Obesity in Pregnancy:
A Qualitative Approach to Inform an Intervention for Patients and Providers

BY

MICHELLE KOMINIAREK
B.A., Illinois Wesleyan University, 1994
MD, Rush Medical College, 1999

THESIS

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Defense Committee:

Jack Zwanziger (chair and advisor)
Nadine Peacock, Department of Community Health Sciences
Arden Handler, Department of Community Health Sciences

This thesis is dedicated to my family, without whom it would never have been accomplished.

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LIST OF ABBREVIATIONS

GWG	Gestational weight gain
BMI	Body mass index
IOM	Institute of Medicine
MARS	Maternal record system
UI Health	University of Illinois Hospital and Health Sciences System
WHC	Women's Health Clinic
CNM	Certified nurse midwife
EMR	Electronic medical record
ACOG	American Congress of Obstetricians and Gynecologists
WIC	Women, Infants and Children program
PI	Principle investigator
Ob-Gyn	Obstetrician-Gynecologist
MK	Michelle Kominiarek
FG	Franklin Gay

SUMMARY

A qualitative study consisting of focus groups and brief surveys of patients and providers was conducted. The objectives were to describe obese racial-ethnic minority women's knowledge, beliefs, and attitudes about nutrition, exercise, and healthy lifestyles during pregnancy along with their preferences and barriers to improving health behaviors as well as to assess prenatal care providers' perceived barriers to providing prenatal care to obese, racial-ethnic minority women, including attainment of GWG goals and solicit strategies to improve the management of obesity in pregnancy. Four patient and three provider focus groups were conducted in 2012 and 2013, respectively. Discussion topics included GWG goals, body image, health behaviors, stress management, and group prenatal care for the patients and providers with additional emphasis on education and training needs for the provider.

Women frequently stated a target GWG of >20lbs. They expressed fear of gaining weight, but also frustration when told to restrict weight gain. Women described a body image not in line with clinical recommendations ("200 pounds is not that big."). They avoided the term "obese" and more commonly used "thick." They were interested in learning more about nutrition and culturally-specific healthy cooking resources. Women stated they would enjoy massage and exercise in a group setting, though definitions of "exercise" varied. There were mixed feelings about support systems; family members could be helpful, but generational differences posed challenges (e.g., Grandmothers would "curse them out" for exercising during pregnancy). As a result, most felt the need to "encourage myself" and "do this for me and the baby." Providers expressed discomfort discussing GWG and difficulty finding the right words for obesity and this was partially attributed to their own body weight. They gave several examples of the challenges they faced in providing prenatal care to obese women including time

constraints, cultural myths, and system issues. They believed that a group setting that provides social support would be an ideal environment to address health behaviors in obese women

Culturally-tailored programs that use acceptable terms for obesity, provide education regarding healthy eating and safe exercise, and encourage appropriate support from social networks may be effective in addressing GWG in obese minority women. Further provider training in communication skills is necessary to appropriately address obesity in pregnancy.

I. BACKGROUND

Obesity is one of the most challenging chronic diseases to manage. The impact of obesity on health is staggering – no organ system is spared from its effects. In the United States, 35.8% of reproductive age women (20-39 years) were obese in 2009-2010.[1] There are profound racial-ethnic differences related to obesity in women: 40.7% of Hispanic and 58.6% of non-Hispanic black women were obese compared to 33.4% of non-Hispanic whites in 2009-2010.[1] Compared to men and women in all racial-ethnic groups, non-Hispanic black women consistently have the highest prevalence of obesity.[1,2]

The combination of obesity and pregnancy introduces additional complications. Although the etiology is not always known, obese women are more likely to have a fetus with a birth defect, develop preeclampsia and gestational diabetes, experience a stillbirth, and deliver by cesarean.[3-8] Cesarean deliveries also increase risk in obese women as postpartum hemorrhage and compromised wound healing more frequently complicate their postpartum course.[8,9] According to the recent recommendations from the Institute of Medicine (IOM), several of these complications can be minimized when obese women limit their weight gain in pregnancy to between 11 and 20 pounds (5-9kg).[10] However, up to 83% of obese pregnant women exceed these recommendations.[11-13] Given that most women are motivated to have "healthy pregnancies," gestational weight gain (GWG) is potentially modifiable through behavioral interventions. Accordingly, the IOM report stated that "interventions" will be needed to assist obese women to meet the GWG goals.[10] However, there is a lack of guidance with regard to a safe and effective approach to meet the GWG recommendations.

A common approach to addressing obesity during pregnancy is to improve health behaviors (e.g., smoking, physical activity, and nutrition) in order to meet GWG goals and improve other perinatal outcomes. According to meta-analyses and systematic reviews, interventions that have focused on a

combination of dietary counseling, weight monitoring, and exercise programs for overweight or obese women to date have had moderate to no influence on GWG or other perinatal outcomes.[14-16] Most importantly, nearly 100% of the women who participated in these behavioral interventions were non-Hispanic whites.[17-22]

Prior research has described the outcomes of 1:1 patient: interventionist trials such as nutrition consults and exercise for obese women; however, few have used a group approach.[21-24] Group programs both outside of pregnancy (e.g., Weight Watchers) and during pregnancy (e.g., CenteringPregnancy™) have demonstrated that socialization through groups can help persons achieve goals that would not be reachable by individuals alone and that support from attending meetings enhances feelings of control and confidence.[25-27] Therefore, it seems plausible that a behavioral intervention in a group setting might be an effective way to achieve GWG goals.

To date, behavioral interventions for GWG have focused only on the pregnant woman rather than on the prenatal care provider. Providers often ignore obesity and provide routine prenatal care for obese women for several reasons including discomfort or lack of training in discussing weight issues[28-31], perceived futility regarding weight counseling[29,32], a provider's own body weight and image issues[33-37], and lack of time in a routine prenatal visit to address this complex issue.[38] If prenatal care providers do not feel comfortable addressing obesity and GWG, they may be giving inconsistent messages to their patients either by ignoring the issue or providing incorrect information.[39] The importance of the provider's involvement in behavioral interventions for GWG in obese women is underscored by the fact that patients successful at weight loss outside of pregnancy commonly report that the initiating event was either an explicit warning from a doctor or the discovery of a risk factor on routine screenings.[40]

To summarize, obesity is a serious problem in pregnancy. Prior efforts at intervention have not been effective in assisting obese women to meet GWG goals. This may be attributed to a failure of these

interventions to adapt their content for minority women, not considering a group intervention, or involving the prenatal care provider. In order to design an effective behavioral intervention for obese minority women that ultimately aims to improve perinatal outcomes, preliminary steps need to be taken to explore both the patients' and providers perspectives. In this study, focus groups will be used to gather preliminary data.

Focus groups are a form of qualitative research that can obtain opinions, beliefs and attitudes even in situations that involve sensitive issues such as obesity.[41] Focus groups have been successful in engaging participants from culturally diverse backgrounds.[41,42] These were the two primary reasons why focus groups, as opposed to individual surveys, were chosen for the current study. In addition, the facilitated interview technique gathers this information individually and collectively so as to obtain a range of ideas that might extend beyond the original construct. This information can eventually inform a larger quantitative study or intervention, which was also one of the long-term goals of this study.[43] One assumption of focus group methodology is that the individual has valuable information and can effectively relate his or her behaviors, viewpoints, or experiences in a group setting.[44] Analytic approaches such as Grounded Theory can be used to identify thematic patterns and/or to generate hypotheses based on focus group data.[45] Thematic saturation will be defined when no additional themes are identified in the analysis of the data.

II. STUDY OBJECTIVES

The objectives of this study were two-fold:

(1) To examine and describe obese racial-ethnic minority women's knowledge, beliefs, and attitudes about nutrition, exercise, and healthy lifestyles during pregnancy along with their preferences and barriers to improving health behaviors. An emphasis was placed on the design of group programs during pregnancy that will help women meet their GWG goals.

(2) To assess prenatal care providers' strategies for and perceived barriers to providing prenatal care to obese, racial-ethnic minority women, including management of obesity in pregnancy and attainment of GWG goals.

III. METHODS

A. Patient Sample

English-speaking pregnant women of any gestational age with a prepregnancy BMI $\geq 30 kg/m^2$ were recruited from the University of Illinois Hospital & Health Sciences System's (UI Health) Women's Health Clinic (WHC). They either responded to a recruitment flyer posted in the waiting rooms and patient exam rooms (n=3) or were recruited by study personnel after eligibility was confirmed from the electronic patient scheduling system (Cerner Powerchart) and the obstetrical database (Maternal Record System, MARS) on the day of a prenatal visit in the clinic (n=57). Recruitment continued until 10-15 participants were scheduled for a particular focus group. Recruiters briefly described the content of the focus group discussion, information about the time and date of the focus group, and the incentives for participation either in person or via telephone. Study personnel contacted the participants by telephone two days prior to the focus group session to confirm participation. Women who deliver at UI Health are primarily minorities (54% non-Hispanic black, 30% Hispanic) and 70% receive Medicaid. Among obese women (35%) who deliver at UI Health, 55% exceed the IOM GWG guidelines.

B. Patient Study Procedures

Informed consent was obtained at the time of the focus group session which occurred in a meeting room at UI Health. After consent, the participants completed an anonymous 15-item survey which asked questions about demographics (e.g., age, race, parity) and knowledge of GWG (Appendix A). The audiotaped 90 minute focus groups were then conducted according to standard focus group procedures.[43] The key topics were derived from a review of existing literature, the principle investigator's (PI) prior clinical and research experience, and incorporated constructs from the Health Belief Model including perceived susceptibility and severity of the condition, perceived benefits and

barriers to change, and cues to action.[46] The following topics were presented with open-ended or semi-structured questions: (1) attitudes and beliefs about GWG; (2) attitudes and beliefs about obesity risks in pregnancy; (3) current behaviors and plans to change behavior during pregnancy; (4) stress management; and (5) the design of prenatal care programs to target GWG in a group setting. Many of the open ended questions were preceded by concrete statements (i.e., This [BMI] chart shows how much a person should weigh based on their height. Higher BMI values are associated with increased health risks. What do you think about that statement?) A moderator trained in focus group studies (Franklin Gay, FG) and a note taker (MK), who noted nonverbal behavior and level of engagement among the participants), along with one other research personnel who facilitated the informed consent and survey administration attended the focus group sessions. Participants received healthy snacks during the focus group along with $25 in cash, and reimbursement for travel expenses and parking at the completion of the focus group. The original plan was to complete three focus groups of 6-8 participants or until thematic saturation was reached. Given the low turnout for the first three groups, an additional focus group was conducted. The focus group moderator and PI agreed that data saturation was achieved after four focus groups.

C. Provider Sample

Faculty (n=25) and resident (n=28) obstetrician-gynecologists, faculty family medicine physicians (n=9), and certified nurse midwives (CNM, n=25) who provided prenatal care at UI Health were recruited for the focus group study through an email invitation. The email contained information on the content of the focus group discussion, the time and date of the focus group, the incentives for participation, and the consent process. The mean age of eligible faculty providers (36 faculty physicians, 25 CNM), was 45 years with 13 years in practice; the majority were female (91%) with a diverse racial-ethnic composition (66% non-Hispanic whites, 12% non-Hispanic blacks, 6% Hispanics, 12% Asians, 4% other). The mean number of new and return outpatient prenatal visits for providers at

UI Health was 32 and 188, respectively in 2012. Focus groups occurred separately for faculty physicians, resident physicians, and CNMs to allow for more candid discussions and capture a range of perspectives.

D. Provider Study Procedures

Informed consent was obtained at the time of the focus group session which occurred in a meeting room in the hospital. After consent, the participants completed a 19-item "Provider Characteristics and Knowledge Survey," adapted from Herring et al. (Appendix B) which assessed knowledge of BMI categories and GWG recommendations by BMI as well as physician characteristics (e.g., sex, self-reported height and weight, body self-image and satisfaction, years in practice, subspecialty).[34] The audiotaped 90 minute focus group was conducted according to standard focus group procedures.[43] A semi-structured interview guide with open-ended questions was used to explore the following topics: (1) attitudes and beliefs about managing obesity in pregnancy and GWG and how they might vary by patient race/ethnicity; (2) current approach to nutrition and exercise counseling and its perceived effectiveness; (3) opinions on improving prenatal care for obese, low-income, minority women; (4) opinions on provider education and training needs (e.g., online courses, apps, checklists, toolkits, etc.), especially related to the time constraints of a prenatal visit. The participants received a meal during the focus group and a $50 gift card at its completion. The original plan was to complete 2-3 focus groups for each type of prenatal care provider, but thematic saturation was thought to be reached after completing one focus group per provider type suggesting that the provider types were not as different as originally proposed. The separate focus groups for each provider type were important not only to allow for more candid discussions, but also to minimize any potential status or power issues. In addition, further provider recruitment presented a challenge.

