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Knowledge, behaviors, and social factors that influence pregnancy weight gain among youth ages 16–24 years

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Abstract

Study Objective: The vast majority (50–75%) of youth (≥ 21 years old) who become pregnant gain more weight during pregnancy than is recommended by the National Academy of Medicine. Excess weight gain during pregnancy is a strong risk factor for long term obesity among mothers and their infants. There is a significant gap in our understanding of youth's knowledge and behavior related to weight gain during pregnancy. In order to develop effective interventions for pregnant youth, it is necessary to understand their distinct needs and preferences. Using a youth-centered qualitative approach, the purpose of this study was to explore the knowledge, behaviors, and social factors that influence weight gain during pregnancy for youth.

Design: Participants completed weekly text message surveys and semi-structured interviews to explore their perspectives of weight gain during pregnancy. Data were analyzed using qualitative thematic analysis based on grounded theory.

Participants: Pregnant youth ages 16–24 years old.

Results: Among our sample (n=54) four themes emerged. First, many youths were knowledgeable about healthy behaviors in pregnancy. However, the second theme showed that

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Conflict of Interest

Leigh Morrison has no potential, perceived, or real conflicts of interest to report.

Melissa DeJonckheere has no potential, perceived, or real conflicts of interest to report.

Lauren Nichols has no potential, perceived, or real conflicts of interest to report.

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many youths reported barriers to engaging in these healthy behaviors, including stress, poor motivation, and issues of convenience. Third, they demonstrated inadequate knowledge about exercise in pregnancy, and fourth, many endorsed food cravings that significantly influenced diet choices.

Conclusion: Many pregnant youths have appropriate knowledge about healthy behaviors during pregnancy, but face many youth-specific barriers to achieving these behaviors. Interventions should address logistical challenges (e.g. food access, cost, transportation) to healthy behaviors in pregnancy to make healthy diet and exercise more convenient for pregnant youth.

Keywords

Pregnancy; pregnant; pregnant youth; teen; teenager; adolescent; young adult; healthy behaviors; barriers; text messaging; diet; exercise; weight gain; pregnancy weight gain; gestational weight gain; qualitative

Introduction

The vast majority (50–75%) of youth (< 21 years old) who become pregnant gain more weight during pregnancy than is recommended by the National Academy of Medicine (NAM).^{1–4} Excess weight gain during pregnancy is also disproportionately experienced by low-income and racial/ethnic minority youth.^{1,2,5,6} This is a serious concern for health care providers, as excess weight gain during pregnancy increases the risk of complications for the mother and her baby. Antenatal complications include large for gestational age infants, preeclampsia, gestational diabetes,^{1,7} fetal distress, operative delivery, and stillbirth. Following delivery, excessive gestational weight gain increases the likelihood of long-term obesity for both mother and child.^{2,7–12}

Despite knowledge of the risks of excess pregnancy weight gain, little progress has been made to address disparities and promote healthy gestational weight gain for pregnant youth.¹³ While healthy lifestyle interventions have demonstrated success among adults,^{14–18} few address the specific needs faced by youth. Research is needed to understand the experiences of pregnant youth, specifically the knowledge, behaviors, and social factors that influence weight gain among pregnant youth, in order to identify the barriers this population faces to being healthy during pregnancy in order to create innovative and effective solutions.¹⁹

Given adolescents' ongoing physical and emotional development, interventions designed for adults may not be appropriate or effective when applied to a youth population. In this digital age, many adolescent social interactions take place within virtual environments. Hence, interventions to address youth behavior, in part, should leverage and be designed for these social environments. Text messaging is able to capture real-time thoughts and feelings from youth, who often have difficulty verbalizing their beliefs due to their ongoing neurobiological, social, and emotional development and limited health literacy.^{20–22} Semi-structured interviews help to provide context and details to the youth experience, complementing the real-time data gathered through text messaging surveys. The objective of this study is to use text messaging and semi-structured interviews to better understand the knowledge, behaviors, and social factors that influence weight gain among pregnant youth.

