Diet and Pregnancy: Health-Care Providers and Patient Behaviors

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Abstract

In this study, associations between health-care providers (HCPs) discussing diet with their pregnant patients and patient dietary behavior were assessed in addition to factors related to HCPs discussing diet with their patients. Questionnaires were completed by 237 pregnant women and 31 HCPs at 12 obstetrics–gynecology clinics across the United States. Patients provided versus those not provided dietary counseling by their HCP were more likely ($OR = 2.17$, 95% CI = 0.75–6.25) to engage in healthy dietary practices. HCPs that discussed multiple health behaviors were nearly four times more likely to discuss diet with their pregnant patients compared with HCP who did not discuss other health behaviors ($OR = 3.67$, 95% CI = 1.10–12.28). This study indicates that HCP education can positively impact dietary behaviors of their pregnant patients.

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Obesity is commonly defined as a body mass index (BMI) equal to or greater than 30 kg/m² and is one of the most frequent and preventable high-risk obstetric complications (Galtier-Dereure, Boegner, & Bringer, 2000). Lack of sound nutri-

tional principles veiled under the justification of “eating for two” has been identified as a cause of obesity in pregnancy. Erroneously, many pregnant women believe increasing food intake is more important than eating a nutritionally sound diet (Clarke, 2004; Rifas-Shiman, Rich-Edwards, Kleinman, Oken, & Gillman, 2009). Unfortunately, maternal obesity is associated with higher risks of preeclampsia, gestational diabetes mellitus, and cesarean surgery and is also related to newborns having hypertensive complications, peripheral edema, and fetal macrosomia (Kalk et al., 2009;

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Leddy, Power, & Schulkin, 2008; Lynch, Sexton, Hession, & Morrison, 2008).

The American Congress of Obstetricians and Gynecologists (ACOG; 2005) recommends aggressive preventative management of weight before, during, and after pregnancy. According to the Academy of Certified Birth Educators (ACBE, 2012), certified childbirth educators should assist women in assessing their own nutritional status according to the food guide pyramid. Although formal education (e.g., structured classes) has been shown to positively affect pregnant patients' knowledge about lifestyle behaviors including diet, little is known about associations between health-care providers' (HCPs) activities (e.g., counseling) and changes in their pregnant patients' dietary behavior (Koehn, 2002). This is surprising given the results of a questionnaire of 900 obstetrician-gynecologists showing that 80% regularly counsel their pregnant patients about weight control (Power, Cogswell, & Schulkin, 2006). In addition, the increased frequency of prenatal visits expands the window of opportunity within which HCPs can impact prenatal nutrition. Perhaps researchers have been hesitant to explore the effects of HCPs on pregnant patient dietary behaviors because a substantial percentage (65%) of HCPs do not believe weight control counseling significantly affects the incidence of obesity (Power et al., 2006). For these reasons, this study was conducted to determine if HCPs counseling for diet is associated with a change in dietary behavior among their pregnant patients. Secondly, this study examined factors related to HCPs discussing diet with pregnant patients.

METHODS

Study Design and Population

Questionnaires were sent to 52 obstetric-gynecology clinics located in the United States and having at least one alumnus of our medical school. Each clinic received a packet containing patient and HCP questionnaires with instructions and anonymous self-addressed return envelopes. The instructions described the research, explained how to complete the questionnaires, and included the contact information of the investigators. Twenty-five qualified female patients per clinic were randomly selected to participate in the questionnaire by a receptionist at the clinic. To qualify, a patient had to be 18 years or older and either pregnant or have given birth in the last year. The randomization protocol was distributed with the questionnaires and consisted of a

simple, randomized selection scheme (ask the third pregnant patient, then fifth, then . . .). The HCP questionnaires could be completed by any HCP in the clinic who was licensed to examine pregnant patients and had direct contact with pregnant patients. This study was approved by the Institutional Review Board of the Kansas City University of Medicine and Biosciences.

As appropriate, clinics received two follow-up letters to encourage the return of completed questionnaires. Three of the clinics reported they were no longer in business and questionnaires were received from 12 of the remaining 49 clinics. A total of 237 patients and 31 of their HCPs completed and returned questionnaires from these 12 clinics.