E. Analysis for Both Patient and Provider Focus Groups

After each focus group, a brief preliminary report summarized important themes or ideas, the extent to which these differed from or confirmed expectations, similarities to and differences from prior focus groups, and considerations for the next focus group. The focus group recordings were professionally transcribed (Landmark Transcription, Inc.) and the PI reviewed the verbatim transcripts for accuracy. For more in-depth analysis, focus group transcripts were uploaded into Atlas.ti (Berlin, Germany), a computer-assisted software program that facilitates the storage, annotation, coding, and retrieval of qualitative data. Two researchers (MK and FG) independently coded each transcript and held several in-person meetings to review these procedures. Several steps were taken to assure that the analyses were verifiable and credible. First, the researchers independently wrote extensive methodological and interpretive memos based on the first focus groups for the patients and providers. These memos were then used to create a code list with clear operational definitions. A protocol to identify and code text segments was also created. Agreement statistics to evaluate inter-coder reliability and reconciliation of differences between coders (MK and FG) was also performed whereby a kappa statistic <0.80 was used as a cut-off to focus attention on the codes with the poorest agreement.[47] Code definitions were then refined for codes with a high level of disagreement. The remainder of the focus group transcripts were then coded according to the final compilation of code definitions.

Next, a second-level conceptual analysis evaluated patterns in the data to uncover common themes from the focus groups. The first step to evaluate patterns was to examine code frequency. Code frequency was used to determine how often codes had been "grounded" or tagged to a segment of text. The query tool function in Atlas.ti explored the code features including the proximity of the most frequent codes with each other (Semantic operators) and how inclusive or exclusive the codes were with other codes (Boolean operators). Strauss and Corbin's constant comparison method in grounded theory

was then used to examine the codes and the context in which codes occur in the data and constantly compare them with one another to decide which ones belong together.[48]

The next step to evaluate patterns in the data was to examine how codes relate to each other and build a common story from the data relationships between the codes. The Network Editor in Atlas.ti helped facilitate this process by visually mapping the data. Through the Network Editor, the analyst imported codes and memos to visually enhance the understanding of the focus group themes. Within the network editor, relations, which are concepts that link the codes, help facilitate theory development. Miles and Hubberman describe this qualitative analysis process as building a conceptual framework.[49] The data analysts' approach was to use the conceptual framework to explain the dominant themes discovered in the data in a graphic form.

The final stage of data analysis aimed to describe whether these existing relationships between the codes are plausible and confirm or disconfirm any pre-existing knowledge on GWG. Two questions that guided the analyst when interpreting results were: "How credible is the data?" "How do the focus group findings add new knowledge by contradicting, confirming or contributing to knowledge or new knowledge."[50]

During the analysis of the patient focus groups, 280 memos were created which were then used to develop 34 final codes. In the second-level conceptual analysis, all codes (n=11) "grounded" at least 35 times were reviewed. During the analysis of the provider focus groups, 62 memos were created, 30 final codes were developed, and all codes (n=11) "grounded" at least 25 times were evaluated in the second-level conceptual analysis. The focus group findings from patients (Objective 1) and providers (Objective 2) were analyzed separately, but cross-cutting themes were considered together. Descriptive statistics were used to characterize the patient and provider samples. Institutional review board approval

was obtained from the University of Illinois at Chicago separately for both the patient and provider focus groups studies

IV. RESULTS

A. Patients

Four focus groups with a participant size of 3-6 per group were conducted in 2012 over a four month period. Of the 60 patients who were approach to participate in the study, 16 completed the study procedures. The primary reasons for not participating in the study were lack of time or interest. The majority of the patients were non-Hispanic black and the mean pre-pregnancy BMI was 39±7 kg/m^2 (Table I). The major themes discussed in the smaller focus groups were similar to those of the largest focus group.

Attitudes about gestational weight gain and terms for obesity

In general, weight gain was perceived as inevitable during pregnancy. Patients had a wide range of GWG goals, but commonly stated their goals were >20 pounds. They expressed a fear of gaining weight, but also frustration when told to restrict GWG. Patients also stated that the actual GWG was not as important as "just being healthy." They thought they had little control over GWG (e.g., "You can't control it, cuz that baby controlling it for you."). Patients described a body image not in line with standard clinical recommendations (e.g., "200 pounds is not that big."; 200 pounds was "comfortable for me"). The term "obesity" was not well received among the groups; "thick" was a term more commonly used among the individual participants, but they also admitted that there really wasn't a "nice way to say it." One patient stated she didn't consider herself overweight or obese because "I don't look it. I ain't got flab." Many patients considered that the term "obese" referred to people who were not physically active or "stuck in their house." Being physically active should prevent them from being called "obese," as described in the passages below.

> *Participant 3 focus group 2*: Now, me, myself, I'm real active. I participate in the classes that I go to. I, you know, volunteer at my school. I, you know, participate around the community and things like that. So how's I'm fat? You know what I'm saying? Or obese?

Participant 1 focus group 2: I don't feel like I'm the typical obese person, you know. They say I'm obese, and I'm like, well, I don't know how you figure I'm obese. How do you classify obesity? I don't like that word because I don't feel—I know I'm big, but I'm not as big as most.

TABLE I
PATIENT CHARACTERISTICS

Variable	**Participant responses (n=16)**	
	Mean ± standard deviation or %	**Range**
Demographics		
Prepregnancy body mass index (kg/m^2)	39±7	30-49
Race-ethnicity	87% Black 13% Hispanic	
Age	28±5	21-39
Multiparas	93.7%	
Completed 12th grade	93.7%	
Married	18.7%	
Medicaid	75%	
Gestational age (weeks)	24±8.6	9-38
Employed outside of the home for a salary	56%	
Prenatal care provider	25% Certified nurse midwife 62.5% Physician 12.5% Other	
Weight-related questions		
Do you think you should gain or lose weight during this pregnancy?	67% Gain 20% Lose 13% Stay the same	
If you should gain weight during this pregnancy, how many pounds do you think you should gain?	24±10	15 to >50
Do you think there are any risks of being obese during a pregnancy?	87% Yes 13% No	
Has a provider ever discussed how much weight you should gain during a pregnancy?	62.5% Yes 31.2% No 6.3% Don't remember	
Has a provider ever talked to you about the risks of being obese during a pregnancy?	43.7% Yes 43.7% No 12.6% Don't remember	

When the patients were shown a chart of BMI's and normal ranges of weight based on their height, they expressed strong opinions against the chart (e.g., "It's a lie") and that their weight was not associated with health risks since women with normal weights could still have problems such as diabetes or hypertension and health risks were frequently attributed to hereditary factors or a family history.

Health behaviors including exercise and nutrition and the relationship to support

There was little consistency in how women defined exercise or physical activity. The routine activities of daily living were considered exercise. For example, patients felt that doing chores, picking up children from school and other responsibilities that involved movement were exercise. Few patients agreed that exercise involved increasing their heart rate over an extended period of time through aerobic activity.

> *Moderator: Is taking kids to school exercise?*
>
> *Participant 2 focus group 1*: Yeah, because your body's moving. You're not, like, in one place, not laying in the bed, not sitting still. Your body is in motion.
>
> *Moderator: What does "working out" mean?*
>
> *Participant 1 focus group 3:* Um, walking, moving in motion, cleaning up, it could mean several things.

The following passage captures strategies that patients take to improve health (i.e., avoiding fried foods), but also shows how women struggle with the challenges of not having time, the convenience of fast food, and cultural practices.

> *Participant 1 focus group 2*: I have to watch the carbs I eat at each setting. Um, I can't still eat the foods I normally eat. Um, but I have moved away from fried foods. And see, I'm not a cooker. I can cook, but when I'm coming home at 9:00 at night and I gotta feed my family, we gonna stop and get something to eat if I got anything to do with it. I'm gonna spend money at a fast food restaurant before I go home and cook something because then that means it's gonna take more time for me to get my daughter prepared for bed. And my husband working, you know, it's just—it's quicker to buy out than to cook. I will cheat sometimes, like on the weekends or something like that. And cheatin', to me, is like, um, I can have fried chicken or

> something. Or I can have a piece of cake if it's a family function and it—you know, everybody is eating—it's a festivity. I—I'm gonna cheat because I'm not at home.
>
> *Participant 2 focus group 2:* Because, like I said, I have down south people that stays around me. And they don't do nothing. They don't believe in boil. They don't believe in baked. They believe in fried.

Not surprisingly, patients provided several examples of how unhealthy nutrition led to excessive GWG and how healthy nutrition behaviors assist them in meeting GWG goals and having a healthy pregnancy. As described above, an important feature was the influence of cultural or regional practices on nutrition and how the concept of support was woven in between the two. Support persons were defined as self, family members, friends, or partners but they were not necessarily "supportive" of healthy behaviors. In the following quote, the patient's support persons did not understand common appetite changes during pregnancy and their views on GWG and nutrition were a source of stress during her pregnancy.

> *Participant 2 focus group 2*: I feel like everybody that I have on my team are beating me down because I'm not eating. Now if I had a positive person on my team to say, okay, well, you know what, I'm gonna eat this with you to make you feel a little better. I love greasy food...but I think in my own mind that if I get away from the fried food and go to the healthy food, that I could …at least try to start to eat more, but by me having my auntie stay right directly next door to me, and she—you know, she from down south. You know, every Friday, they have a fish fry and the spaghetti and all that. And the bad part about it, my auntie, she's a nutrition person where she goes out and talks to people about the nutrition, but when I went up to her, she want to jump on me because I'm not eating. So I think if you get more positive health and advice about the type of food you should eat, then it'll help more.
>
> *Participant 2 focus group 3:* The food that my mother buy [gets in the way of me reaching my GWG goal]. She don't buy healthy food, she, cuz my brother, and they all like fried chicken. I don't know, they just fry up food, like they love fried food, period. She don't buy plain chicken.

The concept of "eating for two" was also highly prevalent among their support persons. Their support persons were also critical of provider advice regarding exercise and GWG goals and instead they offered advice that was based on cultural or generational practices as detailed in the following dialogue.

Moderator: So your source was saying that you can't exercise, you said your grandmother told you?

Participant 1 focus group 1: So she'd tell me "No, you can't. You can't ride a bike. You can't do, like, sit-ups and stuff. You can't, you can't do that - while you're pregnant."

Moderator: So if you, if your grandma was walking in and you were doing sit-ups, how would she react?

Participant 1 focus group 1: [Laughing] How she would—she would curse me out.

Participant 3 focus group 3: She was like, "You walked all the way to Walgreens with the kids? That's not good, and you're pregnant," and she just worries about like the—I dunno. She says like, basically she makes it sound like pregnancy's a handicap, which it's not, you know?

Conversely, young children, whether they were their own or a relative's, were reported as being supportive because they were non-judgmental and were primarily focused on the patient's health, not cultural practices. Nevertheless, the support system was disrupted for these patients, who recognized the need to "encourage myself" and "do this for me and the baby." Patients frequently stated that stress leads to unhealthy nutritional behavior and this was an obstacle to attaining goals during pregnancy.

Suggestions for group programs during prenatal care

When patients were specifically asked about what group programs or interventions would help obese women during pregnancy, they viewed the group setting as an environment that could provide support as determined by the following passages:

Participant 2 focus group 1: It could be people in a group that's going through the same thing you're going through, so don't feel that it's just you.

Participant 1 focus group 2: Once you get out into these groups or you talk—you start talking and then your family start listening. So even with my husband, when we sat down and they had to do the insulin and we had—I had to sit down with the nutritionist, he started looking at some of the food he was eating. And, like, "dang, I can't eat that no more." No, you're not even supposed to eat that because—it didn't just education me, it educated him, too, on what he should be eatin'. When I got on insulin, my mama started talking about baking chicken….I do think you should bring anybody who help prepare your meals or anybody you know that's close to or that you go to confide in. You should welcome them to come out to the meetings with you.

Participant 1 focus group 3: Yeah, a partner or whatever, to be there with you, cuz some people could feed off other people energy….Like, girl, let's go walk, even though they both might be pregnant….But they might, that might just motivate you. Like, okay, come on girl, let's go walk and talk, have a conversation.

As evidenced by the responses, some of the patients had previously participated in some type of group sessions, but only one of them had previously participated in group prenatal care (CenteringPregnancy™). There were also negative aspects of attending group programs, especially as they relate to their support systems.

> *Participant 2 focus group 1*: "I'm your momma. I told you this—how this is supposed to be - and you're gonna go over to this group and let them tell you something different? If your baby comes out like this, it's your fault"—you know, it's just— having you confused, like—listen to my momma or go to the group?

