% CI = 0.69 – 0.94, $p < 0.001$). Providers were significantly less likely to strongly agree or agree that they liked women with obesity (predicted probability = 0.57, 95% CI = 0.41 – 0.73) compared to women with normal weight (predicted probability = 0.82, 95% CI = 0.71 – 0.94, $p = 0.04$). There were no significant differences in provider ratings of patient trust or how well the patient and provider understood each other ($p > 0.05$). There were no significant differences in patient ratings of providers by patient BMI category ($p > 0.05$, data not shown).

4.0 Discussion and conclusion

4.1 Discussion

This cross-sectional study of routine prenatal care visits reveals that providers use less patient-centered communication and give lower ratings of patient-provider relationship when providing prenatal care to pregnant women with overweight or obesity. These findings are concerning, given that The American College of Obstetricians and Gynecologists recommends that providers provide nonjudgmental, compassionate and high quality care to all women, irrespective of body weight, noting that negative attitudes towards women with overweight and obesity may undermine the patient-provider relationship [21].

Providers engaged in less lifestyle discussion when providing care to patients with overweight or obesity, asking overweight patients a third fewer lifestyle questions and giving obese patients less than half as much lifestyle information compared to patients with normal weight. This finding suggests that women with overweight or obesity may not be receiving effective behavioral counseling across a number of domains, including nutrition, tobacco use, physical activity, postpartum contraception, and breastfeeding. This finding may be expected, given that many providers report limited self-efficacy to counsel patients with respect to lifestyle and behavior change, may fear offending patients if they raise the subject, and may also perceive these discussions to be time-consuming and ineffective [25, 36–39]. Although our study suggests that providers may be particularly hesitant to discuss these issues when providing prenatal care to pregnant women with overweight or obesity, routine prenatal care may provide a unique opportunity for women and providers to set and frequently evaluate behavior change goals.

An earlier analysis of our study recordings applied the 5A's (Assess, Advise, Agree, Assist, and Arrange) behavioral counseling framework and found that in almost half of the visits that included any behavioral counseling, patients had initiated the discussion [40]. Moreover, when discussions were patient initiated, they were less verbally dominated by their

clinicians, they were longer, more socioemotional in nature, and more likely to include multiple 5A's strategies. We interpret this finding to support the contention that clinicians will positively and effectively respond to patient interest in this topic and, in fact, may be reluctant to broach the topic without an indication of patient receptivity [40].

Consistent with the findings of Gudzone and colleagues among primary care providers [19], we found differences in the rapport building, activating and partnering communication domains by patient body weight among obstetric providers. In providing care to patients with overweight, providers less frequently checked to make sure patients understood the discussion. Providers also used fewer concern and approval statements when providing prenatal care to women with overweight and fewer self-disclosure statements when providing care to patients with obesity. As noted by ACOG, these elements of patient-centered communication may increase patient participation in prenatal visits and enhance the patient-provider relationship by cueing patients to providers' ability to appreciate patient perspectives and experiences [21]. Increased attention to this domain may strengthen the therapeutic relationship between women and their prenatal care providers during and after pregnancy.

Similar to studies by Gudzone and colleagues [19] and Bertakis and Azari [20], we found no difference in biomedical communication by patient body weight. It might be expected that elevated risk profile for patients with overweight and obesity might increase the need for biomedical communication, and that biomedical concerns would outweigh lifestyle and psychosocial issues as well as relationship building, activating and partnering communication. Our findings of no difference in biomedical communication do not support our study hypotheses. While women with overweight and obesity received equal amounts of biomedical communication, this may represent an inequity in care given their greater burden of medical comorbidities that may require greater attention.

Consistent with previous literature, providers gave lower ratings of the patient-provider relationships when providing prenatal care to women with obesity compared to women with normal weight [8, 9]. Providers were less likely to endorse that they liked their patients with obesity. They were also less likely to endorse that women with obesity provided an accurate medical history compared to women with normal weight. In combination with the differences in provider communication, these ratings suggest that providers' negative attitudes towards patients with overweight or obesity adversely affect the quality of patient-provider relationship.

While our findings suggest that patient body weight is associated with provider communication and ratings of patient-provider relationship, the current study does not show that these differences are the direct result of weight bias. However, the study findings are consistent with observed patterns of communication that have been directly linked to measures of implicit bias in the context primary care visits [41]. Based on the previous literature, we can hypothesize that differences in provider communication observed in this study are mediated by implicit bias or negative attitudes towards patients with overweight and obesity [5–7]. However, future studies are needed to directly examine the relationship

between patient body weight, measures of provider weight bias, and provider communication.