Materials and Methods

The Healthy Pregnancy Project is a mixed methods study comprised of text message surveys and semi-structured interviews. Participants were recruited from two urban, low-income, primary care clinics in Southeast Michigan. Together, these clinics serve over 70% of the pregnant youth in the county. Eligibility criteria included youth with singleton pregnancies, ages 14–24, with access to a cell phone with texting capabilities, and the ability to speak and read English. Clinic schedules were reviewed daily by study staff to identify participants who met the inclusion criteria and were recruited before or after prenatal appointments to reduce the burden of additional appointments. All participants provided written consent or assent, with the addition of verbal consent from the parents or guardians of participants under the age of 18 years. Participants were informed of the study name, Health Pregnancy Project, and of the purpose to learn about the knowledge, beliefs, and social factors that affect weight gain during pregnancy.²³ Monetary incentives were provided for completing each component of the study, for a total of up to \$30 dollars. The University of Michigan Medical School Institutional Review Board approved this study (HUM00104989). A full description of the methodology used in the Healthy Pregnancy Project is described elsewhere, and summarized below.²³

Youth-friendly text message surveys were sent through an automated secure texting platform (Qualtrics SMS or [Textizen.com](https://www.textizen.com)) to participants once weekly starting on or after 20 weeks gestational age, to correspond with the time in pregnancy when many women gain the most weight.²⁴ The text messages were intended to learn about participants' experiences. Eight weeks of survey questions were designed to be conversational in nature, probing youth for their knowledge and perceptions of weight gain in pregnancy using questions about diet, exercise, body image, healthy habits, and unhealthy behaviors in pregnancy (see Appendix Table 1 for text message survey items). If participants did not respond, or phone numbers changed, surveys were resent once.

In-person semi-structured interviews were conducted during the participant's third trimester, with the exception of one participant who was interviewed postpartum. Interviews were conducted at each participant's prenatal clinic site, following a prenatal visit. A standard interview guide was used and included several domains related to beliefs and behaviors during pregnancy: knowledge about healthy eating, perceptions of weight gain, obstacles to healthy eating and exercise, and behaviors related to healthy eating, food access and preparation, and exercise (see Appendix Table 2 for interview guide). Trained research staff conducted the interviews.

The responses from the text message surveys and semi-structured interviews were analyzed using an inductive, thematic analysis, adapted from a grounded theory approach.²⁵ All questions were open-ended and inductive in nature, focusing on general topics related to weight gain in pregnancy with the goal of exploring the insights of pregnant youth through the views expressed in the text surveys and semi-structured interviews. The analysis was guided by a constant comparative method of cataloguing insights into essential concepts.²⁶ For the text message surveys, all open-ended survey responses were compiled in an Excel spreadsheet. The research team first reviewed all of the responses, then applied descriptive

codes to the responses. The descriptive codes could represent the content of a full participant response (e.g. “I could exercise more but I’m just being lazy”) or a smaller segment of text (e.g. “exercise”, “lazy”, “too tired”). Next, the research team built a codebook by grouping descriptive codes into related categories. Two members of the research team independently coded subsequent text message responses, met to modify the codebook and resolve discrepancies, and organize the codes into larger themes. Semi-structured interviews were audio-recorded and transcribed. The research team performed a thematic analysis, as described above, to initially code, develop a codebook, apply codes to all interviews, and synthesize codes into categories that represented emergent themes. Any discrepancies were resolved by consensus. Both qualitative datasets were merged by comparing the emergent themes.

Results

Fifty-four young mothers, ages 16–24, were enrolled in the Healthy Pregnancy Project. Five participants did not complete the study due to developing high risk pregnancies, and three participants transferred care. Participants were included in the data analysis if they completed at least one study element (text message surveys and/or semi-structured interview). Data from the 51 participants who met this criterion are described here. The mean age was 21.1 years ($SD=2.3$), with 47 participants 18 years old, and four participants <18 years old (one 16 years old and three 17 years old). Forty-nine percent of participants identified as black, 31% as white, and 14% as multiracial. Fourteen percent identified as Hispanic or Latino. Forty-three percent graduated from high school, and the median annual household income for participants was \$8,796 (see Table 1 for participant demographics). Thirty-nine participants (76%) completed at least one of the text message surveys, 32 participants (62%) completed >50% of the text message surveys, and 13 participants (26%) completed all of the text message surveys. Forty-four participants (86%) completed the semi-structured interview.