Patients also envisioned engaging in activities such as massage, yoga, other stress reduction techniques, and cooking classes in a group setting. More specifically, they wanted culturally-based nutrition education that could be incorporated into cooking classes or a "hood cook book." Exercise was also discussed as an activity for groups with treadmills given as an example, but patients still felt as though their daily activities counted for exercise, as previously discussed.

> *Participant 2 focus group 1*: And as far as, like, uh, activities, the exercise would be nice, because a lot of people probably don't exercise. I know I don't really exercise but, like I said, getting the kids ready and walking to the car—I feel like that's sufficient enough for me to exercise.

Healthy snacks were seen as an incentive to attend the group programs. Patients also expressed an interest in discussing their mood and depression, especially as it related to excessive GWG (e.g, "And sometime I beat myself up for it [weight gain]. I'm like, oh, I'm just so depressed, and I don't wanna eat no more.") and stated that this would add more variety to the content of the program as depression is traditionally discussed postpartum. This participant highlighted the depression, stress, and overeating link along with the need for support during a pregnancy:

> *Participant 3 focus group 4*: And just a whole lot of other health conditions that comes along that really, really triggers some stress. Or depression, and that's like to me I think that was, that's one of the main focuses that a lot of pregnant people go through is depression and stress. You know? Sometimes you overeat because you're stressed or depressed. So I just think if that was incorporated somehow in the prenatal care that the doctors give you or whatever.

The role of the provider from the patient's perspective

Lastly, the patients discussed their prior experiences in discussing obesity and GWG with their providers. They reported that although it "hurt" when providers discussed their weight, they knew they were being truthful and ultimately it was helpful for them. However, some women reported that they received mixed messages about how much GWG was appropriate.

> *Participant 4 focus group 4*: They always tell you two different things and you don't know who to believe. One doctor tells you oh you can gain 13 pounds, one doctor tells you oh you can gain 25 pounds.

They also gave recommendations on how providers could improve their counseling approaches including giving concrete examples of healthy food choices, being knowledgeable about nutrition, and not getting defensive when patients ask weight-related questions.

B. Providers

Three focus groups with a participant size of 4-9 were conducted over a 3 month period in 2013. All of the 19 participants were female and the majority was non-Hispanic whites. Certified nurse midwives followed by faculty obstetrician-gynecologists had the greatest representation, with a smaller number of resident and family medicine physicians (Table II). The major themes were as follows:

Counseling on obesity and gestational weight gain goals

Although providers were aware of the 2009 IOM recommendations for GWG in obese women (11-20 pounds) based on the survey responses (63% recommended a GWG of 10-20 pounds), most communicated the lower limit of GWG (10 or 11 pounds) to their patients and even encouraged "weight maintenance" (e.g., "the average patient I see does not need to gain weight"). Their patients commonly experienced excessive GWG. Weight loss during pregnancy was viewed as a byproduct of improved health behaviors (i.e., healthier diets) and not necessarily a substantial risk to the developing fetus as long as the fetal growth was appropriate (e.g., "If they lose weight it's fine, too, but it's not the ultimate

[goal]"). Providers did not feel comfortable discussing weight with obese women and had to motivate themselves to start the discussion:

> Participant 1, faculty ob-gyn: I think overall I'd rather not talk about weight with obese patients. I look at their problem list and see obesity. Then, I have to prime myself that this is something that I really need to talk about. It's not something I feel completely comfortable. I have to just encourage myself that, "It's really important we're gonna talk about this today." I think I'd rather not address it.

TABLE II
PROVIDER CHARACTERISTICS

Variable	**Participant responses (n=19)**	
	Mean ± standard deviation or %	**Range**
Age (mean ± SD)	38.6 ± 13.7; Median 34 yrs	31-56
Ethnicity	84.2% non-Hispanic 15.8% Hispanic	
Race	78.9% White 5.3% African American 5.3% Asian 10.6% Missing	
Female gender	100%	
Provider type	21.0% Resident ob-gyn 47.4% CNM 26.3% Faculty ob-gyn 5.3% Faculty family medicine	
Years in practice (CNM and faculty only)	10.9 ± 11.1; Median 8yrs	1-35
Years in practice at UI Health	6.8 ± 5.3; Median 4 yrs	0-17.5
Should obese women lose or gain weight during pregnancy?	10.5% Lose 57.9% Gain 31.5% Stay the same	
If obese women should gain weight, how many pounds should they gain? (n=11)	9.1% 5-10 pounds 90.9% 10-20 pounds	
Do you discuss weight gain during pregnancy with your patients?	89.5% Always 10.5% Sometimes	
Are there risks of being obese during a pregnancy?	100% Yes	
How would you describe your own body weight?	47.4% Normal 26.3% Overweight 26.3% Obese	
Body mass index (mean ± SD)	26.1 ± 6.3 kg/m^2 10.5% incomplete data	21-41
How would you describe your nutrition?	78.9% Very good 15.8% Good 5.3% Fair	
During the past 7 days, on how many days were you physically active for at least 60 minutes per day?	2.3 ± 1.6; Median 2 days	0-5
General health description	10.5% Excellent 36.8% Very good 52.6% Good	
Are you satisfied with your body weight?	26.3% Yes 73.7% No	
Which of the following are you trying to do about your weight?	73.7% Lose weight 0% Gain weight 21.0% Stay the same weight 5.3% Nothing	

The CNM providers, in particular, directly acknowledged their patient's successes (e.g., reaching GWG goals or health behaviors) in the form of praise. Providers sensed that their patients did not understand the health risks of obesity as evidenced by the statements below. Phrases in quotations represent direct quotes from their patients.

> Participant 2, CNM: "I'm very happy with my weight. There's more to love."
>
> Participant 5, faculty ob-gyn: "[My husband] likes big women. I could lose my husband if I lose weight."
>
> Participant 9, CNM: I'm glad that you're comfortable in your own skin, but this is a health risk for you.
>
> Participant 4, resident: It is really interesting that people don't really think the weight is a problem until they are wheelchair-bound.

Terms for obesity

The dominant theme from the groups was how careful and sensitive providers were when communicating obese status to their patients. Regardless of the number of years in practice and experience, finding the right words to refer to obesity was a formidable challenge for providers. In order to avoid insulting patients, they substituted the term "obesity" with "overweight" or with phrases (e.g., "when you are heavier at the beginning of pregnancy", "higher weight starting off"). They often skirted the "obesity issue" and instead focused on discussions about healthy diets and exercise and GWG goals. Because "BMI" is a defined medical term, some had greater comfort using this term, but would never tell a patient that she was "morbidly" obese, another defined medical term.

Challenges to providing prenatal care to obese women

Limited time in a standard prenatal care visit was a universal challenge to addressing issues such as obesity and GWG. Providers suggested longer and additional visits. This concept extended beyond the typical time-related complaints from an outpatient setting because the discussion of obesity and GWG required that the provider first establish the patient's trust. As such, this discussion was best

avoided at the initial visit and instead discussed at subsequent visits when the relationship had become stronger. Discontinuity in prenatal care providers was recognized as a potential frustration for patients who may then receive conflicting messages about GWG.

Overcoming cultural myths was also a prominent challenge. Several providers discussed patients with excessive GWG and battling the "eating for two" myth and the perception that pregnancy is a "get out of jail free card" with respect to health behaviors (e.g., "I'm taking care of my baby by eating more."). In all groups, providers acknowledged and were empathic about their patients' limited resources and how culture may impact healthy food choices. The most critical issue was the patients' family beliefs and expectations regarding GWG, which could lead the patient to mistrust the provider. In contrast, family influence was also seen as an advantage when it pertained to patients with gestational diabetes. For example, this diagnosis unified the family's approach to nutrition because diabetes was viewed as important to manage appropriately during pregnancy. This concept was also discussed in the patient focus groups.

Providers referenced their own weight status as a barrier to their counseling strategies if their BMI was normal or high. On the other hand, some providers with higher BMI's made a connection with their patients when they relayed their own personal weight struggles and shared successful strategies. Nonetheless, regardless of the providers' BMI (both low and high), they reported that they still did not feel comfortable discussing these sensitive issues.

Some challenges were related to the health care system design. Providers were unaware of exactly what happened during the nutrition consult and weren't sure if this was a beneficial visit for the patient. Given the high volume of patients who could benefit from nutritional advice during pregnancy, a more convenient location for this person would be within the prenatal clinics and not a separate location.

What do providers need in order to improve prenatal care for obese women?

Providers acknowledged extremely limited nutritional knowledge and they primarily attributed this to a lack of education and training. Despite having the greatest proximity to training, resident physicians more commonly focused on their limited education and knowledge compared to the other provider types (e.g., "Well, that's the five minutes of nutrition I know." "My comfort stops at the basic nutritional advice, which I do not think is sufficient for most of our patients.").

As opposed to traditional learning formats such as didactic grand-rounds, they proposed "hands-on nutrition training," which is more consistent with contemporary educational approaches. Most importantly, they sought training on effective communication strategies that would improve their comfort level in discussing GWG, especially as it relates to their own body weight. Standard, clear guidelines built into an electronic medical record (EMR) such as order sets and algorithms would assist providers because the current management varied from provider to provider and among provider types. Since providers also had difficulty remembering the BMI cut-off numbers for the different weight categories and consequently used an absolute weight value as a trigger to have a discussion about obesity risks and GWG, an EMR that automatically calculated BMI and created the management pathway was suggested.

Providers shared their expert opinions

Even though providers felt their nutritional knowledge and comfort in discussing obesity was lacking, they shared their unique approaches to managing obesity during prenatal care visits and gave several concrete and feasible examples that would be useful for all prenatal care providers. Many of these examples included a distinct communication style regarding nutrition, exercise, and GWG. For example, they recommended keeping the conversation basic, such as how a pediatrician might talk to a 10 year old patient. Phrases such as "eat the fruit, don't drink the juice" engaged their patients and

helped them understand the role of nutrition in reaching GWG goals. Food diaries were a favored tool because they were simple tasks that any patient could do for either a short or long-term period. This was generally an "eye-opening experience" for the patient. The free resources on the website choosemyplate.gov, specific diets (e.g., "Pregnancy power," eat healthy for 6 days and on the 7th eat what you want), and diet books (e.g., "Eat This, Not That) were discussed. As an alternative to joining a health club with membership fees, turning on the radio and dancing for 20-30 minutes in their home would fulfill the daily requirements for exercise. Since patients spend many hours in the waiting room at the prenatal care clinic, a television program with pregnancy-related health information would supplement their educational needs.

The approach to group programs for obese women during pregnancy

Providers understood the concept of support and its importance in helping their patients reach their GWG goals. A "breakfast club" was proposed whereby patients would enjoy a healthy breakfast, which would also be an incentive to attend, while discussing nutrition. A model similar to Weight Watchers (though several providers preferred the online, as opposed to the in-person, session), or CenteringPregnancy™ was proposed. The following segment portrays the providers' opinions about group prenatal care:

> Moderator: What if prenatal care was provided in a group setting to obese women with particular emphasis on diet?
>
> Participant 7, CNM: That would be ideal. That's absolutely ideal. Those groups are amazing. The most amazing thing is that the patients form bonds—they form community…Absolutely, Centering.
>
> Participant 8, CNM: I guess Centering will be very great because it will bring a sense of competition and you are in a circle with people with the same problem. That really would be good.

Suggested adaptations to the traditional CenteringPregnancy™ approach included discussion of nutritional substitutions that were less expensive, recipe exchanges, cooking classes/demonstrations, and instruction on reading food labels. However, providers expressed concern that obese women would be "stigmatized" when they were invited to participate in a group for obese women only and they struggled with the title for such a program (e.g., "Wellness Centering"). One provider referenced a research study previously conducted in the prenatal clinics at the university which specifically and successfully recruited obese pregnant women to participate. Incentives would be needed to pique their interest. They also suggested that the patients' support persons could attend some, but perhaps not all, of the sessions. Other challenges commonly encountered in group prenatal care programs such as CenteringPregnancy™ were discussed including group space, coordinating provider schedules, and lack of privacy to discuss sensitive issues. Providers also suggested a multidisciplinary approach similar to what typically occurs in a bariatric surgery practice with a team of providers that included not only the prenatal care provider, but social workers, psychologists, and nutritionists thereby creating a larger support network.

Comparisons and contrasts to the patient focus groups

There were several similar themes discussed among the patient and provider groups including lack of access to healthy foods in the patients' community and homes (e.g., "It's not just that they have to decide to eat broccoli, but they have to convince their whole family to eat broccoli.") and messages from family and friends that did not support healthy behaviors (e.g., "Eat as much as you want." "You need to gain 40-50 pounds this pregnancy."). For some of the themes, the patients and providers had differences of opinions. Patients expressed negative feeling about the BMI chart, but providers used the chart "a lot" so that they could more directly demonstrate risks associated with a higher BMI. Providers could then "medicalize" obesity and attenuate the patient concept of what "looks good on them." Conversely, some providers also minimized the BMI chart discussion and instead focused on concrete

examples to improve health behaviors and the quality of consumed food. The mixed opinions about the BMI chart are demonstrated in the following quote:

> Participant 7, CNM: I don't show it to people because I was horrified when I saw where I fell on it, so I think it can be really—on the other hand, it was a bit of a wakeup call.