Future studies should also explore other relevant outcomes including patient satisfaction and use of health services. Although studies of the relationship between patient body weight and satisfaction with care are somewhat mixed, the general consensus is that, irrespective of body weight, patients generally report being satisfied with their overall care [42–44]. In primary care, Wadden and colleagues found that women were significantly less satisfied with their care for obesity and weight management, relative to their satisfaction with overall care [45]. Gudzone and colleagues found that “doctor shopping” for primary care providers (defined as having claims with 5 or more primary care physicians in a 24-month period) among patients with overweight and obesity, was associated with increased healthcare utilization but possibly decreased continuity of care for these patients [26]. In some studies in primary care, participants report delaying care because of concerns about how health professionals discuss weight-related issues during routine care [46–49]. Since women may be in more frequent contact with the healthcare system during routine prenatal care, this creates a unique opportunity for women and their providers to build a therapeutic relationship that extends beyond pregnancy. It is possible that provider communication and attitudes towards pregnant women (such as those shown in our study) undermine this therapeutic relationship, which may affect women’s satisfaction with healthcare and their future access to preventive health services [12, 14–16, 26, 43]. Moreover, strengthening the therapeutic relationship between pregnant women and their obstetrics providers may also enhance progress toward Healthy People 2020 goals, including access to early and adequate prenatal care and healthy weight gain during pregnancy [50].

Our study has several limitations. In this small, convenience sample, the majority of the providers were White, female, resident physicians and the majority of their patients were young Black women or had Medicaid insurance. We believe that these findings may be generalizable to other urban obstetrics clinics, but our results may not be representative of practices in other settings with fewer trainees or with a more racially and socioeconomically diverse patient population. The size of the sample may have also limited our statistical power to detect other differences in elements of the patient-provider relationship. Additionally, our study is cross-sectional and only one prenatal visit was recorded for each patient; therefore, the results may or may not be representative of communication throughout women’s pregnancies. We controlled for gestational age and the number of prenatal visits to attempt to account for these differences. In the current study, we were unable to examine specific lifestyle topics that may be particularly relevant to patients with overweight and obesity (e.g. nutrition and physical activity) as RIAS does not include separate codes for these subtopics [40].

Despite these limitations, our study has several strengths. We used audio recordings of prenatal visits – rather than provider or patient report – to examine the relationship between patient body weight and well-established communication domains. Although there is some concern that recording medical visits may cause Hawthorne (observer) effect, previous studies suggest that these methods provide important insight into the content of medical dialogue without significantly or systematically affecting provider or patient communication

[51–53]. Moreover, we were able to account for a number of different covariates that may influence communication, which lends legitimacy to the hypothesis of an independent association between patient body weight and provider communication. Additionally, our study combines an examination of recorded communication with provider ratings of their interactions with patients, providing a more complete picture of the association between patient body weight and quality of the patient-provider relationship.

4.2. Conclusion

Our cross-sectional analysis of a small, convenience sample of routine prenatal visits in an urban obstetrics clinic suggests that providers use less lifestyle, rapport-building, activating and partnering communication when caring for women with overweight and obesity. Moreover, providers were less likely to endorse that they liked women with obesity or that these women provided an accurate medical history.

4.3 Practice implications

Previous studies of provider attitudes [5, 7–9], patient experiences [10, 11, 54], and access to women's health services [12, 13, 55], suggest that body weight affects the quality of care women receive. This study provides new evidence to support those conclusions and further suggests that increased use of patient-centered communication can strengthen therapeutic relationships and enhance the quality of prenatal care for women with overweight and obesity. These stronger patient-provider relationships may also lead to greater access to preventive care and improved health outcomes during and after pregnancy. Interventions to increase provider use of patient-centered communication – especially for women with overweight and obesity – may improve the quality of prenatal care women receive, as well as promote better health outcomes for women and their children.

I confirm all patient/personal identifiers have been removed or disguised so the patient/person(s) described are not identifiable and cannot be identified through the details of the story.

