



Research Article

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# Exploring Women's Perspectives on Effective Interventions to Promote Healthy Eating and Exercise during Pregnancy: A Qualitative Study

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## Abstract

**Background:** Approximately 3 in 5 U.S. women of reproductive age are now classified as overweight or obese and are at risk for a number of medical complications during pregnancy and childbirth. To date, there is limited evidence to guide effective strategies for limiting pregnancy weight gain in this population.

**Methods:** Seventeen pregnant women with obesity were recruited and 10 were randomized to the behavioral nutrition and physical activity intervention group and 7 were in the routine care group. Of the 17 in the pilot study, 10 participated in a 60-minute semi-structured interview. The interviews explored barriers and facilitators of success when attending the prior study visits and adhering to recommended lifestyle behavior changes. Transcripts were coded using an inductive thematic analysis.

**Results:** The LIFE intervention participants expressed increased knowledge, energy and perceived behavioral control about appropriate nutrition and physical activity during pregnancy.

Specifically, the intervention group participants reported the supportive, professional study team members was an effective social support system in being able to complete the different aspects of the intervention program. Additionally, the nutrition education and exercise coaching provided a key learning opportunity for making progress toward healthy management of weight gain during their pregnancy.

**Conclusions:** Our study demonstrates that pregnant women who are overweight or obese are eager to learn more about healthy eating and physical activity and may benefit from a

variety of educational and support programs. Further research is needed to understand what additional components of behavioral intervention may be suited for women from diverse backgrounds and settings who are obese and at higher risk for maternal and infant complications.

**Keywords:** Obstetrics; Pregnancy; Psychological Wellbeing; Qualitative methods; Treatment interventions

## Introduction

Nearly three in five U.S. women of reproductive age, 20 to 44 years of age, are now classified as overweight, which is considered as a body mass index [BMI] of 25 kg/m<sup>2</sup> to 29.9 kg/m<sup>2</sup>, or obese, a BMI of ≥ 30 kg/m<sup>2</sup>, and are at risk for a number of medical complications during pregnancy and childbirth [1-3]. Excessive prenatal weight gain is a significant contributor to long-term weight retention and rising obesity rates in women. The Institute of Medicine (IOM) and the World Health Organization (WHO) gestational weight gain (GWG) guidelines advise obese women gain no more than 11 to 20 pounds during pregnancy [4]. However, it has been shown that up to 50-60% of pregnant women with obesity gain more than the recommended amount of weight [5]. According to WHO, excessive GWG and obesity have been recognized as independent risk factors for maternal and offspring complications, including diabetes, hypertension, operative deliveries, macrosomia and neonatal complications [6].

The offspring of women who gain excessive weight during pregnancy are also at increased risk for obesity and increased cardiovascular risk in childhood and adolescence [7-10]. In addition, epidemiological data suggest that maternal and neonatal outcomes, consisting of fewer cesarean deliveries, lower rates of preeclampsia, and the optimal balance between large-for-gestational and small-for-gestational aged infants, may be optimized if women with obesity gain less than the recommended 11 pounds [11].

The prenatal period is recognized as an appropriate time period in which interventions to reduce GWG may have benefits for both the mother and her offspring [12,13]. Pregnancy may present an opportunity to encourage women to change their eating habits and physical activities, and thereby prevent excessive weight gain. Specifically, a systematic review and meta-analysis of 44 relevant randomized control trials demonstrated the application of lifestyle and dietary interventions did improve maternal and child health by reducing risk of preeclampsia, shoulder dystocia, and reduced birthweight [14]. Despite these positive findings, there is limited evidence to guide effective strategies to limit weight gain for women with overweight and obesity especially across different population groups. Recruitment and retention have been major issues reported in the existing literature for both intervention studies and service-based clinical programs [15]. Furthermore, studies on patient expectations and acceptability of intervention programs to prevent excessive weight gain are sparse.