This theme can be summarized by the terms "healthy obese" or "fit and fat" which faculty obstetrician-gynecologists used in one of the focus groups. This avoided "getting stuck on the numbers" and shifting the focus to a healthy lifestyle. A normal BMI may not be a goal that all patient and providers can reach. Instead, this needs to be individualized and perhaps there needs to be a compromise between the recommendations and the goals.

Lastly, a need for greater patient education and perhaps a greater public health issue arose in the discussion of juice. Patients thought juice was healthy (e.g., "I know I need to drink more juice") whereas all providers consistently discussed how unhealthy juice was (e.g., "You don't need [juice]", "Do not drink your calories") and pleaded for the Women, Infants, and Children program (WIC) to stop giving away juice.

V. CONCLUSIONS

A. Patient Health Behaviors and Dual Role of Support Systems

From the patient focus groups, it is clear that patient behaviors with respect to nutrition are tied to their support system and the environment. Aside from the typical barriers of time, responsibilities, and lack of access to healthy foods in their community, patients' experiences with support was embedded in an ecological framework in which they hear society-level and geographical-specific cultural myths (e.g., "eat for two" while pregnant and pregnancy being a "get out of jail free" card) with respect to health behaviors. Many patients in these focus groups came from households in which they were not the sole homeowner or cook. Therefore, in addition to cultural barriers, they also encountered family-level constraints when it pertained to eating healthier and exercising while pregnant. In these often-cited scenarios, their experiences caused an undue amount of stress. This stress, coupled with unhealthy eating, largely contributed to not reaching GWG goals. Conversely, the role of support through programs that involve multiple patients with similar experiences was viewed as a strategy to learn more about cooking, healthy eating, as well as providing a social aspect to exercise or be physically active. These types of programs can also contribute to educating the patients' families on ways they can be more supportive. For example, both patients and providers described a stronger support system when a pregnancy became complicated by gestational diabetes. The overarching patient conceptual model is presented in Figure 1.

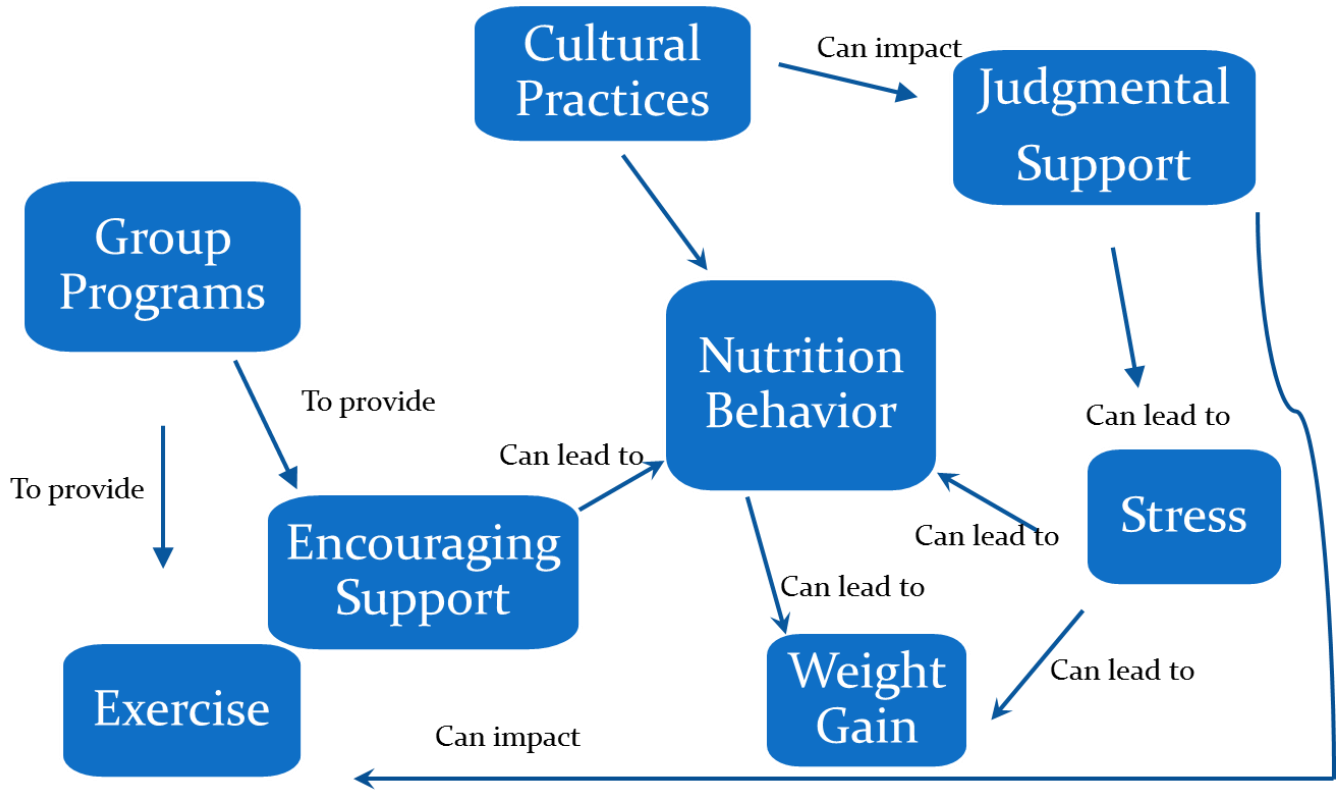

Figure 1. Patient conceptual framework.

These findings were similar to other reports from non-pregnant women. In a focus group study of non-pregnant, obese, Hispanic immigrants, these women requested "buy-in" from their families for weight loss, support for physical activity from a group setting, and a strong social support system.[51] Most importantly, they desired programs that incorporated traditional foods and supported cultural traditions with a family focus.[51] In another focus group study that explored what motivates non-pregnant African-American women to engage in regular physical activity and maintain weight loss, participants reported that a buddy, a personalized exercise program, and joining a group were motivations to start exercising.[52] For those participants who were already exercising, social support was cited as key to maintain exercise patterns.

B. The Challenge of Incorporating Exercise into Daily Activities

In addition to advice from family or other support persons, there are several factors that contribute to the reticence to exercise during pregnancy including the patients' perceptions of their routine daily activities as exercise. In a previous study, African-American women also had broad definitions about what types of activities were considered exercise, but they generally thought that exercise was good during pregnancy.[53] Nonetheless, certain types of activities could cause problems with the pregnancy and cultural myths communicated by family members (e.g., raising hands over the head caused stillbirth) were pervasive. Of note, the highest levels of energy expenditure during all three trimesters were attributed to household chores and caregiving activities in the prior study.[53] In another report, more than a third of African-American women reported no exercise and 56% reported engaging in only non-strenuous physical activity during pregnancy.[54] Despite the published guidelines that recommend 30 minutes of exercise every day during pregnancy and the advice providers might give about exercise during pregnancy, overcoming patient and family beliefs about the risks of exercise during pregnancy will be a significant hurdle in the pathway of improving health behaviors in obese women.[55] The attitudes towards exercise also need to be interpreted in the context of the higher national rates of preterm delivery in minority women and the patient's perception of exercise potentially increasing the risk for preterm delivery. Future studies would need to investigate their beliefs about the causes of preterm delivery and whether or not there is a relationship to exercise.

C. The Provider and Communication Style

Patients welcome greater involvement from their providers in the discussion of obesity and GWG, but emphasized the importance of consistent messages. Other studies have also emphasized that inconsistent advice from providers has prompted patients to not follow their recommendations and to seek information elsewhere.[56,57] It is clear that providers need to educate their patients about GWG given

that many patients in this study, the majority of whom were already in their second trimester, had a GWG goal > 20 pounds. A low GWG recommendation or weight maintenance were also reported in a qualitative study of obstetric clinicians (e.g., "Why should they gain any weight at all?…But these women, if you give them five pounds they take 20.").[58] Providers need additional training regarding obesity-related pregnancy risks as well as improved communication skills so as to dispel common myths and simultaneously convey confidence and compassion regarding these issues. Communication skills appear critical given that prenatal care providers appear to have difficulty in discussing this topic (e.g., "have to choose our words carefully").[59] This also extends to the psychological aspects of being obese and pregnant and addressing mental health problems such as depression and anxiety.

Of further interest, patients in this study were not receptive to the BMI chart, which providers commonly used as a visual guide for weight goals. This finding was similar to another focus group study of minority parents who felt as though the charts that physicians use for their children's weight status were wrong and physicians' expectations for weight were also wrong.[60] As a result, the parents became frustrated with their children's physicians. Prenatal care providers also face similar frustrations when their patients seek advice from family influences that encouraged excessive GWG (e.g. "I feel like our mothers know the most.").[56] These findings confirm that there are substantial barriers to behavioral change that likely stem from low-income urban environments including complex family dynamics and generational conflict about food. Regardless, women seek concrete and feasible advice from their providers regarding healthy behaviors during pregnancy. Providers will need to emphasize the positive aspects of family and support systems and build on these strengths as opposed to dwelling on the negative aspects. The overarching provider conceptual model is presented in Figure 2.

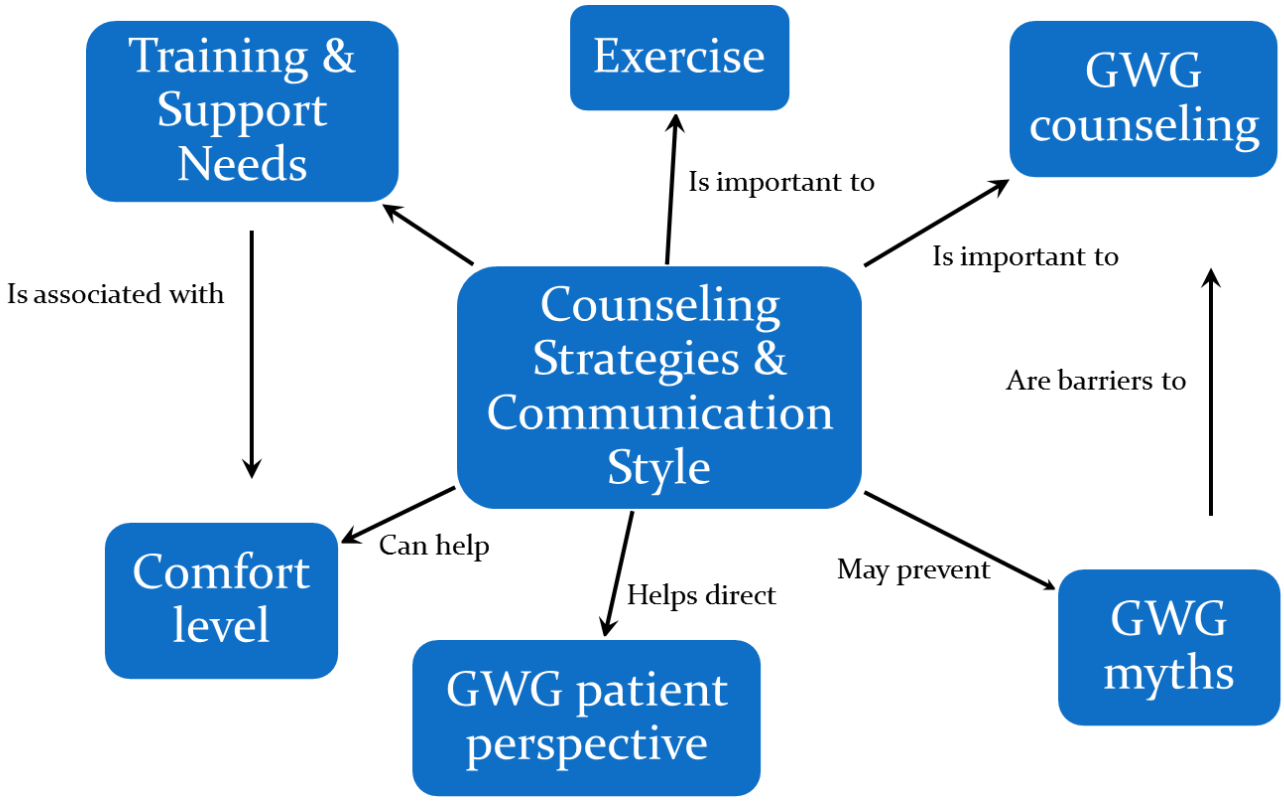

Figure 2. Provider conceptual framework.