Acknowledgments

The authors acknowledge the women and providers who participated in the parent study. We also acknowledge all members of the parent study team. The parent study was funded by the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (R01HD050437). KOWC was supported by a training grant from the National Institute of General Medical Sciences (T32GM00730941). KAG was supported by a career development award from the National Heart, Lung, and Blood Institute (K23HL116601). These funding sources were not involved in study design; the collection, analysis or interpretation of the data; in the drafting of the manuscript; or in the decision to submit the manuscript for publication. The study findings were presented at The International Conference on Communication in Healthcare in New Orleans, Louisiana on October 27, 2015.

References

1. McBride C, Emmons K, Lipkus I. Understanding the potential of teachable moments: the case of smoking cessation. *Health Educ Res.* 2003; 18:156–70. [PubMed: 12729175]
2. Phelan S. Pregnancy: a “teachable moment” for weight control and obesity prevention. *Am J of Obstet and Gynecol.* 2010; 202:135e1–e8. [PubMed: 19683692]
3. Puhl RM, Heuer CA. Obesity stigma: important considerations for public health. *Am J Public Health.* 2010; 24:252.

4. Puhl RM, Heuer CA. The stigma of obesity: a review and update. *Obesity* (Silver Spring). 2009; 17:941–64. [PubMed: 19165161]
5. Foster GD, Wadden TA, Makris AP, Davidson D, Sanderson RS, Allison DB, et al. Primary care physicians' attitudes about obesity and its treatment. *Obes Res*. 2003; 11:1168–77. [PubMed: 14569041]
6. Teachman BA, Brownell KD. Implicit anti-fat bias among health professionals: Is anyone immune? *Int J Obes Relat Metab Disord*. 2001:25.
7. Schwartz MB, Chambliss HON, Brownell KD, Blair SN, Billington C. Weight bias among health professionals specializing in obesity. *Obes Res*. 2003; 11:1033–9. [PubMed: 12972672]
8. Huizinga MM, Bleich SN, Beach MC, Clark JM, Cooper LA. Disparity in physician perception of patients' adherence to medications by obesity status. *Obesity* (Silver Spring). 2010; 18:1932–7. [PubMed: 20186132]
9. Huizinga MM, Cooper LA, Clark JM, Beach MC. Physician respect for patients with obesity. *J Gen Intern Med*. 2009; 24:1236–9. [PubMed: 19763700]
10. Lindhardt CL, Rubak S, Mogensen O, Lamont RF, Joergensen JS. The experience of pregnant women with a BMI > 30 kg/m² in their encounters with healthcare professionals. *Acta Obstet Gynecol Scand*. 2013
11. Smith D, Lavender T. The maternity experience for women with a body mass index ≥ 30 kg/m²: a meta-synthesis. *BJOG*. 2011; 118:779–89. [PubMed: 21385305]
12. Fontaine KR, Faith MS, Allison DB, Cheskin LJ. Body weight and health care among women in the general population. *Arch Fam Med*. 1998; 7:381. [PubMed: 9682694]
13. Wee CC, McCarthy EP, Davis RB, Phillips RS. Screening for cervical and breast cancer: is obesity an unrecognized barrier to preventive care? *Ann Intern Med*. 2000; 132:697–704. [PubMed: 10787362]
14. Nelson W, Moser RP, Gaffey A, Waldron W. Adherence to cervical cancer screening guidelines for US women aged 25–64: data from the 2005 Health Information National Trends Survey (HINTS). *J Womens Health (Larchmt)*. 2009; 18:1759–68. [PubMed: 19951209]
15. Maruthur NM, Bolen SD, Brancati FL, Clark JM. Obesity and mammography: a systematic review and meta-analysis. *J Gen Intern Med*. 2009; 24:665–77. [PubMed: 19277790]
16. Maruthur NM, Bolen SD, Brancati FL, Clark JM. The association of obesity and cervical cancer screening: a systematic review and meta-analysis. *Obesity* (Silver Spring). 2009; 17:375–81. [PubMed: 18997682]
17. Wear D, Aultman J, Varley J, Zarconi J. Making fun of patients: medical students' perceptions and use of derogatory and cynical humor in clinical settings. *Acad Med*. 2006; 81:454–62. [PubMed: 16639201]
18. American College of Obstetricians and Gynecologists. Committee Opinion Number 600: Ethical Issues in the Care of the Obese Woman. Washington, DC: The American College of Obstetricians and Gynecologists; 2014.
19. Gudzone KA, Beach MC, Roter DL, Cooper LA. Physicians build less rapport with obese patients. *Obesity* (Silver Spring). 2013
20. Bertakis KD, Azari R. The impact of obesity on primary care visits. *Obes Res*. 2005; 13:1615–23. [PubMed: 16222065]
21. American College of Obstetricians and Gynecologists. Committee Opinion Number 587: Effective Patient-Physician Communication. Washington, DC: The American College of Obstetricians and Gynecologists; 2014.
22. Kitson A, Marshall A, Bassett K, Zeitz K. What are the core elements of patient-centred care? A narrative review and synthesis of the literature from health policy, medicine and nursing. *J Adv Nurs*. 2013; 69:4–15. [PubMed: 22709336]
23. Roter DL. The enduring and evolving nature of the patient-physician relationship. *Patient Educ Couns*. 2000; 39:5–15. [PubMed: 11013543]
24. Roter, DL., Hall, JA. Doctors talking with patients/patients talking with doctors: improving communication in medical visits. Westport, CT: Greenwood Publishing Group; 2006.

