A Qualitative Study of Factors Affecting Pregnancy Weight Gain in African American Women

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Abstract African Americans and overweight or obese women are at increased risk for excessive gestational weight gain (GWG) and postpartum weight retention. Interventions are needed to promote healthy GWG in this population; however, research on exercise and nutritional barriers during pregnancy in African American women is limited. The objective of this qualitative study is to better inform intervention messages by eliciting information on perceptions of appropriate weight gain, barriers to and enablers of exercise and healthy eating, and other influences on healthy weight gain during pregnancy in overweight or obese African American women. In-depth interviews were conducted with 33 overweight or obese African American women in Columbia, South Carolina. Women were recruited in early to mid-pregnancy (8–23 weeks gestation, $n = 10$), mid to late pregnancy (24–36 weeks, $n = 15$), and early postpartum (6–12 weeks postpartum, $n = 8$). Interview questions and data analysis were informed using a social ecological framework. Over 50 % of women thought they should gain weight in excess of the range recommended by the Institute of Medicine. Participants were motivated to exercise for personal health benefits; however they also cited many barriers to exercise, including safety concerns for the fetus. Awareness of the maternal and fetal benefits of healthy eating was high. Commonly cited barriers to healthy eating include cravings and availability of unhealthy foods. The majority of women were motivated to engage in healthy behaviors during pregnancy. However, the interviews also uncovered a

number of misconceptions and barriers that can serve as future intervention messages and strategies.

Keywords Pregnancy · Exercise · Healthy eating · Perceptions

Introduction

Overweight and obesity are major public health concerns. In the US, 68 % of adults are overweight (body mass index [BMI] 25–29.9 kg/m²) or obese (BMI ≥ 30 kg/m²) [1]. Pregnancy is a period where women are at higher risk for development of overweight or obesity due to postpartum weight retention [2]. One of the strongest predictors of postpartum weight retention and long-term obesity is excessive weight gain during pregnancy [3, 4]. Table 1 contains the Institute of Medicine (IOM) guidelines for gestational weight gain (GWG) [5]. Up to 50 % of US women gain weight above the range recommended by the IOM [6, 7]. Excessive GWG is also associated with an increased risk of overweight and obesity in the offspring [8].

African Americans and overweight or obese women are at increased risk of excessive GWG [9, 10] and postpartum weight retention [11–14]. Over 75 % of African American women of reproductive age are overweight or obese [1], increasing their already high risk for obesity-related adverse pregnancy outcomes and comorbidities [15–23]. African American women, particularly those who are financially disadvantaged, face unique barriers to physical activity and healthy eating. These barriers include unsafe environments that hinder walking [24–26], lack of physical activity opportunities [24, 26], food insecurity and limited accessibility to low cost healthy foods [27–30], and cultural beliefs regarding diet and physical activity [31, 32].

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Table 1 2009 Institute of Medicine recommendations for total and rate of weight gain during pregnancy, by pre-pregnancy BMI

Pre-pregnancy BMI ^a	BMI (kg/m ²)	Total weight gain range (lbs)	Rates of weight gain 2nd and 3rd Trimester (mean range lbs/week)
Underweight	<18.5	28–40	1 (1–1.3)
Normal weight	18.5–24.9	25–35	1 (0.8–1)
Overweight	25.0–29.9	15–25	0.6 (0.5–0.7)
Obese (includes all classes)	≥30.0	11–20	0.5 (0.4–0.6)

^a Recommendations for weight gain differ by pre-pregnancy BMI to increase the percentage of women who have appropriate for gestational age (2.5–4.0 kg) infants [5]

A useful model to conceptualize the complex barriers faced by this population is the social ecological model [33]. This theoretical framework considers multiple levels of influence that impact health behaviors and outcomes, including: (1) intrapersonal factors (psychological and biological), (2) interpersonal processes (social network and support systems), (3) organizational factors (social institutions), (4) community factors (relationships among organizations and networks), (5) and public policy (local, state, and national laws and policies). Ecological models have been applied to a variety of health behaviors, including physical activity and healthy eating [34–36].