The provider focus group findings also shared similar themes with other published qualitative studies of prenatal care providers and their opinions on prenatal care for obese women. This includes lack of continuity of care, time constraints, training needs (e.g., increased nutrition knowledge, skills to manage obesity), and the need for clear evidence-based guidelines.[56,59,61-65] Other providers also struggled with a name for a prenatal intervention for obese women as this might be a source of embarrassment and negatively impact provider-patient relationships.[66]

D. Implications for Practice and Future Steps: Design of the Group Intervention for Health Behaviors

It has been shown that formative research that assesses beliefs, perceptions, and behavior of a group can be used to design culturally appropriate interventions within the environmental context.[67] Adapted interventions have been more successful at modifying health behaviors that relate to weight

loss outside of pregnancy compared to interventions that did not account for race, ethnicity or socioeconomic status.[68] Based on the current study, culturally-tailored programs that use acceptable terms for obesity, provide education regarding healthy eating and safe exercise, and encourage appropriate support from social networks may be effective in addressing GWG in obese minority women. A group prenatal care program such as CenteringPregnancy™ would be ideal to pilot these ideas with the appropriate provider training and content modification while maintaining the same program processes.

In CenteringPregnancy™, a trained clinician facilitates 10 prenatal care sessions that last approximately 60-90 minutes each (Table III).[25,69] The group format provides women with 15-20 hours of contact time with the same provider. This allows for discussion of a wide range of pregnancy-related health content, including early pregnancy concerns, childbirth preparation, and psychological and social issues. Although there is a schedule of recommended topics for discussion during each session, an important feature of CenteringPregnancy™ is the facilitative, or nondidactic, leadership approach. Group leaders guide rather than control the group discussions, so participants' interests significantly influence the direction of discussions and the specific topics covered. Group leaders also promote engagement by employing participatory group activities, by referring questions raised during discussions back to the group, and by encouraging women to share information with one another.[70] All these features closely mirror what patients and providers in the current study said they were searching for. Health professionals in the United Kingdom also promoted the concept of group sessions that had an emphasis on behavioral change techniques and were previously piloted as part of a feasibility study of an "antenatal lifestyle course" for women with a BMI≥30 kg/m^2.[59] The affirmation of groups was partially attributed to the multi-factorial nature of obesity and the need for an integration of services, similar to the multidisciplinary approach providers in the current study suggested as well.

TABLE III

PROPOSED PATIENT INTERVENTION COMPONENTS FOR CENTERINGPREGNANCY™

#	**Session Topics**	**Gaps/Needs from Focus Group Data & Literature Reviews**	**Adaptations**
1	Eating well for you and your growing baby	GWG unknown/incorrect	GWG plots/goals; Discuss obesity risks/excessive weight gain; co-facilitated by Registered Dietician
2	Dealing with the discomforts of pregnancy	Misconception that exercise could harm fetus, Excessive TV watching	Demonstrate safe exercise; Group walking exercise program/set pedometer goals; co-facilitated by Physical Therapist
3	Relaxation and managing stress	Stress and eating relationship; Limited access to healthy foods	Share/teach stress reduction techniques; Cooking demonstration with a focus on portion size, food labels, shopping in a food desert; Recipe exchange
4	Issues of protecting myself	↓Efficacy of hormonal contraceptives	Discuss contraception options
5	The experience of birth	↑Cesareans; ↓Vaginal birth after Cesarean success; Fetal heart rate monitoring and anesthesia challenges	Discuss intrapartum risks; co-facilitated by Anesthesiologist
6	More on the birth experience		No specific adaptations
7	Thinking about the baby		No specific adaptations
8	Dealing with feelings	↑Perinatal depression; ↓Provider screening	Discuss mental health; co-facilitated by Women's Health Psychiatrist
9	Putting it all together	↓Breastfeeding initiation and duration	Discuss postpartum weight retention/ breastfeeding techniques; co-facilitated by Lactation Nurse
10	Now what happens		No specific adaptations

Proposed adaptions to the content of CenteringPregnancy™ will primarily occur during sessions 1–5, 8 and 9, with the greatest emphasis on sessions 1–2 to effect the maximum change in behavior (Table III). The goal would be to adapt the sessions to improve knowledge, attitudes, and beliefs regarding GWG and nutrition (sessions 1 and 3) and exercise (session 2). Since patients expressed interest in exercising as a group, time will be set aside at each session for an exercise-related activity. Clinicians with expertise in managing obesity in pregnancy specific to their training will co-facilitate the adapted sessions. Every session will have continued review and follow-up of adapted elements (e.g., group review of GWG goals and plots, food diaries, pedometers, and stress reduction techniques). These approaches have been cited as successful in other studies that did not specifically use group programs.[71-75] Healthy snacks and recipes will be shared at each session. For the patient, there is the option of bringing a support person (e.g., partner, friend, etc.); providers would be trained to capitalize on this person's presence and develop meaningful relationships so that their individual advice and group discussions will be more credible. A pilot study of this intervention is planned for women who are English speaking, have a pre-pregnancy BMI $\geq$ 30 kg/m^2 and receive prenatal care at UI Health.

Our focus group results, as well as findings from weight-management intervention studies in non-pregnant and pregnant patients, suggest that before piloting the intervention, the CenteringPregnancy™ providers will need to raise their awareness of the risks of obesity in pregnancy and the importance of obese women meeting GWG recommendations. Toward this end, a provider Obesity Education and Training Program will be created (Table IV).[76-80] In this program, providers will be trained in a ½-day group seminar that will include the six elements in Table IV. At the end of the seminar, role-play of CenteringPregnancy™ groups (30 min) will occur to unite the six elements. Experts in high-risk pregnancies, CenteringPregnancy™, motivational interviewing, and nutrition will facilitate the seminar. Motivational interviewing, which is not part of traditional medical training, has proved effective in eliciting behavior change that contributes to improved health outcomes and patient-

physician communication.[81] There is also a recommendation for Continuing Medical Education activities to include techniques for motivational interviewing so that they can be incorporated into everyday clinical encounters.[76]

TABLE IV
PROPOSED PROVIDER INTERVENTION COMPONENTS FOR CENTERINGPREGNANCY™

#	**Gaps/Needs from Focus Group Data & Literature Reviews**	**Content for Obesity Education and Training Program**
1	How is obesity defined?	Information on obesity trends and diagnosis (15 min)
2	How to start the discussion?	Sample opening sentences; Culturally appropriate words for weight (15 min)
3	What are the risks?	Evidence-based medicine review of risks (30 min)
4	What can be done in pregnancy?	Management plans (e.g., early screen for GDM, exercise program, etc.) (15 min)
5	What are the correct GWG goals?	Review 2009 IOM recommendations; Instruction on plots of GWG (15 min)
6	How to improve patient behaviors?	Provide feedback through motivational interviewing if GWG exceeds goals (2h)

In line with the CenteringPregnancy™ philosophy, the seminar will reinforce the concepts of facilitated discussions instead of didactic presentations, adaptions and spontaneity to meet the specific interests of women in the group, interactive activities that promote group participation and bonding, and

goal setting in the context of the individual and the group. The CenteringPregnancy™ Facilitator's Guide will be edited to include these adaptations. The same provider will facilitate a single group, but there may also be cross-coverage of providers depending on schedules.

E. Limitations

This study has several limitations and strengths. Although 60 patients were approached to participate or responded to recruitment flyers and an average of 10 patients confirmed for the group, only 3-6 patients actually attended each focus group. Reasons for initially declining participation included lack of interest or time. Although this is a limitation, there is also evidence to support that the discussion of more sensitive topics, such as obesity, is effective even with smaller numbers of participants.[82] The provider focus groups had fewer recruitment challenges. The racial/ethnic composition of the sample (87% black, 13% Hispanic) differed from the general population likely because of the English-speaking inclusion criteria and the greater prevalence of prepregnancy obesity among non-Hispanic blacks compared to other race-ethnic groups. This qualitative data may not be generalizable beyond the specific sample population (i.e., pregnant, obese, minority women at UI Health and their providers), but the participants varied in age, race (providers), parity (patients), BMI, and training/experience (providers), all of which captured diverse perspectives. The experienced moderator encouraged all participants to speak yet did not allow the dominant participants control the discussion and probed for additional responses so as to capture these diverse opinions. Lastly, the survey given prior to the focus group discussion may have biased the responses by providing subtle messages about specific content areas of interest to the research team.

No prior intervention study of GWG has included a consistent composition of groups of minority patients and providers. Given that providers do not communicate obesity-related risks and GWG goals effectively, prenatal care in a group setting may decrease barriers between patients and providers and

allow for better communication on these critical issues. Future efforts should continue to explore the role that support systems play as they relate to acting as a barrier to obese pregnant women to improve their health behaviors and ultimately reach their GWG goals.

APPENDICES

APPENDIX A

PATIENT SURVEY

While we are waiting for everyone to arrive, please complete the survey that is located in front of you.	
1. Do you think you should lose or gain weight during this pregnancy?	Lose Gain Stay the same
2. How many pounds do you think you should lose or gain during this pregnancy?	_____lbs
3. Has a provider ever discussed how much weight you should gain during a pregnancy?	Yes No Don't recall
4. Do you think there are any risks of being obese during a pregnancy?	Yes No Not sure
5. Has a provider ever talked to you about the risks of being obese during a pregnancy	Yes No Don't recall
6. What is your age?	_____yrs
7. What is your ethnicity?	Hispanic Non-Hispanic
8. What is your race?	
9. How many times have you been pregnant, including now?	
10. What is the highest school grade you completed?	
11. What is your marital status?	Married Single Living with partner, not married Widowed Divorced Separated
12. What type of health insurance do you have?	
13. When is your due date?	
14. Do you work outside of the home for a salary?	Yes No
15. Who is providing your prenatal care?	Certified nurse midwife (CNM) Physician/doctor Other

APPENDIX B

PROVIDER SURVEY

While we are waiting for everyone to arrive, please complete the survey that is located in front of you.	
1. Do you think obese women should lose or gain weight during pregnancy?	Lose Gain Stay the same
2. How many pounds do you think obese women should lose or gain during a pregnancy?	_____lbs
3. Do you discuss weight gain during pregnancy with your patients?	Always Sometimes Rarely Never
4. Do you think there are any risks of being obese during a pregnancy?	Yes No Not sure
5. Which category best fits your own body weight?	Underweight Normal Overweight Obese Not sure
6. What is your height?	_____ft _____inches
7. What is your weight?	_____pounds
8. How would you describe your nutrition?	Excellent Good Fair Poor
9. During the past 7 days, on how many days were you physically active for a total of at least 60 minutes per day? Add up all the time you spent in any kind of physical activity that increased your heart rate and made you breathe hard some of the time.	_____number of days
10. Would you say your health in general is:	Excellent Very good Good Fair Poor
11. Are you satisfied with your body weight?	Yes No

APPENDIX B (continued)

PROVIDER SURVEY

13. Which best describes your role in providing prenatal care:	CNM Resident physician – FM Resident physician – OB/GYN Faculty – FM Faculty – OB/GYN If faculty OB/GYN subspecialty: _____
14. When (what year) did you complete your training? For residents – year of completion of medical school For fellows – year of completion of residency For faculty physicians – year of completion of residency or fellowship For CNM – year of completion of training	_____year
15. How many year have you been practicing at UIC?	_____yrs
16. What is your ethnicity?	Hispanic Non-Hispanic
17. What is your race?	
18. Are you:	Male Female
19. What is your age?	_____yrs

CITED LITERATURE

1. Flegal KM, Carroll MD, Kit BK, Ogden CL. Prevalence of obesity and trends in the distribution of body mass index among US adults, 1999-2010. JAMA : the journal of the American Medical Association 2012;307:491-7.

2. Wang Y, Beydoun MA. The obesity epidemic in the United States--gender, age, socioeconomic, racial/ethnic, and geographic characteristics: a systematic review and meta-regression analysis. Epidemiol Rev 2007;29:6-28.

3. Weiss JL, Malone FD, Emig D, et al. Obesity, obstetric complications and cesarean delivery rate--a population-based screening study. American journal of obstetrics and gynecology 2004;190:1091-7.

4. Chu SY, Kim SY, Lau J, et al. Maternal obesity and risk of stillbirth: a metaanalysis. American journal of obstetrics and gynecology 2007;197:223-8.

5. Stothard KJ, Tennant PWG, Bell R, Rankin J. Maternal overweight and obesity and the risk of congenital anomalies: a systematic review and meta-analysis. JAMA : the journal of the American Medical Association 2009;301:636-50.

6. Kominiarek MA, Vanveldhuisen P, Hibbard J, et al. The maternal body mass index: a strong association with delivery route. American journal of obstetrics and gynecology 2010;203:264 e1-7.