25. Whitlock EP, Orleans CT, Pender N, Allan J. Evaluating primary care behavioral counseling interventions: An evidence-based approach. *Am J Prev Med.* 2002; 22:267–84. [PubMed: 11988383]
26. Gudzone KA, Bleich SN, Richards TM, Weiner JP, Hodges K, Clark JM. Doctor shopping by overweight and obese patients is associated with increased healthcare utilization. *Obesity (Silver Spring).* 2013; 21:1328–34. [PubMed: 23671015]
27. Roter DL, Erby LH, Rimal RN, Smith KC, Larson S, Bennett IM, et al. Empowering Women's Prenatal Communication: Does Literacy Matter? *J Health Commun.* 2015; 20:60–8.
28. Rand, N., Greenwood, A. *Baby Basics Your Month to Month Guide to a Healthy Pregnancy.* What to Expect Foundation; New York: 2002.
29. Cohen-Cole, SA., Bird, J. *The medical interview: the three-function approach.* Saunders; Philadelphia: 2013.
30. Roter DL, Larson S. The Roter interaction analysis system (RIAS): utility and flexibility for analysis of medical interactions. *Patient Educ Couns.* 2002; 46:243–51. [PubMed: 11932123]
31. Beach MC, Roter DL, Wang N-Y, Duggan PS, Cooper LA. Are physicians' attitudes of respect accurately perceived by patients and associated with more positive communication behaviors? *Patient Educ Couns.* 2006; 62:347–54. [PubMed: 16859867]
32. Hall JA, Horgan TG, Stein TS, Roter DL. Liking in the physician-patient relationship. *Patient Educ Couns.* 2002; 48:69–77. [PubMed: 12220752]
33. Street RL. Information-giving in medical consultations: the influence of patients' communicative styles and personal characteristics. *Soc Sci Med.* 1991; 32:541–8. [PubMed: 2017721]
34. Hall JA, Dornan MC. Patient sociodemographic characteristics as predictors of satisfaction with medical care: a meta-analysis. *Soc Sci Med.* 1990; 30:811–8. [PubMed: 2138357]
35. Horrocks S, Anderson E, Salisbury C. Systematic review of whether nurse practitioners working in primary care can provide equivalent care to doctors. *Brit Med J.* 2002; 324:819–23. [PubMed: 11934775]
36. Power ML, Holzman GB, Schulkin J. Obstetrician-Gynecologists' Views on the Health Risks of Obesity. *Obstet Gynecol Surv.* 2002; 57:214–5.
37. Power ML, Cogswell ME, Schulkin J. Obesity prevention and treatment practices of US obstetrician-gynecologists. *Obstet Gynecol.* 2006; 108:961–8. [PubMed: 17012460]
38. Stotland NE, Gilbert P, Bogetz A, Harper CC, Abrams B, Gerbert B. Preventing excessive weight gain in pregnancy: how do prenatal care providers approach counseling? *J Womens Health (Larchmt).* 2010; 19:807–14. [PubMed: 20078239]
39. Oken E, Switkowski K, Price S, Guthrie L, Taveras EM, Gillman M, et al. A Qualitative Study of Gestational Weight Gain Counseling and Tracking. *Matern Child Health J.* 2012:1–10. [PubMed: 21052801]
40. Washington Cole KO, Roter DL. Starting the conversation: Patient initiation of weight-related behavioral counseling during pregnancy. *Patient Educ and Couns.* 2016; 99:1603–1610.
41. Cooper LA, Roter DL, Carson KA, Beach MC, Sabin JA, Greenwald AG, et al. The associations of clinicians' implicit attitudes about race with medical visit communication and patient ratings of interpersonal care. *American journal of public health.* 2012; 102:979–87. [PubMed: 22420787]
42. Fong RL, Bertakis KD, Franks P. Association between obesity and patient satisfaction. *Obesity (Silver Spring).* 2006; 14:1402–11. [PubMed: 16988083]
43. Wee CC, Phillips RS, Francis Cook E, Haas JS, Louise Puopolo A, Brennan TA, et al. Influence of body weight on patients' satisfaction with ambulatory care. *J Gen Intern Med.* 2002; 17:155–9. [PubMed: 11841531]
44. Hebl M, Xu J, Mason M. Weighing the care: patients' perceptions of physician care as a function of gender and weight. *Int J Obes (Lond).* 2003; 27:269–75.
45. Wadden TA, Anderson DA, Foster GD, Bennett A, Steinberg C, Sarwer DB. Obese women's perceptions of their physicians' weight management attitudes and practices. *Arch Fam Med.* 2000; 9:854. [PubMed: 11031392]
46. Adams CH, Smith NJ, Wilbur DC, Grady KE. The relationship of obesity to the frequency of pelvic examinations: do physician and patient attitudes make a difference? *Women Health.* 1993; 20:45–57. [PubMed: 8372479]