Procedures

Based on previous research assessing behaviors of pregnant patients and HCPs' interactions with their patients, a 12-item patient questionnaire and a 10-item HCP questionnaire were developed (Boyle, Lawrence, Schwarte, Samuels, & McCarthy, 2009; Evenson & Pompeii, 2010). Content validity of the questionnaires was established a priori through two-stage expert panel review. Panel members reviewed each item and proposed revisions in the first stage. Secondly, panel members reached consensus on proposed item revisions. To ensure the questions were clear and concise, preliminary versions of the questionnaires were pilot-tested with a cohort of pregnant women and HCPs.

The patient questionnaire was one page and took approximately 10 min to complete. Questions assessed demographics (age, level of education, ethnicity, insurance type) and pregnancy-related information (trimester, number of previous pregnancies, number of visits to the clinic). A series of questions were used to determine behavioral changes concerning health choices and HCP input during the current or most recent pregnancy. Questions began with "During your pregnancy, have you done any of the following?" and were followed by behavior-specific questions. For diet, the follow-up question was "been more careful about choosing healthy foods." Other behavioral changes related to caffeine, alcohol, drugs, oral hygiene, tobacco, and exercise were assessed in this manner. For each behavior, patients also were asked if their HCP had discussed the behavior with them during their pregnancy.

This HCP questionnaire was similar to the patient questionnaire and was designed to mirror

The women who discussed compared with women who did not discuss diet with their HCP were significantly more likely to have made healthy dietary changes during pregnancy.

the patients' questions. It contained 10 items that required approximately 10 min to complete. Questions assessed demographics (age, gender, ethnicity, title) and practice information (years of practice, number of pregnant patients per month, percentage of pregnant patients with complications, percentage of patients with specific types of insurance). HCPs were then instructed to indicate "How often do you discuss each of the following with your patients" and "How often do you assist in modifying each of the following." The health behaviors were each listed (tobacco, alcohol, drugs, oral hygiene, caffeine, exercise, and diet) with a 7-point Likert scale ranging from 1 (*always*) to 7 (*never*). The last question was "Would you be interested in additional training on these items?" and then listed the health behaviors.

Data Analysis

Data from patients as well as HCPs are expressed as means with standard deviations (*SD*) or as percentages where appropriate. Student's *t* test for continuous variables and chi-square analysis for categorical variables were used to compare patients who became more careful about choosing healthy foods with those that did not. The same analytical procedures were followed to contrast select variables between HCPs who did or did not discuss diet with their pregnant patients. Binary logistic regression analysis was conducted to determine if patients who became more careful about their diet versus those who weren't more likely to have discussed diet with their HCP. In this regression model, the patients' dietary behavior (became more careful vs. did not become more careful) was the dependent variable and patient demographics (education, insurance type, ethnicity), the number of other health behaviors discussed with their HCP, and whether diet was discussed with their HCP were the independent variables. Education was stratified as "high school degree or less" or "more than a high school degree," insurance coverage was stratified as "private insurance" or "Medicaid/no insurance," and ethnicity was dichotomized as "White" or "minority." Another binary logistic regression model was constructed to determine if self-reported characteristics of HCPs were associated with HCPs' discussions about diet with their pregnant patients.

Odds ratios along with their 95% confidence intervals (CI) were calculated for all independent variables in the models. Statistical analyses were performed using Statistical Package for the Social Sciences (SPSS) software (rel. 19, IBM Corp., Armonk, NY).

RESULTS

There were 223 patients who were pregnant when they completed the questionnaire, and most were in the second trimester. They were typically White, educated, younger women who had on average two previous pregnancies (range of 1–8). Presented in Table 1 are the characteristics of patients who made dietary behavior changes ($n = 204$, 86%) and those who didn't ($n = 33$, 14%). Education level attained, having private versus Medicaid/no insurance, ethnicity, age, week of pregnancy, and the number of other health behaviors discussed with their HCP did not differ between groups. The women who discussed compared with women who did not discuss diet with their HCP were significantly more likely to have made healthy dietary changes during pregnancy ($\chi^2 = 3.85$; $p < 0.05$). The results of the logistic regression analysis also are given in Table 1. After controlling for patient age, ethnicity, insurance type, and the number of other health behaviors discussed with their HCP, HCP discussion of healthy diet was significantly associated with patients making positive dietary changes (adjusted OR = 2.28, 95%; CI = 1.05–5.41).