7. Gunatilake RP, Perlow JH. Obesity and pregnancy: clinical management of the obese gravida. American journal of obstetrics and gynecology 2011;204:106-19.

8. Myles TD, Gooch J, Santolaya J. Obesity as an independent risk factor for infectious morbidity in patients who undergo cesarean delivery. Obstetrics and gynecology 2002;100:959-64.

9. Blomberg M. Maternal obesity and risk of postpartum hemorrhage. Obstetrics and gynecology 2011;118:561-8.

10. Medicine Io. Weight gain during pregnancy: reexamining the guidelines. In; 2009; Washington, DC; 2009.

11. Moore Simas TA, Doyle Curiale DK, Hardy J, Jackson S, Zhang Y, Liao X. Efforts needed to provide Institute of Medicine-recommended guidelines for gestational weight gain. Obstetrics and gynecology 2010;115:777-83.

12. Bodnar LM, Siega-Riz AM, Simhan HN, Himes KP, Abrams B. Severe obesity, gestational weight gain, and adverse birth outcomes. Am J Clin Nutr 2010;91:1642-8.

13. Krukowski RA, Bursac Z, McGehee MA, West D. Exploring potential health disparities in excessive gestational weight gain. J Womens Health (Larchmt) 2013;22:494-500.

14. Oteng-Ntim E, Varma R, Croker H, Poston L, Doyle P. Lifestyle interventions for overweight and obese pregnant women to improve pregnancy outcome: systematic review and meta-analysis. BMC medicine 2012;10:47.

15. Dodd JM, Grivell RM, Crowther Ca, Robinson JS. Antenatal interventions for overweight or obese pregnant women: a systematic review of randomised trials. BJOG : an international journal of obstetrics and gynaecology 2010;117:1316-26.

16. Campbell F, Johnson M, Messina J, Guillaume L, Goyder E. Behavioural interventions for weight management in pregnancy: a systematic review of quantitative and qualitative data. BMC Public Health 2011;11:491.

17. Hui A, Back L, Ludwig S, et al. Lifestyle intervention on diet and exercise reduced excessive gestational weight gain in pregnant women under a randomised controlled trial. BJOG : an international journal of obstetrics and gynaecology 2012;119:70-7.

18. Wolff S, Legarth J, Vangsgaard K, Toubro S, Astrup A. A randomized trial of the effects of dietary counseling on gestational weight gain and glucose metabolism in obese pregnant women. Int J Obes 2008;32:495-501.

19. Jeffries K, Shub A, Walker SP, Hiscock R, Permezel M. Reducing excessive weight gain in pregnancy: a randomised controlled trial. Med J Aust 2009;191:429-33.

20. Callaway LK, Colditz PB, Byrne NM, et al. Prevention of gestational diabetes: feasibility issues for an exercise intervention in obese pregnant women. Diabetes care 2010;33:1457-9.

21. Guelinckx I, Devlieger R, Mullie P, Vansant G. Effect of lifestyle intervention on dietary habits, physical activity, and gestational weight gain in obese pregnant women: a randomized controlled trial. The American journal of clinical nutrition 2010;91:373-80.

22. Nascimento SL, Surita FG, Parpinelli MÂ, Siani S, Pinto e Silva JL. The effect of an antenatal physical exercise programme on maternal/perinatal outcomes and quality of life in overweight and obese pregnant women: a randomised clinical trial. BJOG : an international journal of obstetrics and gynaecology 2011;118:1455-63.

23. Bechtel-Blackwell DA. Computer-assisted self-interview and nutrition education in pregnant teens. Clin Nurs Res 2002;11:450-62.

24. Claesson I-M, Sydsjö G, Brynhildsen J, et al. Weight gain restriction for obese pregnant women: a case-control intervention study. BJOG : an international journal of obstetrics and gynaecology 2008;115:44-50.

25. Rising S. Centering Pregnancy: an interdisciplinary model of empowerment. J Nurs Midwifery 1998;43:46-54.

26. Wolfe W. A review: maximizing social support--a neglected strategy for improving weight management with African-American women. Ethn Dis 2004;14:212-8.

27. Tsai AG, Wadden TA. Systematic review: an evaluation of major commercial weight loss programs in the United States. Ann Intern Med 2005;142:56-66.

28. Campbell F, Johnson M, Messina J, Guillaume L, Goyder E. Behavioural interventions for weight management in pregnancy: a systematic review of quantitative and qualitative data. BMC Public Health 2011;11:491.

29. 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.

30. Power ML, Cogswell ME, Schulkin J. Obesity prevention and treatment practices of U.S. obstetrician-gynecologists. Obstetrics and gynecology 2006;108:961-8.

31. Kushner RF, Roth JL. Assessment of the obese patient. Endocrinology and metabolism clinics of North America 2003;32:915-33.

32. Gudzune KA, Beach MC, Roter DL, Cooper LA. Physicians build less rapport with obese patients. Obesity (Silver Spring) 2013.

33. Stotland N, Tsoh JY, Gerbert B. Prenatal weight gain: who is counseled? J Womens Health (Larchmt) 2012;21:695-701.

34. Herring SJ, Platek DN, Elliott P, Riley LE, Stuebe AM, Oken E. Addressing obesity in pregnancy: what do obstetric providers recommend? J Womens Health (Larchmt) 2010;19:65-70.

35. Knight BA, Wyatt K. Barriers encountered when recruiting obese pregnant women to a dietary intervention. Nursing times 2010 Aug 17-23:20-2.

36. Perrin EM, Flower KB, Garrett J, Ammerman AS. Preventing and treating obesity: pediatricians' self-efficacy, barriers, resources, and advocacy. Ambulatory pediatrics : the official journal of the Ambulatory Pediatric Association 2005;5:150-6.

37. Yancey AK, Sallis RE, Bastani R. Changing physical activity participation for the medical profession. JAMA : the journal of the American Medical Association 2013;309:141-2.

38. Phelan S, Phipps MG, Abrams B, Darroch F, Schaffner A, Wing RR. Practitioner advice and gestational weight gain. J Womens Health (Larchmt) 2011;20:585-91.

39. Stengel MR, Kraschnewski JL, Hwang SW, Kjerulff KH, Chuang CH. "What my doctor didn't tell me": examining health care provider advice to overweight and obese pregnant women on gestational weight gain and physical activity. Women's health issues : official publication of the Jacobs Institute of Women's Health 2012;22:e535-40.

40. Roberts A, Ashley G. What are the characteristics of overweight and obese patients who achieve weight loss and what factors are most helpful? A quantitative and qualitative study of patients and interventions in a rural general practice. Journal of Human Nutrition and Dietetics 1999;12:20-7.

41. Halcomb EJ, Gholizadeh L, DiGiacomo M, Phillips J, Davidson PM. Literature review: considerations in undertaking focus group research with culturally and linguistically diverse groups. Journal of clinical nursing 2007;16:1000-11.

42. Murdaugh C, Russell RB, Sowell R. Using focus groups to develop a culturally sensitive videotape intervention for HIV-positive women. Journal of advanced nursing 2000;32:1507-13.

43. Krueger RC, Mary Anne. Focus Groups: A Practical Guide for Applied Research. 4th ed: SAGE Publications, Inc; 2008.

44. Clarke A. Focus group interviews in health-care research. Prof Nurse 1999;14:395-7.

45. Patton MQ. Qualitative research & evaluation methods. 3rd ed: Thousand Oaks: Sage Publications; 2002.

46. Janz NK, Becker MH. The Health Belief Model: a decade later. Health education quarterly 1984;11:1-47.

47. Carey JW, Morgan M, Oxtoby M. Inter-coder agreement in analysis of responses to open-ended interview questions: Examples from tuberculosis research. Cultural Anthropology Methods 1996;8:1-5.

48. Corbin J SA. Basics of Qualitative Research:Techniques and Procedures for Developing Grounded Theory 3rd ed: SAGE Publications, Inc; 2007.

49. Miles MB, Huberman AM. Qualitative Data Analysis: An Expanded Sourcebook. 2nd ed: SAGE Publications, Inc; 1994.

50. Kielhofner G. Research in Occupational Therapy: Methods of Inquiry for Enhancing Practice: F.A. Davis Company; 2006.

51. Agne AA, Daubert R, Munoz ML, Scarinci I, Cherrington AL. The cultural context of obesity: exploring perceptions of obesity and weight loss among Latina immigrants. Journal of immigrant and minority health / Center for Minority Public Health 2012;14:1063-70.

52. Young DR, Gittelsohn J, Charleston J, Felix-Aaron K, Appel LJ. Motivations for exercise and weight loss among African-American women: focus group results and their contribution towards program development. Ethn Health 2001;6:227-45.

53. Krans EE, Chang JC. Low-income African American women's beliefs regarding exercise during pregnancy. Maternal and child health journal 2012;16:1180-7.

54. Orr ST, James SA, Garry J, Prince CB, Newton ER. Exercise and pregnancy outcome among urban, low-income, black women. Ethnicity & disease 2006;16:933-7.

55. ACOG Committee opinion. Number 267, January 2002: exercise during pregnancy and the postpartum period. Obstetrics and gynecology 2002;99:171-3.

56. Herring SJ, Henry TQ, Klotz AA, Foster GD, Whitaker RC. Perceptions of low-income African-American mothers about excessive gestational weight gain. Maternal and child health journal 2012;16:1837-43.

57. Brown A, Avery A. Healthy weight management during pregnancy: what advice and information is being provided. Journal of human nutrition and dietetics : the official journal of the British Dietetic Association 2012;25:378-87.

58. Oken E, Switkowski K, Price S, et al. A Qualitative Study of Gestational Weight Gain Counseling and Tracking. Maternal and child health journal 2012.

59. Smith DM, Cooke A, Lavender T. Maternal obesity is the new challenge; a qualitative study of health professionals' views towards suitable care for pregnant women with a Body Mass Index (BMI) >/= 30 kg/m(2). BMC pregnancy and childbirth 2012;12:157.

60. McKee MD, Maher S, Deen D, Blank AE. Counseling to prevent obesity among preschool children: acceptability of a pilot urban primary care intervention. Annals of family medicine 2010;8:249-55.

61. Ferrari RM, Siega-Riz AM, Evenson KR, Moos MK, Carrier KS. A qualitative study of women's perceptions of provider advice about diet and physical activity during pregnancy. Patient education and counseling 2013;91:372-7.

62. Sui Z, Turnbull DA, Dodd JM. Overweight and Obese Women's Perceptions About Making Healthy Change During Pregnancy: A Mixed Method Study. Maternal and child health journal 2012.

63. Shieh C, Weaver MT. Comparisons in perceived importance of and needs for maternal gestational weight information between african american and caucasian pregnant women. The Journal of perinatal education 2011;20:100-7.

64. Mills A, Schmied VA, Dahlen HG. 'Get alongside us', women's experiences of being overweight and pregnant in Sydney, Australia. Maternal & child nutrition 2013;9:309-21.

65. Johnson M, Campbell F, Messina J, Preston L, Buckley Woods H, Goyder E. Weight management during pregnancy: A systematic review of qualitative evidence. Midwifery 2013.

66. Heslehurst N, Moore H, Rankin J, Ells LJ, Wilkinson JR, Summberbell CD. How can maternity services be developed to effectively address maternal obesity? A qualitative study. Midwifery 2011;27:e170-7.

67. Gittelsohn J, Evans M, Helitzer D, et al. Formative research in a school-based obesity prevention program for Native American school children (Pathways). Health education research 1998;13:251-65.

68. Fitzgibbon ML, Tussing-Humphreys LM, Porter JS, Martin IK, Odoms-Young A, Sharp LK. Weight loss and African-American women: a systematic review of the behavioural weight loss intervention literature. Obesity reviews : an official journal of the International Association for the Study of Obesity 2012;13:193-213.

69. Novick G. CenteringPregnancy and the current state of prenatal care. J Midwifery Womens Health 2004;49:405-11.

70. Novick G, Reid AE, Lewis J, Kershaw TS, Rising SS, Ickovics JR. Group prenatal care: model fidelity and outcomes. American journal of obstetrics and gynecology 2013;209:112 e1-6.

71. Phelan S, Phipps MG, Abrams B, Darroch F, Schaffner A, Wing RR. Randomized trial of a behavioral intervention to prevent excessive gestational weight gain: the Fit for Delivery Study. Am J Clin Nutr 2011;93:772-9.

72. Thornton YS, Smarkola C, Kopacz SM, Ishoof SB. Perinatal outcomes in nutritionally monitored obese pregnant women: a randomized clinical trial. J Natl Med Assoc 2009;101:569-77.

73. Bravata DM, Smith-Spangler C, Sundaram V, et al. Using pedometers to increase physical activity and improve health - A systematic review. Jama-J Am Med Assoc 2007;298:2296-304.