47. Olson CL, Schumaker HD, Yawn BP. Overweight women delay medical care. *Arch Fam Med*. 1994; 3:888. [PubMed: 8000560]
48. Amy NK, Aalborg A, Lyons P, Keranen L. Barriers to routine gynecological cancer screening for White and African-American obese women. *Int J Obes*. 2006; 30:147–55.
49. Drury A, Aramburu C, Louis M. Exploring the association between body weight, stigma of obesity, and health care avoidance. *J Am Acad Nurse Pract*. 2002; 14:554–61. [PubMed: 12567923]
50. Office of Disease Prevention and Health Promotion. *Healthy People 2020*. 2016. Maternal, Infant and Child Health.
51. Redman S, Dickinson JA, Cockburn J, Hennrikus D, Sanson-Fisher RW. The assessment of reactivity in direct observation studies of doctor-patient interactions. *Psychol Health*. 1989; 3:17–28.
52. Pringle M, Stewart-Evans C. Does awareness of being video recorded affect doctors' consultation behaviour? *Br J Gen Pract*. 1990; 40:455–8. [PubMed: 2271278]
53. Coleman T, Manku-Scott T. Comparison of video-recorded consultations with those in which patients' consent is withheld. *Br J Gen Pract*. 1998; 48:971–4. [PubMed: 9624767]
54. Wong M, Gudzone KA, Bleich SN. Provider communication quality: Influence of patients' weight and race. *Patient Educ and Couns*. 2015; 98:492–498.
55. Østbye T, Taylor DH Jr, Yancy WS Jr, Krause KM. Associations between obesity and receipt of screening mammography, Papanicolaou tests, and influenza vaccination: results from the Health and Retirement Study (HRS) and the Asset and Health Dynamics Among the Oldest Old (AHEAD) Study. *Am J Public Health*. 2005; 95:1623. [PubMed: 16051935]

Highlights

- Providers asked pregnant women with overweight fewer lifestyle questions
- Providers gave pregnant women with obesity less lifestyle information
- Providers used fewer concern and approval statements for patients with overweight
- Providers used fewer self-disclosure statements for patients with obesity
- Pregnant women with obesity received lower ratings from their prenatal providers

Table 1

Description of provider communication behaviors and Roter Interaction Analysis System (RIAS) codes.