Guidelines for prenatal care recommend regular physical activity and a balanced diet to decrease excessive GWG [5]. Healthy women should get at least 150 min of moderate-intensity aerobic activity per week during pregnancy [37]. Regular participation in moderate to vigorous physical activity has been associated with reduced risk for excessive GWG [38]. However, activity levels tend to decrease during pregnancy [39, 40]. Excess caloric consumption is also linked with overweight and obesity, and dietary intake increases during and after pregnancy [41–43]. Increasing physical activity and controlling dietary intake are two key factors in reducing the risk of excessive GWG.

Research on physical activity and nutritional barriers during pregnancy in African American women is limited. The objective of this study is to better inform intervention messages by eliciting information on perceptions of appropriate weight gain, barriers to and enablers of exercise and healthy eating, and other influences on healthy weight gain during pregnancy in overweight or obese African American women.

Methods

The *Healthy Weight in Pregnancy and Postpartum* (HIPPP) study was designed to develop and test the feasibility of an intervention for pregnant and postpartum women to prevent excessive GWG and assist with postpartum weight

loss. The project was conducted in two phases, beginning with in-depth interviews with pregnant or postpartum overweight or obese African American women (phase 1). Qualitative analysis of the interviews led to phase 2 of the research study, or development and implementation of an intervention. This paper presents findings from phase 1.

Study Participants

Palmetto Health and the University of South Carolina Institutional Review Boards approved all study protocols. Participants were recruited during their initial obstetric (OB) appointment, routine clinic visit, or 6 week postpartum checkup through an OB-GYN practice associated with Palmetto Health Richland Hospital or two private women's health centers. The inclusion criteria were: (1) 18–39 years old, (2) African American, (3) pre-pregnancy BMI of 25–40 kg/m², (4) able to speak and read English, (5) started prenatal care before 16 weeks gestation, (6) singleton pregnancy, and (7) not affected by any medical or physical conditions that prohibit exercise or regular physical activity. Women were recruited in early to mid-pregnancy (8–23 weeks gestation), mid to late pregnancy (24–36 weeks), and early postpartum (6–12 weeks postpartum). Medical records were used to determine pre-pregnancy BMI and gestational age at enrollment.

Data Collection

Semi-structured, in-depth interviews were conducted in 2010–2011. The social ecological model [33] guided the development of interview questions. Women were prompted to discuss topics at all levels of the social ecological model. The focus of the present paper is to examine perceptions of appropriate weight gain and barriers, risks, motivators, and enablers of exercise and healthy eating.

Interviews took place at the participant's prenatal clinic or home and lasted between 40 and 90 min. Informed consent was obtained prior to each interview. Participants also completed a demographic and background questionnaire. Physical activity was assessed through self-report.

Women were asked if they perform moderate or vigorous physical activities (MVPA) for at least 10 min at a time, and if so, how many days per week and total time per day do they spend in these activities [44]. Participants were categorized as sedentary (no MVPA in last month), underactive (some MVPA but <150 min/week), and meeting recommendations (≥ 150 min/week of MVPA) [37, 45]. Women were compensated \$20 for their participation. Thirty-three interviews were conducted with pregnant ($n = 25$) and postpartum ($n = 8$) women.

Data Analysis

Interviews were transcribed verbatim by a professional transcription service. Staff members verified transcripts against the audio recordings. Transcripts were examined for key, overarching themes and were coded to indicate gestational age so themes could be compared across pregnancy stages. Two investigators independently read and coded two transcripts and met to compare definitions and codes to determine if they had similar data interpretations (SW and MC). Using the method of “open coding,” [46] researchers reached consensus about each code’s definition and meaning, creating a composite code list. The code list was conceptually organized by the research team to reflect the social ecological model, forming the first codebook draft. The codebook was entered into QRS NVivo 8 for computer-assisted qualitative data management. To promote consistency, one researcher coded all manuscripts (KG). A second investigator experienced in qualitative analyses (SW) reviewed the work to ensure codes were correctly applied. The codebook was revised as additional data were collected. All prior transcripts were recoded to reflect these changes.