Most (60%) of the HCPs were doctors of osteopathic medicine, 20% were medical doctors, 13.3% were childbirth educators, and 6.7% were from another field. Presented in Table 2 are the characteristics of the HCP who discussed ($n = 23$) and did not discuss ($n = 8$) diet with their pregnant patients. These groups did not differ significantly with respect to gender and ethnicity composition, age, the number of pregnant patients seen each month, and the percentage of their pregnant patients who developed a complication. The group of HCPs that discussed diet had over twice as many pregnant patients with private insurance as the HCPs who did not discuss diet ($p < 0.05$). In addition, the HCPs who discussed diet also discussed several of the other health behaviors with their pregnant patients than those who did not discuss diet ($p < 0.05$). In the logistics regression analysis, it was found that HCPs who discussed diet were more likely to discuss other health behaviors (Table 2). The likelihood of HCPs discussing diet with their pregnant patients

TABLE 1
Characteristics of Patients Who Made and Did Not Make Positive Dietary Changes During Pregnancy and Predictors of Making Healthy Dietary Changes in Pregnant Women

Variable	Did Not Make Dietary Changes (<i>n</i> = 33)	Made Dietary Changes (<i>n</i> = 204)
Education > high school	63.9%	58.6%
Have private insurance	47.2%	59.3%
Belong to a racial/ethnic group	19.4%	27.5%
Discussed diet with their HCP	68.6%	82.7%*
	Mean (<i>SD</i>)	Mean (<i>SD</i>)
Age in years	25.7 (6.0)	25.0 (5.6)
Week of pregnancy	27.7 (8.4)	26.9 (9.5)
Other behaviors discussed with HCP	2.3 (1.6)	2.8 (1.5)
	Predictors	
	Adjusted <i>OR</i>	95% <i>CI</i>
Age (years)	0.99	0.93–1.07
Racial/ethnic origin (ethnic vs. White)	1.74	0.65–4.65
Insurance (% with private insurance = 1 vs. none = 0)	1.58	0.69–3.64
Discussed diet with their HCP (yes vs. no)	2.28	1.05–5.41

Note. HCP = health-care provider; *SD* = standard deviation; *OR* = odds ratio; *CI* = confidence interval.

* $\chi^2 = 3.85$; $p < 0.05$.

increased almost fourfold for each additional health behavior discussed. Discussing diet with pregnant patients was not associated with HCP age, number of patients seen, percentage of pregnant patients with a complication, or percentage of pregnant patients with private insurance. More than one third (36.7%) of HCPs reported being interested in additional training to assist pregnant women in maintaining good dietary behaviors.

DISCUSSION

Our primary objective was to examine the association between HCPs discussing diet with their pregnant patients and the patients' likelihood of making positive diet changes during pregnancy. We found that patients who made beneficial dietary changes were more apt to have discussed diet with their HCP. Secondly, we sought to determine factors related to HCPs discussing diet with their pregnant patients. The findings indicate that HCPs who discussed diet also discussed other health behaviors with their pregnant patients. Finally, a relatively small percentage of HCPs indicated being interested in learning more about how to assist pregnant patients with positive dietary changes.

Our finding that pregnant patients were more likely to make positive dietary changes if they discussed diet with their HCPs is not surprising in light

of existing literature. Previous research found that pregnant women have a heightened interest in dietary information (Szwajcer, Hiddink, Maas, Koelen, & van Woerkum, 2008). They prefer to obtain dietary information from the Internet, books, and midwives (Szwajcer et al., 2008). Interestingly, these resources are similar to the ones used by HCPs for content to use in dietary counseling (Mihalynuk, Knopp, Scott, & Coombs, 2004). The existence of this "common ground" may contribute to the link between HCP dietary counseling and patient dietary behavior. For example, patients may be more apt to make positive dietary behavior changes if told to do so by an HCP they understand and perceive as knowledgeable on the topic (Baum & Dooley, 2012). The perception of this HCP attribute emanating from the HCP relating diet information the patient uncovered in one of their preferred sources of information. This contention may not hold outside of the pregnancy period. Mothers of preschoolers appear to have issues (recall failure, frustration) with dietary discussions offered by their HCP (McKee, Maher, Deen, & Blank, 2010; Woolford, Clark, Lumeng, Williams, & Davis, 2007). In addition, given the plethora of dietary information available to pregnant women, they are highly likely to find information that does not correspond with what their HCP says. This could be why only 2% of pregnant women consider their HCP the

TABLE 2
Characteristics of Health-Care Providers Who Discuss and Don't Discuss Diet With Their Pregnant Patients and Predictors of Health-Care Providers Discussing Diet With Their Pregnant Patients