Communication Domain	RIAS Codes	Example Statements
Data gathering	Biomedical questions	“Have you had any contractions?”
	Psychosocial questions	“Who will help you when the baby is born?”
	Lifestyle questions	“How many cigarettes do you smoke every day?”
Patient education and counseling	Biomedical information and counseling	“Your blood pressure is elevated.”
	Psychosocial information	“You are at risk for post-partum depression.”
	Lifestyle information	“Breastfeeding provides nutrients for the baby.”
	Lifestyle and psychosocial counseling	“You should eat several small meals every day.”
Activating and partnership	Check for understanding, clarification	“You said that this is your third pregnancy, right?”
	Asks for permission	“May I start your physical exam?”
	Asks for opinion	“What do you think is causing your dizziness?”
Rapport building	Self-disclosure	“I have a hard time remembering to take pills too.”
	Statements of concern	“I’m worried about your high blood pressure.”
	Statements of approval	“It’s great that you quit smoking.”
	Reassurance and optimism statements	“Your blood sugar looks much better.”
	Empathy statements	“You seem very upset.”
	Legitimizing statements	“It’s normal to be worried about that.”

Table 2

Selected provider characteristics for study sample

Providers (n = 22)	
Gender; n (%)	
Female	21 (95.5)
Male	1 (4.5)
Race; n (%)	
White	13 (59.1)
Black	6 (27.3)
Asian	3 (13.6)
Profession; n (%)	
Resident	18 (81.8)
Nurse practitioner	2 (9.1)
Attending	2 (9.1)
Number of visits	
Mean (range)	4.5 (1 – 17)

Table 3

Selected characteristics for normal weight, overweight, and obese patients in study sample

	Total (n = 117)	Normal 18.5 – 24.9 kg/m ² (n = 39)	Overweight 25.0 – 29.9 kg/m ² (n = 37)	Obese 30 kg/m ² (n = 41)	p
Visit length (minutes)					
Mean (SD)	24.8 (11.1)	25.8 (14.0)	23.6 (9.3)	25.0 (9.6)	0.69
Age (years)					
Mean (SD)	22.9 (5.2)	21.8 (4.9)	23.0 (5.6)	23.7 (4.9)	0.26
Gestational age (weeks); n (%)					
First trimester	22 (18.8)	8 (20.5)	7 (18.9)	7 (17.1)	0.98
Second trimester	62 (53.0)	19 (48.7)	20 (54.1)	23 (56.1)	
Third trimester	33 (28.2)	12 (30.8)	10 (27.0)	11 (26.8)	
Race; n (%)					
Black	98 (83.8)	35 (89.7)	30 (81.1)	33 (80.5)	0.81
White	14 (12.0)	3 (7.7)	5 (13.5)	6 (14.6)	
Other	5 (4.3)	1 (2.6)	2 (5.4)	2 (4.9)	
Education; n (%)					
Less than high school	38 (32.5)	11 (28.2)	14 (37.8)	13 (31.7)	0.49
High school or GED	37 (31.6)	12 (30.8)	8 (21.6)	17 (41.5)	
Some college	27 (23.1)	10 (25.6)	11 (29.7)	6 (14.6)	
No answer	15 (12.8)	6 (15.4)	4 (10.8)	5 (12.2)	
Insurance; n (%)					
Medicaid	90 (76.9)	27 (69.2)	30 (81.2)	33 (80.5)	0.79
Private insurance	7 (6.0)	4 (10.3)	2 (5.4)	1 (2.4)	
Self-pay	5 (4.3)	2 (5.1)	1 (2.7)	2 (4.9)	
No answer	15 (12.8)	6 (15.4)	4 (10.8)	5 (12.2)	
Co-morbidities; n (%)					
Diabetes (gestational or chronic)	11 (9.4)	1 (2.6)	2 (5.4)	8 (19.5)	0.02*

	Total (n = 117)	Normal 18.5 – 24.9 kg/m ² (n = 39)	Overweight 25.0 – 29.9 kg/m ² (n = 37)	Obese 30 kg/m ² (n = 41)	p
Hypertension (pregnancy-induced or chronic)	17 (14.5)	1 (2.6)	6 (16.2)	10 (24.4)	0.02 *
Depression; n (%)	36 (30.8)	8 (20.5)	11 (29.7)	17 (41.5)	0.13

* p < 0.05

ANOVA was used for continuous variables and χ^2 tests were used for dichotomous or categorical variables.