Investigating the attitudes and satisfaction with an intervention program is important for evaluating and shaping cost-effective, successful long-term patient centered programs for weight management during pregnancy. Therefore, this qualitative study sought to provide relevant information related to barriers and

facilitators that helped or prevented pilot study participants from reaching their goals.

## Materials and Methods

We initiated this qualitative study to further explore and better understand barriers and facilitators related to achieving healthy lifestyle goals as a follow up to the recent Lifestyle Intervention ForEver: Healthy Weight Gain for Pregnancy and Birth (LIFE) pilot program, which was conducted by a collaborative group consisting of a dietitian/nutritionist, exercise physiologists, psychologists, and healthcare professionals within the United States, and at a Midwestern, urban academic institution. Research was conducted in accordance with ethical principles and was reviewed by the academic Institutional Review Board.

### Original Intervention Background

The Lifestyle Intervention ForEver: Healthy Weight Gain for Pregnancy and Birth (LIFE) pilot study was a single-blinded, randomized control trial, conducted from 2012 to 2014, to examine the impact of a healthy lifestyle intervention and weight gain restriction ( $\pm 10$  pounds) in pregnant women with obesity. Pregnant women with obesity engaged in a single-blinded randomization to the LIFE intervention group and received nutritional counseling from a registered dietitian at each obstetrical office visit, met with an exercise physiologist who developed an exercise plan for moderate physical activity, and participated in a contingency management program which included rewards and incentives to reinforce the positive behavior change.

The LIFE intervention subjects were instructed to keep food and activity logs as well as limit weight gain to  $\pm 10$  pounds, for which they were provided rewards consisting of gift cards as a part of the contingency management program. The Routine Care (RC) control group did not receive any additional intervention beyond standard of care consisting of general statements and guidance from the obstetrician on weight gain recommendations, tips for eating healthy and physical activity in pregnancy.

In the original LIFE study, 17 subjects participated, 10 in the LIFE intervention group and 7 in the RC control group. Characteristics for age, marital status, education, gravidity, race, and employment status were similar in both groups. Of the 7 routine care participants, none gained less the IOM guidelines for GWG, 3 (43%) stayed within the 11-20-pound target range, and 4 (57%) exceeded the 20-pound goal, which is comparable to weight change trends in the literature [5]. Among the 10 LIFE intervention subjects, 4 (40%) stayed within the  $\pm 10$ -pound goal, 4 (40%) stayed within the 11 to 20-pound target range, and only 2 (20%) exceeded the 20-pound IOM goal. Despite achieving the weight gain goals, only 4 participants in the LIFE intervention group obtained rewards through the contingency management portion of the program. Incentives were provided to subjects who recorded their food intake and provided proof of physical activity through a downloadable pedometer or heart rate monitor.

### Recruitment

All 17 subjects who were enrolled in the LIFE Program, including those who withdrew from participation during the course of their pregnancy, were approached for inclusion in this qualitative study. Potential participants received a letter of invitation explaining the purpose and goals of the study. The letter explained there would be one

interview, which would last between 30 to 60 minutes. The letter provided directions about how to contact the research team with questions and/or intent to participate. The letter also stated that the research team would follow up with a phone call as an additional recruitment tool.

If the participant wanted to take part in the study, an appointment was scheduled to come to the research unit and meet with the research team. At their appointment, the research team reviewed the consent, answered questions and, in cases where the participant agreed to take part in the study, they signed the consent and began participation in the interview process. Of the 17 participants initially recruited, 7 successful interviews were conducted. There were 4 and 3 participants in the intervention and RC group, respectively.

### Participants

Women who participated in the qualitative interviews were representative (age, race, and education) of the LIFE intervention study sample. Just over half (57.1%) of participants were African-American with an average age of 29 ( $\pm 4$ ) and with an estimated 15 ( $\pm 2$ ) years of education.

### Data collection

Two qualified interviewers, public health professionals with backgrounds in maternal and child health, conducted the in-depth interviews. The interviewers used a semi-structured interview guide which explored barriers and enablers in the following areas of interest: participant perspectives on the healthcare system, personal beliefs and habits about healthy weight gain, social support systems, potential competing responsibilities that included work and home life as well as possible caretaker responsibilities for other children and adult family members, and environmental factors (i.e. neighborhood safety, proximity to grocery stores and types of available foods, available venues for exercise).