Variable	Discussed Diet (<i>n</i> = 23)	Did Not Discuss Diet (<i>n</i> = 8)
Gender (% of female)	56.5	62.5
% of White	92.0	94.5
	Mean (<i>SD</i>)	Mean (<i>SD</i>)
Age (years)	42.7 (11.0)	34.5 (9.9)
# of pregnant patients seen by HCP per month	163.8 (115.2)	141.3 (114.6)
% of HCP pregnant patients with complications	30.8 (31.4)	40.0 (32.1)
% of HCP pregnant patients with private insurance	57.3 (29.5)	26.9 (18.7)*
# of other behavior changes discussed with patient by HCP (range 0–4)	3.4 (2.0)	2.6 (1.5)*
Predictors		
	Adjusted <i>OR</i>	95% <i>CI</i>
Age (years)	1.06	0.94–1.21
# of pregnant patients seen per month	1.01	0.99–1.02
% of pregnant patients with complications	1.07	0.99–1.15
% of pregnant patients with private insurance	1.12	0.97–1.27
# of other behavior changes discussed with pregnant patients	3.67	1.10–12.28

Note. January 2010–December 2010. The offices were located throughout the U.S. *SD* = standard deviation; HCP = health-care provider; *OR* = odds ratio; *CI* = confidence interval.

most important source of pregnancy-related dietary information (Szwajcer et al., 2008). Determining why HCPs influence dietary habits of their pregnant patients will add clarity on this topic.

Our findings indicate that HCPs that discussed diet also discussed other healthy behaviors with their pregnant patients. For each additional health behavior discussed, the odds of an HCP discussing diet increased by 3.6-fold. In essence, this suggests that HCPs typically help their pregnant patients with multiple behaviors simultaneously, probably depending on the patient's need. This may depend on the HCP because some have been shown to be more aware of the holistic aspect of health and health behaviors, and thus more likely to advise patients on other health behaviors (McNerney, Andes, & Blackwell, 2007). Others have found that HCPs who are physicians see dietary counseling as average in terms of importance as a preventive strategy and that the main reasons HCPs (physicians) do not provide dietary counseling include lack of time, perceived lack of patient interest, as well as lack of training (Boyle et al., 2009; Cornuz, Ghali, Carlantonio, Pecoud, & Paccaud, 2000; Wynn, Trudeau, Taunton, Gowans, & Scott, 2010).

Furthermore, HCPs' personal health habits and attitude toward diet also predict their use of dietary counseling (Cornuz et al., 2000; Wynn et al., 2010).

Because women already use other sources besides their HCP for diet information and HCPs pinpoint lack of time and training as barriers to dietary counseling, some HCPs refer patients to registered dietitians (Mihalynuk et al., 2004; Szwajcer et al., 2008; Wynn et al., 2010). Research has shown that dietary counseling by qualified dietitians is more effective than by certain HCPs (physicians) (Thompson et al., 2003). Although some HCPs feel there are inadequate networks for dietary referrals and/or insufficient reimbursements to support this practice, it is a strategy that has been shown to be successful (Boyle, et al., 2009; Mihalynuk et al., 2004).

Although the results of this study are informative, there are limitations that should be considered when interpreting the outcomes. The sample was drawn from a database of our university's alumni, all of whom are doctors of osteopathic medicine (DO). The returned surveys were heavily populated by DOs, which could limit the generalizability of our findings. The philosophy of osteopathy focuses

on prevention and treating the whole person, which could lead to more dietary counseling efforts than what would be noted in a population void of medical training based on a different philosophy. Although we followed standard questionnaire development procedures, our line of inquiry is relatively novel. As such, there are undoubtedly other factors associated with dietary behaviors of pregnant patients, and HCPs' propensity to provide dietary counseling that should be examined.

In conclusion, the results suggest that HCP dietary counseling is associated with pregnant women making positive dietary changes. Promoting HCP discussions of diet with their pregnant patients will involve multicomponent programs to help HCP with barriers to and perceptions of preventive health counseling. Additional research should determine the most efficient and effective methods for HCP to promote dietary changes.

Implications for Practice

The information presented in this article informs practices by HCPs from various disciplines (e.g., medical doctors, childbirth educators). Specifically, the relatively simple act of discussing diet with their pregnant patients is related to patients making positive dietary changes. Although a substantial proportion of the HCPs did not have an interest in further education about dietary counseling, this does not preclude presenting HCPs with information about the potential influence they could have on their pregnant patients' dietary practices. This may be important not only from the standpoint of alerting HCP of the benefits of dietary discussions but also of the possibility of pregnant patients not making positive dietary changes if the HCP does not discuss diet.

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