Themes

Themes are defined as seven or more women addressing a topic. Trimester is only noted when responses differed by this variable. Barriers, motivators/benefits, and strategies/enablers to exercise and healthy eating are reported reflective of the ecological model. Each level is presented in the results section only if a theme is present.

Results

All participants ($N = 33$) were African American and averaged 25.9 years of age. As shown in Table 2, 69.7 and 30.3 % of the participants were overweight and obese, respectively. Four women were in the first trimester, 10 in the second, 11 in the third, and 8 in the postpartum period. Over 50 % of women were not meeting physical activity

Table 2 Characteristics of women

Characteristic	n	Mean $\pm$ SD (range)
Pre-pregnancy BMI, kg/m ²	33	29.0 $\pm$ 3.6 (25.0–38.3)
Age at interview, years	33	25.9 $\pm$ 4.9 (18.3–39.3)
Characteristic	n	%
Pre-pregnancy BMI		
Overweight	23	69.7
Obese	10	30.3
Age at interview		
18–20	3	9.1
21–25	15	45.5
26–30	8	24.2
31–35	6	18.2
36–40	1	3.0
Gestational age at interview		
1st Trimester	4	12.1
2nd Trimester	10	30.3
3rd Trimester	11	33.3
Postpartum	8	24.2
Perceived health		
Excellent	7	21.2
Very good	14	42.4
Good	9	27.3
Fair	3	9.1
Poor	0	0
Physical activity level		
Meets recommendations	15	45.5
Underactive	10	30.3
Sedentary	8	24.2
Marital status		
Single	24	72.7
Married/member of unmarried couple	8	24.2
Divorced	1	3.0
Parity		
Nulliparous	12	36.4
1 Child	5	15.2
≥ 2 Children	16	48.5
Education		
≤ 12 years	20	60.6
>12 years	13	39.4
Employment status		
Full time	17	51.5
Part time	2	6.1
Self employed	1	3.0
Student	2	6.1
Out of work	8	24.2

recommendations. Most women were single (72.7 %), parous (48.5 %), had ≤ 12 years of education (60.6 %) and worked full time (51.5 %).

Table 3 Major themes (N = 33)

	Themes (≥ 7 participants)	n
<i>Exercise topics</i>		
Safe exercises	Walking	32
	Swimming	21
	Yoga	11
	Biking	10
Unsafe exercises	Running or jogging	18
	Lifting heavy objects	12
	Sit-ups or crunches	10
	Push-ups or pull-ups	8
Barriers to exercise	Fatigue	21
	Pain	20
	Nausea	18
	Laziness	15
Risks of exercise	Lack of childcare support	10
	Workplace	10
	Falling	13
	Premature labor	11
Motivators and benefits of exercise	Miscarriage	10
	Umbilical cord around baby's neck	7
	Limiting pregnancy weight gain	23
	Improves maternal health	20
Strategies and enablers of exercise	Easier labor	19
	Postpartum weight loss	17
	Support from family/friends	13
	Living in safe environment	19
<i>Nutrition topics</i>		
Barriers to healthy eating	Enjoyment	14
	Availability of parks	11
	Support from family	10
	Cravings	22
Risks of unhealthy eating	Availability of fast food	14
	Unhealthy food at the workplace	13
	Seeing others eat unhealthy foods	9
	Unhealthy baby	15
Motivators and benefits of healthy eating	Development of diabetes	9
	Development of heart disease	8
	Excessive gestational weight gain	7
	Healthy baby	28
Strategies and enablers to healthy eating	Weight control	15
	Improves maternal health	14
	Prevention of chronic diseases	12
	Support from family	8
	Substituting healthier options	12
	Planning ahead	11
	Availability of grocery stores	10
	Support from family	8

Perceptions of Appropriate Weight Gain During Pregnancy

Almost 70 % of participants (n = 22) provided incorrect estimates of appropriate GWG based on the ranges recommended by the IOM for their pre-pregnancy BMI, with 9 % reporting too little (n = 3), 54 % reporting too much (n = 18), and 1 not knowing how much weight to gain.