The NAM recommendations for weight gain in pregnancy vary based on pre-pregnancy body mass index (BMI).⁴ In our study, regarding pre-pregnancy BMI, 23 participants (45%) were within the normal range, 11 participants (22%) were overweight, and 16 participants (31%) were obese. Twenty participants (39%) gained over the NAM recommendations for total weight gain during pregnancy based on their pre-pregnancy BMI.^{4,27} Of the 27 participants that were overweight or obese pre-pregnancy, 11 participants (41%) gained over the NAM recommendations.

Four main themes emerged from both the text message surveys and the semi-structured interviews. First, many pregnant youths had knowledge about healthy behaviors in pregnancy (See Table 2 for representative quotes). Participants consistently identified healthy behaviors in pregnancy consistent with American College of Obstetricians and Gynecologists (ACOG) recommendations^{28–29}, including healthy eating, exercise, and drinking water. Participants were able to categorize food groups into healthy versus unhealthy and commented on the positive effects of eating from specific healthy food groups. For example, most participants emphasized the importance of consuming more fruits and vegetables (e.g., “Like, uh, greens. Um, things like a lot of fruits. Having a colorful

diet.”) and avoiding sweets (e.g., “cutting out candy”). Some pregnant youths appropriately estimated healthy weight gain for pregnancy, consistent with the National Academy of Medicine recommendations for weight gain in pregnancy (e.g. “I believe I’m only supposed to gain like 20–25 pounds”). Similarly, many understood that weight gain recommendations vary based on pre-pregnancy body mass index and body habitus (e.g. “I don’t want to gain a lot due to the fact I’m already obese”).

Second, despite having familiarity with healthy behaviors in pregnancy, young mothers reported barriers to engaging in these behaviors including stress (e.g. “Stress over money part because I’m not working right now”), inconvenience (e.g. “If there is fruit in the house, I eat my fruit.”), and poor motivation (e.g. “I could exercise more but I’m just being lazy”) (See Table 3 for representative quotes). Barriers to healthy eating reported by participants included eating out frequently (e.g. “We eat out a lot. Sometimes you just don’t feel like cooking.”), or eating meals prepared by others because participants did not do their own grocery shopping or cooking (e.g. “His mom usually goes grocery shopping for us... cause she cooks most of the time”). Finally, participants reported being too tired during pregnancy which prohibited them from eating healthy foods (e.g. “I was not trying to cook anything really... and it wasn’t because I was too busy, it was cause I was too tired.”).

Third, although some respondents recognized exercise and staying active as a healthy behavior in pregnancy, many pregnant youths demonstrated inadequate knowledge about exercise during pregnancy (See Table 4 for representative quotes). Some participants felt it was unsafe to exercise at all during pregnancy because of perceived harm (e.g. “I don’t see why anyone would do that cause that’s just dangerous.”). Other youth had misconceptions about the effects of exercise on their bodies and their growing babies (e.g. “Just not knowing what’s too much or what. If I turn the wrong way can I rip something, and she came out, or I don’t know? I don’t know all those things, what exercises to do.”). A small subset of participants did not think exercise was necessary, and did not understand the benefits of exercise during pregnancy.

Fourth, regarding their cravings, participants overwhelmingly described that their cravings influenced their diet during pregnancy (e.g. “I know that they say you should eat healthy for the baby, but I kind of feel like you should eat whatever you want. You have cravings, you gotta satisfy those cravings.”) (See Table 5 for representative quotes). Participants reported on the intensity of their cravings and their willingness to seek out the foods they craved. Some would even plan ahead to keep foods they craved nearby to help satisfy their cravings in the moment (e.g. “I have some cravings I usually keep it in my house so I can eat it when I’d like.”).