74. Clarke KK, Freeland-Graves J, Klohe-Lehman DM, Milani TJ, Nuss HJ, Laffrey S. Promotion of physical activity in low-income mothers using pedometers. Journal of the American Dietetic Association 2007;107:962-7.

75. Decocker K, De Bourdeaudhuji I, Brown W, et al. Moderators and mediators of pedometer use and step count in the "10,000 Steps Ghent" intervention. Int J Behav Nutr Phys Act 2009;6:1-7.

76. Gynecologists ACoOa. Motivational interviewing: a tool for behavior change. Committee opinion no. 423. In; 2009; 2009.

77. Tailor A, Ogden J. Avoiding the term 'obesity': an experimental study of the impact of doctors' language on patients' beliefs. Patient education and counseling 2009;76:260-4.

78. Volger S, Vetter ML, Dougherty M, et al. Patients' preferred terms for describing their excess weight: discussing obesity in clinical practice. Obesity (Silver Spring, Md) 2012;20:147-50.

79. Wadden Ta, Didie E. What's in a name? Patients' preferred terms for describing obesity. Obesity research 2003;11:1140-6.

80. Olson CM, Strawderman MS, Reed RG. Efficacy of an intervention to prevent excessive gestational weight gain. American journal of obstetrics and gynecology 2004;191:530-6.

81. Miller WR, Rollnich S. Motivational interviewing: preparing people for change. 2nd ed. New York: Guilford Press; 2002.

82. Cote-Arsenault D, Morrison-Beedy D. Practical advice for planning and conducting focus groups. Nursing research 1999;48:280-3.

VITA

NAME: **Michelle Ann Kominiarek**

EDUCATION:

B.A. Chemistry and Biology, Cum Laude
Illinois Wesleyan University; Bloomington, Illinois, 1994

MD, Rush Medical College; Chicago, Illinois, 1999

M.S., Clinical and Translational Science Candidate
School of Public Health, University of Illinois at Chicago; Chicago, Illinois, 2013

TEACHING RESPONSIBILITIES:

3rd and 4th Year Medical Students rotating on Obstetrics and Gynecology Clerkship or Maternal-Fetal Medicine sub-internship
Clinical supervision and teaching during outpatient and inpatient services 8-10h/week One hour lecture on "Cesarean Deliveries" or "Electronic Fetal Monitoring" every 6 weeks
One hour instruction on "Suturing and Knot Tying" skills once per year, 2008-Present.

Obstetrics and Gynecology and Family Practice Residents
Clinical supervision and teaching during outpatient and inpatient services 8-10h/week One hour lecture on ultrasound, maternal-fetal medicine, or research topic twice per year Coordinator of monthly journal clubs, 2008-Present.

Maternal Fetal Medicine Fellows
Clinical supervision and teaching during outpatient and inpatient services 8-10h/week One hour lecture on ultrasound or maternal-fetal medicine topic twice per year, 2008-Present.

HONORS AND AWARDS:

Cum Laude, Illinois Wesleyan University, 1994
Excellence in Research Award, University of Illinois at Chicago, 2003
Outstanding Senior Resident Award, Department of Obstetrics and Gynecology, University of Illinois at Chicago, 2003
Senior Resident Teaching Award, Department of Obstetrics and Gynecology, University of Illinois at Chicago, 2003
Young Clinician Scholar Award, Central Association of Obstetricians and Gynecologists, 2003
American College of Obstetricians and Gynecologists/Kenneth Gottesfeld-Charles Hohler Memorial Foundation Research Award in Ultrasound, 2005
Honorable Mention Award, American Institute of Ultrasound in Medicine Poster Presentation, 2006
Faculty Scholarship Support Award, University of Illinois at Chicago, 2009

Faculty Scholarship Support Award, University of Illinois at Chicago, 2010
Best Doctors®, 2009-2010
Faculty Scholarship Support Award, University of Illinois at Chicago, 2010-2011
Best Doctors®, 2011-2012
Faculty Scholarship Support Award, University of Illinois at Chicago, 2011-2012
Faculty Scholarship Support Award, University of Illinois at Chicago, 2013
Research Mentoring Award, Department of Obstetrics and Gynecology, University of Illinois at Chicago, 2013
Best Doctors® in America, 2012-2013

COMMITTEES AND PROFESSIONAL ACTIVITIES

Participant, Resident Reporter Program, American College of Obstetricians and Gynecologists and Wyeth-Ayerst Pharmaceuticals, 2001.

Participant, Pfizer Obstetrics and Gynecology Residency Scholarship Program, American College of Obstetricians and Gynecologists and Pharmedica Communications, 2002.

Participant, Annual NICHD Aspen Conference on Maternal-Fetal-Neonatal and Reproductive Medicine, 2004.

Participant, Annual Perinatal and Developmental Medicine Symposium, Mead-Johnson Nutritionals, 2005.

Instructor, "Ultrasound: A look at the basics." American College of Obstetricians and Gynecologists Annual Meeting Hands-on Postgraduate Course, 2005-2007.

Member, "Kate Cares" stillbirth review program for Indiana University/Clarian Health, 2006-2008.

Instructor, Illinois Department of Public Health Postpartum Hemorrhage Project, 2008-2010.

Poster Judge, Society for Maternal Fetal Medicine Annual Meeting, 2008-2010.

Course and exam developer, Credentialing of all clinical staff at University of Illinois at Chicago in Fetal Heart Rate Monitoring, 2008-Present.

Member, Education Committee of the Society of Maternal-Fetal Medicine, 2012-Present.

Director, Resident Research Program at the University of Illinois at Chicago, Department of Obstetrics and Gynecology, 2012-Present.

Reviewer, Department of Obstetrics and Gynecology Seed Grants at the University of Illinois at Chicago, 2012-Present.

Council member, "text4baby" on behalf of the Society of Maternal-Fetal Medicine, 2012-Present.

Member, Education Committee at the University of Illinois at Chicago, Department of Obstetrics and Gynecology, 2012-2013.

Participant, American Association of Medical Colleges Mid-Career Women Faculty Professional Development Seminar, Dec 2012.

Member, Programming Committee at the University of Illinois at Chicago, Department of Obstetrics and Gynecology, 2013-2014.

PROFESSIONAL SOCIETY MEMBERSHIPS

American Medical Women's Association, 1995-1999
Fellow, American College of Obstetricians and Gynecologists, 1999-Present
Associate Member, Society of Maternal-Fetal Medicine, 2003-Present
American Institute of Ultrasound in Medicine, 2004-Present
Illinois State Medical Society, 2008-Present.
Central Association for Obstetricians and Gynecologists, 2013-Present

PUBLICATIONS

Original Peer-Reviewed Research

Zaki M, Hibbard J, **Kominiarek MA**. *Contemporary Labor Patterns and Maternal Age*. Obstet Gynecol 2013;122:1-8.

Kominiarek MA, Rankin K, Rosenberg D, Handler A. *Provider adherence to recommended prenatal care content: does it differ in obese women?* Matern Child Health J. 2013: In Press.

Haberman S, Saraf S, Zhang J, Landy HJ, Branch DW, Burkman R, Gregory KD, Ramirez MM, Bailit JL, Gonzalez-Quintero VH, Hibbard JU, Hoffman MK, **Kominiarek** MA, Lu L, VanVeldhuisen P, VonGruenigen V. *Non clinical parameters affecting primary cesarean rates in the United States.* Am J Perinatol. 2013:In Press.

Kominiarek MA, Seligman N, Dolan C, Gao W, Berghella V, Hoffman M, Hibbard J. *Gestational weight gain and obesity: Is 20 pounds too much?* Am J Obstet Gynecol. 2013;209: 214.e1-214.e11.

Kominiarek MA, Zhang J, VanVeldhuisen P, Troendle J, Beaver J, Hibbard JU. *Contemporary labor patterns: The impact of maternal body mass index*. Am J Obstet Gynecol. 2011;205:244.e1-244.e8.

Zhang J, Branch W, Ramirez M, Laughon K, Reddy U, Hoffman M, Bailit J, **Kominiarek** MA, Chen Z, Hibbard J. *Oxytocin regimen for labor augmentation, labor progression and perinatal outcomes*. Obstet Gynecol. 2011;118:249-256. PMCID:PMC3212654

Hoffman MK, Bailit JL, Branch DW, Burkman RT, VanVeldhuisen P, Lu L, **Kominiarek** MA, Hibbard JU, Landy HJ, Haberman S, Wilkins I, Gonzalez Quintero VH, Gregory KD, Hatjis CG, Ramirez MM, Reddy UM,

Troendle J, Zhang J, for the Consortium of Safe Labor. *A comparison of obstetrical maneuvers for the acute management of shoulder dystocia.* Obstet Gynecol. 2011;117:1272-1278. PMCID: PMC3101300

Kominiarek MA, Zork N, Pierce S, Zollinger T. *Perinatal outcome in the liveborn infant with prenatally diagnosed omphalocele.* Am J Perinatol. 2011;28:627-633.

Shapiro N, **Kominiarek** MA, Nutescu EA, Chevalier AB, Hibbard JU. *Low molecular weight heparin in high-risk pregnancy: Dosing and monitoring approaches based on a single center observational study.* Pharmacotherapy. 2011;31:678–685.

Landy HJ, Laughon K, Bailit J, **Kominiarek** MA, Gonzalez-Quintero VH, Ramirez M, Haberman S, Hibbard JU, Wilkins I, Branch W, Burkman R, Gregory K, Hoffman MK, Learman LA, Hatjis C, VanVeldhuisen P, Reddy UM, Troendle J, Sun L, Zhang J, for the Consortium on Safe Labor. *Characteristics associated with severe perineal and cervical lacerations during vaginal delivery.* Obstet Gynecol. 2011;117:627-635.

Zhang J, Landy HJ, Branch DW, Burkman R, Haberman S, Gregory KD, Hatjis CG, Ramirez MM, Bailit JL, Gonzalez-Quintero VH, Hibbard JU, Hoffman MK, **Kominiarek** MA, Learman LA, Van Veldhuisen P, Troendle J, Reddy UM, for the Consortium on Safe Labor. *Contemporary patterns of spontaneous labor with normal neonatal outcomes.* Obstet Gynecol. 2010;116:1281-1287.

Zhang J, Troendle J, Reddy U, Laughon SK, Branch DW, Burkman R, Landy HJ, Hibbard JU, Haberman S, Ramirez MM, Bailit JL, Hoffman MK, Gregory KD, Gonzalez-Quintero VH, **Kominiarek** MA, Learman LA, Hatjis CG, Van Veldhuisen P for the Consortium on Safe Labor. *Contemporary cesarean delivery practice in the United States*. Am J Obstet Gynecol. 2010:203:326.e1-326.e10.

Hibbard JU, Wilkins I, Sun L, Gregory K, Haberman S, Hoffman M, **Kominiarek** MA, Reddy U, Bailit J, Branch DW, Burkman R, Gonzalez Quintero VH, Hatjis CG, Landy H, Ramirez M, VanVeldhuisen P, Troendle J, Zhang J for the Consortium on Safe Labor. *Respiratory morbidity in late preterm births*. JAMA. 2010;304:419-425.

Kominiarek MA, VanVeldhuisen P, Hibbard J, Landy H, Haberman S, Learman L, Wilkins I, Bailit J, Branch W, Burkman R, Gonzalez-Quintero VH, Gregory K, Hatjis C, Hoffman M, Ramirez M, Reddy UM, Troendle J, Zhang J for the NICHD Consortium on Safe Labor. *The maternal body mass index: a strong association with delivery route*. Am J Obstet Gynecol. 2010:203:264.e1-7. PMCID:PMC2933947

Kominiarek MA Vonderheid S, Endres LK. *Maternal Obesity: Do patients understand the risks?* J Perinatol. 2010;30:452-458.

Bailit JL, Gregory KD, Reddy UM, Gonzalez-Quintero VH, Hibbard JU, Ramirez MM, Branch DW, Burkman R, Haberman S, Hatjis CG, Hoffman MK, **Kominiarek** MA, Landy HJ, Learman LA, Troendle J, Van Veldhuisen P, Wilkins I, Sun L, Zhang J for the NICHD Consortium on Safe Labor. *Neonatal outcomes by labor onset type and gestational age.* Am J Obstet Gynecol. 2010;202:245.e1-245.e12.

Contreras KR, **Kominiarek** MA. *The impact of tobacco smoking on perinatal outcome among patients with gestational diabetes*. J Perinatol. 2010;30:319-323.

Contreras KR, Rothenberg JM, **Kominiarek** MA, Raff JR. *Hand-assisted laparoscopic management of a midtrimester rudimentary horn pregnancy with placenta increta: a case report and literature review*. J Minim Invasive Gynecol. 2008;15:644-648.