Safe and Unsafe Exercises

As shown in Table 3, 97 % of women thought that walking was the safest exercise during pregnancy (n = 32), and some said they were afraid to try other activities. For example, one participant said *"Only one exercise I think is probably safe for pregnancy is walking. That's about it, because like I said I was kind of scared to do other things or whatever, so I just mainly walk. I don't know nothing else that'll, you know, be safe"* (Age 27, Overweight). Women also listed swimming (n = 21), yoga (n = 11), and biking (n = 10) as safe, relaxing exercises that do not cause overexertion.

Many women believed running or jogging was an unsafe exercise (n = 18) because it would shake the baby. *"I really don't think running is that safe 'cause when you're running you're, you know, bouncing the baby and it's not really that good"* (Age 23, Overweight). Many women who cited running did not know why it was an unsafe exercise, but felt it was something they should not do when pregnant. Other unsafe exercises included lifting heavy objects (n = 12), sit-ups or crunches (n = 10), and push-ups or pull-ups (n = 8). Women discussed how these exercises overly strained the body, possibly inducing miscarriage. Women were more likely to cite lifting and sit-ups/crunches as unsafe in their first trimester.

Barriers to Exercise

The most commonly cited intrapersonal barrier to exercise was fatigue, especially in the 1st and 3rd trimesters (n = 21). Women discussed how they quickly became fatigued when physically active, losing motivation for exercise. Participants also mentioned different types of pain (n = 20), and nausea (n = 18) as barriers. Pain was more commonly discussed in the 3rd trimester, and included pain of the muscles, joints, stomach, head, and feet. Laziness was the top cited psychological intrapersonal barrier (n = 15). *"What else made it hard was I just got lazy when I first found out I was pregnant—just got so lazy, didn't wanna do nothing, and just wanted to sit around, and that's it"* (Age 21, Overweight). An interpersonal barrier to exercise was lack of childcare support (n = 10). Women discussed how they could not leave the house to

exercise because no one was available to watch the children. The workplace was commonly cited as an organizational barrier ($n = 10$). For example, one woman said that her job required her “to sit at a computer all day” (Age 27, *Overweight*).

Risks of Exercise

The most commonly cited risk of exercise was falling, particularly during the second trimester ($n = 13$). *You might—if you run or something, you might trip over something and fall on your stomach or just fall down and you can harm the baby* (Age 23, *Obese*). Other perceived risks included premature labor ($n = 11$), miscarriage ($n = 10$), or having the cord wrap around the baby’s neck ($n = 7$). *I was told you’re not supposed to reach your arms over your head and the cord will get wrapped around their neck or something. So I guess that’s what that is, real serious* (Age 21, *Overweight*).

Motivators and Benefits of Exercise

Women primarily cited intrapersonal motivators/benefits to exercise. Limiting GWG was commonly discussed ($n = 23$). Women also stated that exercise makes them healthier ($n = 20$), leads to an easier labor ($n = 19$), and contributes to postpartum weight loss ($n = 17$). *Yeah, it’s more of a mental thing, just thinking that it [exercise] will make your labor better, make it faster, probably not as much pain. Of course you’re going to have pain but not as much pain. Loosen up your muscles and everything like that, so it’s more of a mental thing than it is a physical thing* (Age 21, *Overweight*). An interpersonal motivator was support from family and friends ($n = 13$). Many women discussed how they were given verbal encouragement to exercise, while others had family and friends offer to walk with them.

Strategies and Enablers to Exercise

The most commonly cited intrapersonal enabler to exercise was enjoyment ($n = 14$). Family support was cited as an interpersonal enabler ($n = 10$). *My husband, he would always encourage me, you want to go outside, you want to walk?* (Age 23, *Overweight*). Top cited community level enablers were living in a safe neighborhood ($n = 19$) and the availability of parks ($n = 11$).