Discussion

Four major themes emerged related to pregnant youth’s knowledge and perception about weight gain and healthy behaviors in pregnancy. First, many pregnant youths had knowledge about healthy behaviors in pregnancy, and some were familiar with how much weight was appropriate to gain during pregnancy. Second, however, young mothers reported barriers to engaging in these healthy behaviors, including stress, inconvenience, not doing their own

shopping or cooking, being busy, being tired, and having poor motivation. Prior research shows that low-income African American women have reported that recommendations for strict caloric targets and specific diets are unappealing, not only because of the associated cognitive complexity of these recommendations, but also due to resource limitations such as food access, availability, cost, and transportation.³⁰ This suggests that the multidisciplinary team of medical providers caring for pregnant youth may be more successful in combatting excessive weight gain in pregnancy by providing resources for tangible supports like food and transportation in addition to using a motivational interviewing approach to encouraging healthy behaviors.

Reliable transportation for buying groceries and providing resources that make preparing healthy foods more convenient would also address reported barriers among young mothers. Many young mothers qualify for programs such as the Women Infants and Children Food and Nutrition Service (WIC), though most do not maximize their fruit and vegetable allotment.^{31–32} Future approaches could also focus on efforts that make healthy behaviors more convenient for pregnant youth by using grocery delivery programs, as many young mothers in our study discussed eating what was convenient.^{33–34} Studies have shown that expenditures on fruits and vegetables increased with the use of an internet grocery delivery program in an urban food desert, while candy, desserts, and sweets represented only a small proportion of expenditures.³⁵ Similarly, online grocery order and home delivery services decreased access to high-fat food choices in behavioral weight loss program participants.³³

Regarding the third theme of limited exercise-specific knowledge, some participants identified emotional and physical benefits they derived from exercise, while others reported that they thought exercise was not needed at all during pregnancy. The frequent prenatal visits pregnant women attend provide opportunities to discuss exercise, though very few providers focus on this important health behavior during pregnancy.^{36–37} Furthermore, participants in our study reported that their obstetrical providers and the internet were trustworthy sources of information, making prenatal visits an optimal time for exercise counseling, and suggesting that online resources related to exercise may be well-received by pregnant youth. Specifically, providing frequent youth-centered guidance on the types, frequency, duration, and safety of appropriate exercises during pregnancy may help to overcome barriers. Mobile health programs have also been shown to decrease barriers to physical activity among pregnant women.³⁸ Because cell phone use is nearly ubiquitous among youth, physical activity could also be supported between visits through texting interventions and mobile apps, which are often low cost, convenient, and accessible.^{39–42}

Fourth, cravings appeared to play a large role in what and when young women ate while pregnant. Helping pregnant youth develop realistic strategies to avoid unhealthy cravings and promote healthier diet behaviors may be critical to helping young mothers plan ahead and make healthier decisions. Young women in our study seemed particularly motivated by what “baby” was craving. By understanding and embracing this mental construct among pregnant youth, clinicians can help young women make healthier choices for themselves and their babies.

Although our study represents a novel investigation of the knowledge and perceptions of pregnant youth, the study does have limitations. Given the mission of the study to keep women healthy during pregnancy, responses may be subject to social desirability bias. While our study included a diverse sample of lower income young mothers, the sample was limited to Southeast Michigan, and our findings may not be widely generalizable.

Conclusion

Many pregnant youths have knowledge about healthy behaviors during pregnancy but face youth-specific barriers to achieving these behaviors. Successful interventions should address logistical challenges to healthy behaviors in pregnancy to increase young mothers' agency and motivation to make healthy dietary and exercise choices the easy choice.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1.