Adjusted incidence rate ratios^a of provider communication – patients with overweight and obesity compared to patients with normal weight

Table 4

Provider Communication	Average (n = 39) IRR	Overweight (n = 37) IRR (CI)	p	Obese (n=44) IRR (CI)	p
All provider statements	1.00 (ref)	0.91 (0.75 – 1.10)	0.32	0.97 (0.82 – 1.16)	0.78
Data Gathering					
Biomedical Questions	1.00 (ref)	0.91 (0.76 – 1.08)	0.29	0.97 (0.80 – 1.19)	0.78
Lifestyle Questions	1.00 (ref)	0.66 (0.44 – 0.99)	0.04 *	1.04 (0.75 – 1.44)	0.81
Psychosocial Questions	1.00 (ref)	0.68 (0.43 – 1.07)	0.10	0.90 (0.59 – 1.40)	0.65
Education and Counseling					
Biomedical information and counseling	1.00 (ref)	0.93 (0.72 – 1.20)	0.57	1.04 (0.79 – 1.37)	0.78
Lifestyle information	1.00 (ref)	0.76 (0.42 – 1.39)	0.37	0.51 (0.32 – 0.82)	0.01 *
Psychosocial information	1.00 (ref)	2.37 (0.85 – 6.65)	0.10	0.61 (0.16 – 2.37)	0.68
Psychosocial and lifestyle counseling	1.00 (ref)	0.72 (0.36 – 1.46)	0.36	0.79 (0.50 – 1.27)	0.33
Activating and partnering					
Check for understanding, clarification	1.00 (ref)	0.76 (0.64 – 0.93)	0.01 *	0.90 (0.74 – 1.10)	0.30
Asks permission	1.00 (ref)	1.30 (0.50 – 3.39)	0.59	1.73 (0.56 – 5.30)	0.77
Asks opinion	1.00 (ref)	1.00 (0.74 – 1.34)	0.98	1.06 (0.70 – 1.61)	0.85
Relationship building					
Laughter and joking	1.00 (ref)	0.76 (0.46 – 1.26)	0.28	0.73 (0.41 – 1.31)	0.29
Approval statements	1.00 (ref)	0.68 (0.51 – 0.91)	0.01 *	1.01 (0.84 – 1.20)	0.94
Empathy statements	1.00 (ref)	0.70 (0.27 – 1.84)	0.47	0.97 (0.53 – 1.79)	0.93
Legitimizing statements	1.00 (ref)	1.39 (0.44 – 4.35)	0.57	1.95 (0.78 – 4.89)	0.15
Concern statements	1.00 (ref)	0.68 (0.53 – 0.86)	0.002 *	0.88 (0.63 – 1.22)	0.44
Reassurance statements	1.00 (ref)	0.86 (0.64 – 1.15)	0.30	0.89 (0.68 – 1.18)	0.42
Self-disclosure statements	1.00 (ref)	0.55 (0.26 – 1.17)	0.12	0.40 (0.19 – 0.84)	0.02 *

* p < 0.05

^aMultilevel Poisson regression models with exchangeable correlation structure, robust standard errors, and adjustments for patient age, depressive symptoms, co-morbidities, provider type, provider race, visit length, gestational age and intervention assignment.

Adjusted predicted probability^a of provider reporting “Strongly Agree” or “Agree” in rating patient-provider interaction – patients with overweight and obesity compared to patients with normal weight

Table 5

	Adjusted predicted probability (CI) ^b	Overweight predicted probability (CI)	Obese predicted probability (CI)	P
The patient provided an accurate history of her medical condition.	0.81 (0.69 – 0.94)	0.63 (0.50 – 0.76)	0.51 (0.41 – 0.60)	<0.001*
This patient trusts me a great deal.	0.68 (0.48 – 0.87)	0.61 (0.44 – 0.78)	0.44 (0.28 – 0.60)	0.14
I understood what the patient wanted to know.	0.77 (0.63 – 0.90)	0.85 (0.73 – 0.98)	0.79 (0.72 – 0.86)	0.75
The patient had a good understanding of the most important information I gave to her.	0.68 (0.50 – 0.86)	0.76 (0.64 – 0.88)	0.57 (0.42 – 0.71)	0.44
All in all, I like the patient a lot.	0.82 (0.71 – 0.94)	0.85 (0.64 – 1.00)	0.57 (0.41 – 0.73)	0.04*

* p < 0.05

^a Multilevel logistic regression models with exchangeable correlation structure, robust standard errors, and adjustments for patient age, depressive symptoms, co-morbidities, provider type, provider race, visit length, gestational age and intervention assignment.

^b Adjusted probability of provider reporting Strongly Agree or Agree vs. Neutral, Disagree or Strongly Disagree.