To build upon these areas of interest, we first employed the strategy of asking open-ended questions related to how they experienced their pregnancy. With the LIFE intervention and RC group, questions such as, "What were your days like during your pregnancy when it came to family/work?" and "What aspects of healthy eating habits do you think you used?" provided the opportunity for participants to describe their experiences.

Additionally, intervention participants were asked about their interactions with their dietitian/nutritionist and exercise physiologist, questions included, "Did the food log and exercise diary help you think about and motivate you to track your weight during pregnancy?" and "Were you confident you could prepare healthy meals?" In the RC group, the interviewer asked parallel questions in regards to support, food intake, and weight gain; for example, questions such as "What additional support would you like to have seen during your pregnancy?" and "How much weight did you gain during pregnancy and did you feel that your weight gain during pregnancy was too much, not enough, or just right?" were asked to seek information about their perspective on positive social supports and their views on healthy weight gain.

The interviews were all administered at the clinical research division of the hospital in which participants received care, although this location was separate from clinical care areas. Both interviewers intentionally set the tone to make the interview as comfortable and safe

as possible. It was always the focus of the two interviewers to maintain the wellbeing of the participants with the guarantee of having a safe space to discuss their health. The average duration of interviews was 45 minutes. Additionally, the seven participants received an incentive of a \$50 gift card from Target. All participant interviews were audio recorded and later professionally transcribed (Flatworld Solutions Pty. Ltd., Princeton, New Jersey).

### Data analysis

After the interviews were formally transcribed, we reviewed and analyzed the qualitative data. The process was based upon an inductive thematic analysis, which permitted the research team to link data to strong emerging themes. Additionally, the analysis involved six main phases: acquaintance with the data, initial generating of codes, classifying the codes into themes acquired, evaluating the themes for accuracy, generating a concise and clear understanding of the themes into larger categories, and lastly reviewing these categories and relating it back to the research areas of interest. Imports of the transcripts and analysis were conducted using the NVivo 11 qualitative data analysis software program (QSR International Pty Ltd. Version 11, 2015).

### Results

With the use of thematic analysis, there were three emerging categories for those who were in the LIFE intervention group: increased knowledge, increased energy, and increased perceived behavioral control about appropriate nutrition and physical activity during pregnancy.

#### Life intervention group: increased knowledge and energy

The participants stated the exercise diary and meeting with the dietitian every two weeks was an effective way to maintain motivation and helped with revising exercise regimens, if needed. LIFE participants were able to notice, with the implementation of the exercise regimens and documentation of their sleeping habits, additional insight about their sleep cycle and how it was influencing fatigue and energy levels, particularly during more strenuous times across the trimesters (i.e. reaching the 3<sup>rd</sup> trimester and constraints with lying down in bed).

"You know, in first trimester you are tired and just very fatigued. Your second trimester, you are little less fatigued. I remember the first trimester and the second trimester being very hungry but then the second trimester I was into this program I was able to handle it a little bit better."

"So I was seeing the result [of my sleeping habits] and of what I was doing which would then motivate me to keep going..."

Overall, the women stated that the increase in hunger from the 1<sup>st</sup> to 2<sup>nd</sup> trimester was particularly noticeable but having been in the intervention program assisted in deterring a significant increase in eating and finding constructive outlets to address the hunger.

"Once I got into the program, really tracking it [food] with the logs. So when I saw the calorie intake I was doing, that was a huge eye opener and I stopped eating at a certain time at night and my body got used to it."

#### Life intervention group: increased perceived behavioral control

The women stated that logging their exercise was particularly helpful in being able to see what they had accomplished. They also felt an increase in self-confidence and self-esteem, thus promoting healthy weight management. All participants endorsed being aware of basic healthy eating habits and each had access to fitness centers. However, the accountability from their dietitian is what helped them feel able to achieve the behavior of maintaining a healthy gestational weight gain. Moreover, the additional information gained from the dietitian increased their knowledge base which helped the women be more mindful of their activities and eating habits. All the participants reported that accountability from their professional and social supports and the increased knowledge of appropriate activities and eating habits were key factors in achieving appropriate GWG management.