Participant demographics (n=51)

Age in years, Mean (SD)	21.1 (2.3)
Median Annual Income, USD	8,796
Race	n (%)
Black	25 (49)
White	16 (31)
Mixed Race	7 (14)
Other	2 (4)
Unknown	1 (2)
Ethnicity	n (%)
Hispanic or Latino	7 (14)
Non-Hispanic or Latino	43 (84)
Unknown	1 (2)
Educational Status	n (%)
Some high school	13 (26)
High school graduate	22 (43)
Some post-secondary education	14 (27)
Unknown	2 (4)
Pre-Pregnancy BMI Category	n (%)
Underweight (<18.5)	1 (2)
Normal (18.5–24.9)	23 (45)
Overweight (25.0–29.9)	11 (22)
Obese (≥ 30.0)	16 (31)
NAM* Classification of Pregnancy Weight Gain	n (%)
Under recommended weight	16 (31)
Within recommended weight	15 (30)
Over recommended weight	20 (39)

* National Academy of Medicine (NAM) recommendations for total weight gain during pregnancy, by pre-pregnancy BMI

Table 2.

Knowledge about appropriate healthy behaviors in pregnancy

Theme 1: Knowledge about appropriate healthy behaviors in pregnancy					
<i>Total number of participants responding to text message surveys: 51 women</i> <i>Total number of interviewed participants: 44 women</i>					
Sub-theme	Demographics	Gestational age	Weight data	Quote	Source
Exercise	22 yo, white / non-Hispanic, high school graduate	25 weeks	BMI 24.5, +47lbs, over	“Walking and eating healthy”	T
	22 yo, black / non-Hispanic, some college	26 weeks	BMI 25.9, +37lbs, over	“Eating healthier and working out”	T
	22 yo, mixed / Hispanic, vocational training	26 weeks	BMI 29.4, +13lbs, under	“I think that if I would have not eatn so much and extersied more at the beginning of my pregnancy everything would have been easier”	T
	19 yo, white / non-Hispanic, some college	32 weeks	BMI 32.2, +19lbs, within	“I would probably stay enrolled in the gym like I would walk or go on the treadmill, for example, or swimming”	I
	19 yo, black / non-Hispanic, high school graduate	38 weeks	BMI 22.2, +45lbs, over	“I would exercise more, walk around more, and not be as tired and lazy as I was”	I
	22 yo, black / non-Hispanic, high school graduate	33 weeks	BMI 24.1, +52lbs, over	“Probably start exercising earlier in the pregnancy and make it like a routine instead of trying to wait ‘til late”	I
Healthy Eating	19 yo, mixed / non-Hispanic, high school graduate	25 weeks	BMI 23.4, +39lbs, over	“Eating fruits and vegetables and walking”	T
	22 yo, white / non-Hispanic, some high school	26 weeks	BMI 19.3, +35lbs, within	“Trying to eat right, taking walks”	T
	20 yo, mixed / Hispanic, high school graduate	25 weeks	BMI 20.1, +26lbs, within	“Not doing or eating stuff I’m not suppose to”	T
	24 yo, mixed / non-Hispanic, vocational training	35 weeks	BMI 26.3, +25lbs, within	“When you eat fruit and vegetables, you have this energy in you that helps keep you going through the day”	I
	20 yo, white / non-Hispanic, high school graduate	38 weeks	BMI 20.1, +22lbs, under	“Uh, put down the Twix and stop eating that junk”	I
	20 yo, white / non-Hispanic, high school graduate	38 weeks	BMI 20.1, +22lbs, under	“Um, fruits, vegetables, proteins, greens, you know, not cake every day”	I
	23 yo, Hispanic, high school graduate	36 weeks	BMI 29.4, +5lbs, under	“Cook more often so I don’t have to like eat, like, you know, fast food and stuff”	I
Drinking water	18 yo, white / non-Hispanic, some high school	32 weeks	BMI 18.6, +27lbs, within	“I think you should drink a lot of water and eat like fruits and vegetables and like all your dairy stuff, but I definitely don’t go by that like I should”	I
	19 yo, black / non-Hispanic, high school graduate	33 weeks	BMI 19.4, +27lbs, within	“Staying hydrated and eating healthy food”	T
	24 yo, black / non-Hispanic, high school graduate	25 weeks	BMI 28.9, +29lbs, over	“Drinking water and taking my prenatal pills”	T

+ / – = positive / negative weight gain during pregnancy

I = interview response

T = text response

Demographics header = Age (years), race / ethnicity, highest education level obtained

Weight data header = Pre-pregnancy body mass index (BMI), weight gain during pregnancy, National Academy of Medicine (NAM) classification of weight gain at the end of pregnancy

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Table 3.