Barriers to Healthy Eating

Cravings were the top cited intrapersonal barrier to healthy eating ($n = 22$). *I’d say mostly the cravings, ‘cause when you crave stuff it’s like I’ve got to have that taste, so when I*

crave things, that’s what makes it hard for me to stay to the vegetables and the fruits and things. And sometimes I slip and go get the bag of chips and the stuff and eat them ‘cause I’m craving it (Age 18, *Obese*). Seeing others eat unhealthy foods was an interpersonal barrier ($n = 9$). Organizational barriers included unhealthy food at the workplace ($n = 13$). Some women talked about how working in a fast food restaurant made it harder to eat healthy. Others discussed holiday or birthday celebrations, where unhealthy foods were brought to the workplace. Availability of fast food restaurants was cited as a community barrier ($n = 14$).

Risks of Unhealthy Eating

Having an unhealthy baby was the top cited risk of unhealthy eating during pregnancy ($n = 15$). *I don’t think they [the baby] would develop as well as they would if you were eating healthy, trying to give them all the food groups* (Age 31, *Overweight*). Some women said unhealthy eating might cause the baby to be underweight, while others thought it would cause macrosomia. Other risks included development of maternal diabetes ($n = 9$), heart disease ($n = 8$), and excessive GWG ($n = 9$).

Motivators and Benefits of Healthy Eating

Better weight control was one intrapersonal motivator/benefit to healthy eating discussed by many women, especially in their 3rd trimester ($n = 15$). Improved maternal health ($n = 14$) and prevention of chronic diseases ($n = 12$) were commonly discussed. Eight-five percent of women cited having a healthy baby as a top motivator/benefit of healthy eating ($n = 28$). *So whatever I can do for him before and even after he gets here, I’m gonna do it. It’s more so for him, even than it is for me. And I know I have to take care of myself while he’s in me. I’m still gonna have to take care of myself while he’s outta me. You got to lead by example. So I can’t be over here eating on a big greasy corn dog and expect him to eat his little green leafy salad* (Age 27, *Overweight*). Family support, through encouragement of healthy eating, was an interpersonal motivator ($n = 8$).

Strategies and Enablers to Healthy Eating

Substituting healthier options ($n = 12$) and planning ahead ($n = 11$) were commonly cited intrapersonal strategies/enablers for healthy eating. *I try to eat at home before I go like places where I don’t really know how the food’s going to be. I try to either bring my own food, it depends, or try to eat something at home before I go to other places, so I won’t be tempted to eat the bad food for me or whatever*

(Age 18, Obese). Interpersonal factors included family support ($n = 8$). Women talked about family buying fruits and vegetables for the home, and helping with food preparation. A community enabler was the availability of grocery stores with healthy options ($n = 10$).

Discussion

Few studies have examined factors influencing GWG in African American women, a population at risk for overweight, obesity, and excessive GWG. Results from this study could help inform the development of future interventions in this population. It is notable that the majority of women we interviewed were motivated to engage in behaviors that would maximize the likelihood of a healthy pregnancy. Interventions that emphasize the benefits of exercise and healthy eating for a healthy pregnancy and baby are likely to resonate with this population. However, these interviews also uncovered a number of misconceptions and barriers that can serve as intervention targets. The remaining sections highlight our findings relative to suggested intervention strategies and messages.

Most often, women's perception of appropriate weight gain exceeded the range recommended by the IOM [5]. Lack of healthcare provider advice or advice that is inconsistent with recommendations has been consistently reported as a barrier to appropriate GWG [9, 47–51]. During pregnancy, most women have frequent interactions with their healthcare provider. These interactions may be an opportune time for providers to assist women in making positive lifestyle changes that affect GWG. It may be beneficial to work with providers to ensure that clear, consistent GWG recommendations are given.

The majority of women (54.5 %) were not meeting physical activity recommendations for pregnant women [37, 45]. This is likely an underestimate given self-report measures are prone to overreporting of physical activity [52]. Consistent with other findings, women noted their activity levels decreased with pregnancy [39, 40]. This was primarily due to intrapersonal factors such as fatigue, pain, and nausea. These barriers have been commonly cited in other studies that predominately examined Caucasian women [53–57].