Geller SE, Goldstein MA, **Kominiarek** MA, Hibbard JU, Endres L, Cox SM, and Kilpatrick SJ. *Reliability of a preventability model in maternal death and morbidity.* Am J Obstet Gynecol. 2007;196:57-58.

Kominiarek MA, Angelopoulos S, Studee L, Shapiro N, Nutescu E and Hibbard JU. *Low molecular weight heparins in pregnancy: Peripartum bleeding complications.* J Perinatol. 2007;27:329-334.

Kominiarek MA, Diller R, Nordstrom S, Kilpatrick SJ. *Heterotopic pregnancy: incidental finding at term cesarean delivery.* J Matern Fetal Neonatl Med. 2006;19:749-751.

Kominiarek MA, Kemp A. *Perinatal outcome in preterm premature rupture of membranes at ≤ 32 weeks gestation with retained cerclage.* J Reprod Med. 2006;51:533-538.

Chapters

Kominiarek MA**.** *Pregnancy and Lactation*. In: Nutrition and Bariatric Surgery. 1st Ed. 2013. Eds. Kushner R, Still C. Taylor and Francis/CRC Series in Modern Nutrition Science. In Press.

Kominiarek MA. *Intrauterine Growth Restriction*. In: Diagnostic Medical Sonography: Obstetrics and Gynecology. 3rd Ed. 2012. Lippincott Williams & Wilkins. Baltimore, MD.

Kominiarek MA. *Preparing for a Pregnancy after Bariatric Surgery*. In: A Textbook of Preconceptional Medicine and Management. 1st Ed. 2012. Eds. Karoshi M, Newbold S, B-Lynch C, Keith L. Sapiens Publishing, Ltd. Carlisle, UK.

Kominiarek MA, Hollinger EF. *Surgical Complications in Pregnancy*. In: Rush University Medical Center Review of Surgery, 5th Ed. 2011. Eds. Velasco J, Bines S, Deziel D, Millikan K, McCarthy, Prinz R, Saclarides T. Saunders/Elsevier Publishing. Philadelphia, PA.

Peer Reviewed Review Articles

Kominiarek MA. *Preparing for and managing a pregnancy after bariatric surgery*. Sem Perinatol. 2011; 35:356-361.

Kominiarek MA. *Pregnancy after bariatric surgery*. Obstet Gynecol Clin N Am. 2010;37:305-320.

Kominiarek MA. *Bariatric surgery and pregnancy.* Practice Bulletin #105. American College of Obstetricians and Gynecologists. June 2009.

Kominiarek MA. *Late preterm births: Indications and recommendations for obstetrical care*. Neo Rev. 2009;10:295-302.

Kominiarek MA. *Postpartum hemorrhage*. Hospital Physician Obstetrics and Gynecology Board Review Manual. 2008;11:1-12.

Kominiarek MA. *Discussing the risks of obesity in pregnancy with your patients: Recommendations for the Obstetrician-Gynecologist.* The Female Patient. 2008;33:1-5.

Kominiarek MA, Engle WA. *Late preterm infants, early term infants and timing of elective deliveries.* Clin Perinatol. 2008;35:325-341.

Kominiarek MA, Kilpatrick SJ. *Postpartum hemorrhage: A recurring pregnancy complication.* Sem Perinatol. 2007;31:159-166.

Kominiarek MA, Hibbard JU. *Postpartum ovarian vein thrombosis: An update.* Obstet Gynecol Survey. 2006;61:337-342.

Kominiarek MA, Kilpatrick SJ. *Surgical treatment for morbid obesity: Effects on the Ob/Gyn patient.* Contemporary Ob/Gyn. 2005;50:76-88.

Submitted Manuscripts

Zork N, Pierce S, Zollinger T, **Kominiarek MA**. Predicting fetal karyotype in fetuses with an omphalocele: the current role of ultrasound. ReSubmitted to J Neonatl Perinatl Med. September 2013.

ABSTRACT PRESENTATIONS

Poster

Lal A, Kominiarek MA. Gestational weight gain in twins: Are the Institute of Medicine guidelines optimal for pregnancy outcomes? Society for Maternal Fetal Medicine Annual Meeting. New Orleans, LA. February 2014.

Clark-Ganheart CA, Reddy UM, Kominiarek MA, Huang J, Landy HJ, Laughon SK. The optimal delivery route for obese women. Society for Maternal Fetal Medicine Annual Meeting. New Orleans, LA. February 2014.

Kominiarek MA, Cosey-Gay F, Peacock N. A need for culturally tailored group prenatal programs for obese minority women. Tenth Annual Interdisciplinary Women's Health Research Symposium, NIH and the 4th National Centering Conference. Bethesda, MD; October 24, 2013 and Washington, D.C. October 26-29.

Kominiarek MA, Gambala CT, Varady K, Gao W. *Adipokinins in pregnancies at risk for preterm delivery.* Society for Gynecologic Investigation Annual Meeting. Orlando, FL; March 2013.

Kominiarek MA, Gambala CT, Varady K, Gao W. *Leptin levels, body mass index, and gestational age at delivery: A prospective case-control study*. Society for Gynecologic Investigation Annual Meeting. Orlando, FL; March 2013.

Wenckus D, **Kominiarek** MA. *Misoprostol for labor induction in pregnancies with oligohydramnios: What's the risk?* Society for Gynecologic Investigation Annual Meeting. Orlando, FL; March 2013.

Zaki M, Truong M, **Kominiarek MA**, Irwin T. *Wound complications in obese women after cesarean: a comparison of staples versus subcuticular suture.* Society for Maternal Fetal Medicine Annual Meeting. San Francisco, CA; February 2013.

Cordova Y, Hibbard JU, **Kominiarek MA.** *What is the influence of body mass index on the first vaginal birth after cesarean delivery?* Society for Maternal Fetal Medicine Annual Meeting. San Francisco, CA; February 2013.

Kominiarek MA, Vonderheid S. *Health behaviors in low-income minority pregnant women*. Ninth Annual Interdisciplinary Women's Health Research Symposium, NIH. Bethesda, MD; November 14, 2012.

Kominiarek MA, Rankin K, Rosenberg D, Handler A. *Provider adherence to recommended prenatal care content: does it differ in obese women?* Central Association of Obstetricians and Gynecologists Annual Meeting. Chicago, IL; October 2012.

Chico P, Chor J, **Kominiarek MA**, Ayloo S. *Inconsistent contraceptive care for women with bariatric surgery*. 2012 North American Forum on Family Planning. Denver, CO; October 2012.

Zaki M, **Kominiarek MA**, Hibbard J. *Contemporary labor patterns: Does maternal age matter?* Society for Gynecologic Investigation Annual Meeting. San Diego, CA; March 2012.

Wenckus D, **Kominiarek MA**, Hibbard J. *Maternal super-obesity: Intended mode of delivery and outcomes.* Society for Maternal Fetal Medicine Annual Meeting. Dallas, TX; February 2012.

Wenckus D, **Kominiarek MA**, Hibbard J. *Maternal super-obesity: Does gestational weight gain matter?* Society for Maternal Fetal Medicine Annual Meeting. Dallas, TX; February 2012.

Kominiarek MA, Gambala CT, Gao W, Loy G. *Delivery route in fetal growth restriction (FGR): Can we predict the cesarean for fetal distress?* Central Association of Obstetricians and Gynecologists Annual Meeting. Nassau, Bahamas; October 2011.

Gleason T, Shapiro N, **Kominiarek MA,** Nutescu E, Hibbard JU. *Use of low molecular weight heparin (LMWH) in pregnancy: a pharmacodynamic modeling study*. American College of Clinical Pharmacy Annual Meeting. Pittsburgh, PA; October 2011.

Kominiarek MA, VanVeldhuisen P, Gregory K, Fridman M, Hibbard JU. *Predicting delivery route in nulliparas with classification and regression tree analysis*. Society for Maternal Fetal Medicine Annual Meeting. San Francisco, CA; February 2011.

Kominiarek MA, Wenckus D, Hibbard JU, Wilkins I. *Labor characteristics in twin gestations: Are they different than singletons?* Society for Maternal Fetal Medicine Annual Meeting. San Francisco, CA; February 2011.

Gambala CT, **Kominiarek** MA, Gao W, Loy G. *In laboring gravidas, does the delivery mode affect neonatal outcomes for growth restricted fetuses?* Society for Maternal Fetal Medicine Annual Meeting. San Francisco, CA; February 2011.

Contreras KR, **Kominiarek** MA, Zollinger T. *Large for gestational age infants and the 3-hour oral glucose tolerance test values in gestational diabetes: Is there a relationship?* Society for Maternal Fetal Medicine Annual Meeting. San Francisco, CA; February 2011.

Hoffman M, for the NICHD Consortium on Safe labor. *Predictors of shoulder dystocia with and without neonatal injury using multivariable modeling*. Society for Maternal Fetal Medicine Annual Meeting. San Francisco, CA; February 2011.

Kominiarek MA**,** Hibbard JU, Wilkins I, Gao W, Berbaum M. *Should maternal body mass index impact delivery route?* Seventh Annual Interdisciplinary Women's Health Research Symposium, NIH. Bethesda, MD; November 8, 2010 and the University of Illinois College of Medicine Research Forum, Chicago, IL; November 12, 2010.

Kominiarek MA for the NICHD Consortium on Safe Labor. *The maternal body mass index (BMI): A strong predictor of the success of a vaginal delivery*. Society for Maternal Fetal Medicine Annual Meeting. Chicago, IL; February 4, 2010.

Bailit J for the NICHD Consortium on Safe Labor. *Maternal outcomes by labor onset type and gestational age.* Society for Maternal Fetal Medicine Annual Meeting. Chicago, IL; February 4, 2010.

Hibbard JU for the NICHD Consortium on Safe Labor. *Respiratory morbidity in the late preterm neonate*. Society for Maternal Fetal Medicine Annual Meeting. Chicago, IL; February 4, 2010.

Gonzalez-Quintero VH for the NICHD Consortium on Safe labor. *Labor patterns in women with a successful VBAC in the US.* Society for Maternal Fetal Medicine Annual Meeting. Chicago, IL; February 4, 2010.

Eller A for the NICHD Consortium on Safe Labor. *The impact of epidural timing on mode of delivery in nulliparous women at term*. Society for Maternal Fetal Medicine Annual Meeting. Chicago, IL; February 4, 2010.

Kominiarek MA, Zork-Modad N, Pierce SM. *Perinatal outcome with prenatally diagnosed isolated omphalocele*. Central Association of Obstetricians and Gynecologists Annual Meeting, Maui, HI; October 25, 2009.

Contreras KR, **Kominiarek** MA. *The impact of tobacco smoking on perinatal outcome among patients with gestational diabetes*. Society for Maternal Fetal Medicine Annual Meeting. San Diego, CA; January 31, 2008.

Al-Darei Morgan S, **Kominiarek** MA. *Prenatal diagnosis of a scalp mass*. 18th World Congress on Ultrasound in Obstetrics and Gynecology Annual Meeting. Chicago, IL; August 2008.

Kominiarek MA, Loy GL. *The Tei Index as a Measure of Cardiac Functional Reserve in Growth Restricted Fetuses.* Society for Maternal Fetal Medicine Annual Meeting. Dallas, TX; February 2, 2008.

Shapiro N, **Kominiarek** MA, Angelopoulos S, Chevalier A, Nutescu E, Hibbard JU. *Use of low molecular weight heparin during pregnancy: A retrospective analysis.* Central Association of Obstetricians and Gynecologists Annual Meeting. Las Vegas, NV; October 20, 2006.

Kominiarek MA, Angelopoulos S, Studee L, Shapiro N, Nutescu E, Hibbard JU. *Low molecular weight heparins in pregnancy: a case-control study.* American College of Obstetricians and Gynecologists Annual Meeting. Washington, D.C.; May 2006.

Kominiarek MA, Loy GL. *Massive cystic axillary lymphangioma in the fetus.* American Institute of Ultrasound in Medicine Annual Convention. Washington D.C.; March 2006. Honorable Mention Award.

Kominiarek MA, Kemp A. *Perinatal outcome in preterm premature rupture of membranes at ≤ 32 weeks gestation with retained cerclage.* Central Association of Obstetricians and Gynecologists Annual Meeting. LaJolla, CA; October 2003.

Submitted Abstracts

Scott E, Kominiarek MA. Provider adherence to ACOG guidelines for obesity in pregnancy: A comparison of CNM and Ob-Gyn's. Submitted to the American College of Obstetricians and Gynecologists Annual Meeting. Chicago, IL; May 2013.

Pham T, Rankin K**, Kominiarek** MA, , Handler A. Patterns of quitting smoking during pregnancy and subtypes of preterm birth. 141st American Public Health Association Annual Meeting, Boston MA; November 2-6, 2013.