Barriers to healthy behaviors among pregnant youth

Theme 2: Barriers to healthy behaviors among pregnant youth					
Total number of participants responding to text message surveys: 51 women Total number of interviewed participants: 44 women					
Sub-theme	Demographics	Gestational age	Weight data	Quote	Source
Stress	22 yo, black / non-Hispanic, high school graduate	26 weeks	BMI 24.1, +52lbs, over	"Having a 3 year old and worried about not working and paying bills"	T
	21 yo, Native American / non-Hispanic, some college	38 weeks	BMI 26.3, +16lbs, within	"Well me not talking to the child's father, and him not being in the picture. You know, me living on my own. At first I didn't have stable housing, transportation, things like that."	I
	20 yo, mixed / non-Hispanic, high school graduate	33 weeks	BMI 20.1, +26lbs, within	"So I lost my job and, um, then I was really depressed about that because I'm always, you know, very active and loved that job."	I
	22 yo, black / non-Hispanic, some high school	37 weeks	BMI 21.0, +73lbs, over	"I really don't decide right now because, um, I'm staying at a family shelter, and so they kind of feed us."	I
Inconvenience	22 yo, white / non-Hispanic, some high school	31 weeks	BMI 19.3, +35lbs, within	"Transportation usually was [a barrier to exercise], cause I don't drive. So I can't just go to the gym whenever I want."	I
	22 yo, white / non-Hispanic, high school graduate	28 weeks	BMI 24.5, +47lbs, over	"Convenience like is one thing, and money."	I
	18 yo, white / non-Hispanic, some high school	32 weeks	BMI 18.6, +27lbs, within	"It's not really a big choice for me. I just go look in the fridge and I'm just like, you know, and I would pick pizza over vegetables I guess."	I
	24 yo, white / non-Hispanic, high school graduate	33 weeks	BMI 19.7, +22lbs, under	"You know it depends if it's in the house or say if we buy something before work or at work you know."	I
Don't shop or cook	19 yo, white / non-Hispanic, some college	32 weeks	BMI 32.2, +19lbs, within	"I just moved in with my husband and his family. It's kind of hard. Only because like they just keep, like carbs...carbs...carbs. Heavy eating. Where like my mom and my brother were like...so like for example, like at my house, I open the fridge expecting to make like 500 different kind of salads. Where like I open the fridge at my mother-in-law's house, and it's like woah. There's no lettuce. There's no...like there's nothing like...they don't really eat a lot of fruit and vegetables."	I
	19 yo, white / non-Hispanic, some college	32 weeks	BMI 32.2, +19lbs, within	"We eat out a lot for now just because of the situation we're in, you know. She doesn't really cook much at home, and she doesn't really go shopping that much either. So it's kinda hard to eat at home."	I
	24 yo, black / non-Hispanic, some college	33 weeks	BMI 33.8, +20lbs, within	"I cook every now and then when I have the energy. But for the most part, I probably would stop and get something."	I
Busy	24 yo, white / non-Hispanic, high school graduate	27 weeks	BMI 19.7, +22lbs, under	"I work all the time, so I don't really have time to exercise"	T
	19 yo, black / non-Hispanic, high school graduate	25 weeks	BMI 22.2, +45lbs, over	"No I have not been working out. I work a job 8 hours a day 5 days a week. I chill on my off days, I feel like that is enough."	T