Women feared that exercise may harm their fetus, which prevented them from engaging in certain activities. Many participants talked about how exercise could cause the umbilical cord to wrap about their baby's neck, a theme absent in the existing literature. This may be a cultural belief specific to this population. Interventions should seek to educate women on safe exercises and expel myths about unsafe exercises.

Participants also cited numerous factors that motivated them to exercise during pregnancy, including improvements in their health, easier labor, and postpartum weight loss. All outcomes were expressed in terms of their own health; women did not discuss the benefits of exercise for the fetus. Weir reported similar findings in a sample of overweight and obese women [54]. Returning to pre-pregnancy weight, and having an easier pregnancy and labor were the top cited benefits of exercise. None of the participants associated benefits with the fetus unless prompted, perhaps because they thought exercise may harm the fetus. Interventions should emphasize that exercise during a healthy pregnancy is safe and is associated with health benefits. For example, exercise throughout pregnancy may be protective against birth weight extremes [58], thereby increasing the probability of an appropriate for gestational age infant. Maternal exercise may also provide long-term health benefits in the child by triggering beneficial adaptations to environmental stressors [59–62].

The primary motivator and benefit of exercise during pregnancy was limiting weight gain. While studies generally show that African American women report less pressure to be thin [63], less dissatisfaction with their weight [64, 65], and greater acceptance of being overweight [66, 67], these findings are not universal [32] and African American women view health as an important reason to lose weight [68] and are aware of obesity-related health risks [69]. Thus, while our study participants may have felt comfortable with their weight from an aesthetics perspective, the experience of being pregnant may have led them to want to control their weight gain for their own health and the health of their fetus.

Women were motivated to eat a healthy diet during pregnancy for the health of the baby. Participants cited personal benefits, including better weight control, improved health, and prevention of chronic diseases. Although awareness of the benefits of healthy eating was high, women also cited many barriers, including cravings and the availability of unhealthy foods. Interventions should incorporate strategies to help women overcome barriers to healthy eating. Approaches used in other successful behavior change interventions include problem solving to overcome barriers, identifying and dealing with eating triggers, self-monitoring, goal setting, and increasing healthy eating opportunities [70–72].

Similar to other studies, intrapersonal factors were most commonly cited as barriers, motivators and enablers to exercise and healthy eating [53–55]. This study also identified the importance of family support as a motivator and enabler for both exercise and healthy eating. Similarly, Thornton found that husbands and female relatives were important sources of support for weight, diet, and exercise beliefs and behaviors among pregnant Latino women [73].

As is true in evidence-based behavioral programs in general, interventions during pregnancy should help women identify the type of support they need, who can provide it, and how they can effectively solicit it [70, 74].

A major strength of this study lies in its qualitative approach, which allowed women to fully express their thoughts and experiences. This study was also stratified by trimester of pregnancy, which allowed us to explore differences in findings based upon phase of pregnancy. Existing research has been predominately limited to highly educated Caucasian women [53, 54, 56, 57]. This study helps fill a gap in the existing literature by targeting a high risk, financially disadvantaged population.

Several study limitations are noted. All women were recruited from three clinics in Columbia, SC that predominately serve low-income women. These findings may not be generalizable to other settings, women of higher socioeconomic status, or to those of other ethnicities. However, the interviews were conducted to guide the development of an intervention for financially disadvantaged African American women. The relatively small sample size ($N = 33$) may limit the reliability of the results, however, saturation of barriers and motivators was quickly reached (i.e., no new themes emerged). Other qualitative studies of pregnant women have been of comparable size [53, 54, 73].

Conclusions

A healthy lifestyle during pregnancy may help control weight gain and improve pregnancy outcomes. This study uncovered a number of meaningful barriers and motivators for exercise and healthy eating that can help guide clinical practice and subsequent intervention messages and strategies. We found that women lacked knowledge regarding healthy GWG recommendations. Women were motivated to exercise for personal health benefits but fear exercise may harm the fetus. Awareness of the benefits of healthy eating was high, however women also cited many barriers.

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