Theme 2: Barriers to healthy behaviors among pregnant youth					
Total number of participants responding to text message surveys: 51 women Total number of interviewed participants: 44 women					
Sub-theme	Demographics	Gestational age	Weight data	Quote	Source
	22 yo, white / non-Hispanic, high school graduate	26 weeks	BMI 24.5, +47lbs, over	"Being to busy with house work and school work is keeping me from doing it [exercise]"	T
	23 yo, black / non-Hispanic, vocational training	32 weeks	BMI 22.3, +37lbs, over	"It is more on my body I would say because I work and I have the other two kids so I'm doing a lot."	I
Tired	17 yo, black / non-Hispanic, some high school	24 weeks	BMI 25.6, +17lbs, within	"I have not been exercising. I haven't been having the energy to exercise. I've been extremely tired throughout my pregnancy and haven't gained any weight so I don't feel I need to"	T
	22 yo, mixed / Hispanic, vocational training	35 weeks	BMI 29.4, +13lbs, under	"I don't know, like, with my first child, I was very active. I wasn't, like, so drained, and I didn't feel so exhausted. But with this child, it's like I feel so heavy, and I'm so exhausted."	I
	23 yo, black / non-Hispanic, some college	Postpartum	BMI 45.5, -8lbs, under	"I was not trying to cook anything really, um, and it wasn't because I was too busy, it was 'cause I was too tired and too fat... I'm like, I'm not doing nothin', I just wanna relax and be lazy."	I
Poor Motivation	22 yo, black / non-Hispanic, some college	27 weeks	BMI 41.9, +15lbs, within	"Cutting out candy, and nothing I just love candy"	T
	23 yo, black / non-Hispanic, vocational training	27 weeks	BMI 29.8, +42lbs, over	"I could exercise more but I'm just being lazy"	T
	23 yo, black / non-Hispanic, vocational training	34 weeks	BMI 29.8, +42lbs, over	"I'm like I don't have to eat vegetables. I don't like carrots. You can't stuff the vegetables down my throat. If I don't like it and you want to eat more, I want to eat what I want to eat to a certain extent."	I
	19 yo, white / non-Hispanic, some college	32 weeks	BMI 32.2, +19lbs, within	"It's just my laziness basically."	I
	23 yo, black / non-Hispanic, vocational training	32 weeks	BMI 22.3, +37lbs, over	"Oh, well, at the end of the day I could eat healthy, I just choose not to. It's really up to you on what you eat, so."	I
	18 yo, white / non-Hispanic, some college	33 weeks	BMI 31.2, -8lbs, under	"At least I tried to anyway in the beginning, and then I just gave up, I Was like, forget this, if it's gonna happen, it's gonna happen."	I
	23 yo, black / non-Hispanic, vocational training	34 weeks	BMI 29.8, +42lbs, over	"If I'm in a grocery store and I see something like...like for instance, the peppers, tomatoes, mushrooms, whatever, and I see that versus me seeing like chips and French onion dip, then I'm going to go for that."	I
	17 yo, other / Hispanic, unknown	33 weeks	BMI 36.1, -3lbs, under	"Well, he thought I didn't know how to cook, and I'm like I didn't forget, just lazy"	I

+ / - = positive / negative weight gain during pregnancy

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Demographics header = Age (years), race / ethnicity, highest education level obtained

Weight data header = Pre-pregnancy body mass index (BMI), weight gain during pregnancy, National Academy of Medicine (NAM) classification of weight gain at the end of pregnancy

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Table 4.**Inadequate knowledge about exercise**

Theme 3: Inadequate knowledge about exercise					
<i>Total number of participants responding to text message surveys: 51 women</i> <i>Total number of interviewed participants: 44 women</i>					
Sub-theme	Demographics	Gestational age	Weight data	Quote	Source
Think it's Unsafe	23 yo, black / non-Hispanic, vocational training	34 weeks	BMI 29.8, +42lbs, over	"My mom tells me I need to get exercise, but if I can still walk a lot, it can cause my cervix to dilate, and I shouldn't want that right now because I'm not full term"	I
	19 yo, white / non-Hispanic, some high school	32 weeks	BMI 20.4, +35lbs, within	"I don't overexert myself if I don't wanna put stress on the baby."	I
	18 yo, white / non-Hispanic, some high school	32 weeks	BMI 18.6, +27lbs, within	"Yes, I've never had to workout anyways. I mean I was 107 pounds going into this, so yeah, I don't think for me to go workout would be such a good idea because I mean she's already little and then I don't want to go making anything uncomfortable or nothing."	I
	19 yo, black / non-Hispanic, high school graduate	33 weeks	BMI 19.4, +27lbs, within	"I think like I said everybody has their limits and I have asthma to begin with so..."	I
Don't think exercise is necessary	18 yo, white / non-Hispanic, some high school	32 weeks	BMI 18.6, +27lbs, within	"I don't think I'm obligated to exercise, being pregnant."	I
	22 yo, mixed / non-Hispanic, high school graduate	33 weeks	BMI 19.2, +13lbs, under	"I don't think I should be working out and I'm just too lazy to do it, I just never think about working out. I kinda think it's weird that pregnant women get asked if they work out."	I
	23 yo, black / non-Hispanic, some college	Postpartum	BMI 45.5, -8lbs, under	"Just try to stay moving around a stuff like that. Don't lay around all the time, but I'm not gonna say go jog a mile or anything, cause that's crazy"	I
Don't know why they should exercise	18 yo, black / non-Hispanic, some high school	26 weeks	BMI 24.0, +13lbs, under	"All I have been doing is walking. I never did exercise so being pregnant makes it hard to want to start"	T
	18 yo, white / non-Hispanic, some high school	32 weeks	BMI 18.6, +27lbs, within	"I feel comfortable not having to get up and worry about exercise cause what am I exercising for to be honest? I mean I don't know."	I
Don't know how to exercise	20 yo, mixed / non-Hispanic, high school graduate	24 weeks	BMI 20.1, +26lbs, within	"Just depends on what kind of exercise! I believe swimming and squats are okay but weight lifting or anything of that nature is not. Running just depends on the person."	T
	24 yo, black / non-Hispanic, some college	33 weeks	BMI 33.8, +20lbs, within	"But I say me going to work all the time is exercise because I'm constantly moving"	I
	19 yo, mixed / non-Hispanic, high school graduate	33 weeks	BMI 23.4, +39lbs, over	"Hmmm. I don't really know 'cause I don't really talk to people about exercise, but some people tell me that it's not good. Like you can go walking and stuff, go swimming and stuff, but the other exercise, like lifting weights and ab workout, I don't think you should be doing that."	I

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Weight data header = Pre-pregnancy body mass index (BMI), weight gain during pregnancy, National Academy of Medicine (NAM) classification of weight gain at the end of pregnancy

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Table 5.

Influence of cravings on diet

Theme 4: Influence of cravings on diet				
Total number of participants responding to text message surveys: 51 women Total number of interviewed participants: 44 women				
Demographics	Gestational age	Weight data	Quote	Source
22 yo, mixed / Hispanic, vocational training	23 weeks	BMI 29.4, +13lbs, under	“yes i do have cravings. and whenever i crave something i always have to eat it lol”	T
22 yo, black / non-Hispanic, some college	23 weeks	BMI 25.9, +37lbs, over	“Yes I have them and anything I crave I go get”	T
22 yo, white / non-Hispanic, some high school	24 weeks	BMI 19.3, +35lbs, within	“Pregnancy cravings are pretty intense, when you want something you pretty much have to have it. I eat whatever I crave as long as its not too bad for you”	T
20 yo, black / non-Hispanic, some high school	35 weeks	BMI 17.3, +22lbs, under	“Um, fast food. I be craving, like, fries from Burger Kind. I don’t know why.”	I
24 yo, black / non-Hispanic, high school graduate	35 weeks	BMI 33.3, +22lbs, over	“Since I became pregnant, I mainly always want pizza and um, like order out fast food. And sometimes, like I order it like maybe three times a day. And I’m like, that is so... I know it’s horrible.”	I

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Weight data header = Pre-pregnancy body mass index (BMI), weight gain during pregnancy, National Academy of Medicine (NAM) classification of weight gain at the end of pregnancy

lol = “laughing out loud”