"I know this sounds dramatic but it's the truth. If in ten weeks I had already gained ten pounds, you know, in forty weeks at least forty pounds if not more than that. If I didn't learn how to be obedient to being healthy...eating healthy and exercising I would have never done it without this program. I would have never exercised five days a week. I can guarantee that. I would have never found time, I wouldn't have cared that much, I would have been tired, and I wouldn't have taken care of myself."

"I absolutely loved the whole program. I think it was the best thing for me, helped me tremendously."

"I learned how to prepare healthier meals, what to look for and get meals that have lot of vegetables in it, and look at the calorie intake."

#### Routine care group results

With the same analytical structure in place, the dominant theme for the Routine Care Group involved social support stressors. Further, overall stressors resulted in several subcategories of impact: (1) increased overall stress (2) decreased perceived behavioral control (3) disrupted sleep patterns, and (4) increased fatigue/low energy.

#### Routine care group: social support stressors

In this sample, women discussed limited social support as being an influential aspect to their pregnancy. Specifically, women spoke about feeling alone, going through a divorce, and the father of the child not being present. Despite that not all the women were experiencing the same issues, the thematic analysis signaled social support being a barrier for the RC group, thus potentially impacting the ability to focus on the physical/nutritional aspects of the pregnancy.

"Unfortunately he [his father] is in jail and he has caused me a lot of angst and he is just not the person that I thought he was and it was just stressful."

"I wouldn't wish being a single mother on my worst enemy. The thrill and the excitement weren't really there. It was just something I felt, you know I have to go through this and it is what it is. There were moments I would cry and just feel so alone."

#### Routine care group: subcategories of impact

The dominant stressor of limited support systems resulted in increased overall stress, time management stress, and decreased

perceived behavioral control to initiate physical exercise. All the participants in this group stated that they had fatigue. They also identified that their sleeping patterns spanned over longer amounts of time (i.e. naps ranged from 3 to 4 hours on the weekends, to sleeping when getting home until the next day) due to increased stress.

“Well, basically, when I was not at work I was lying down sleeping, like I used to like sleep anytime of the day.”

“I am really thankful that I have him [my child] but at the same time, it sucks going to doctors' visits by myself and seeing other couples. It was kind of depressing. I did have moments in my pregnancy where I just would sleep for long period of time because it was so stressful.”

For all the women in the RC group, the theme of having limited control over situational factors was inhibiting Healthy weight management efforts. All three of the interviewed participants. Stated the biological father was no longer a part of the participant's life due to incarceration, divorce or other issues causing a break in communication. The women reported that this was difficult during their time of pregnancy. Therefore, the participants attributed the stress of not having some control over interpersonal relationships, as impeding the ability to prioritize appropriate GWG.

## Discussion

The LIFE intervention participants expressed increased knowledge, energy and perceived behavioral control about appropriate nutrition and physical activity during pregnancy. Specifically, the intervention group participants reported the supportive, professional study team members was an effective social support system in being able to complete the different aspects of the intervention program. Additionally, the nutrition education and exercise coaching provided a key learning opportunity for making progress toward healthy management of weight gain during their pregnancy.

Although this pilot study had a small sample size, the qualitative interviews provided relevant information related to barriers and enablers that helped or prevented the intervention and RC group participants from reaching their health goals [16,17].

As noted above, the impact of partner presence and support was particularly relevant for the RC group. Further, the qualitative study provided additional insight into the health behaviors of the participants that may not have emerged during the initial LIFE study. As with any study, there are limitations that may have influenced our findings.

Specifically, some of the potential participants needed childcare to be able to be a part of the qualitative study, and we were not able to offer it, thus, reducing the sample size. Additionally, our clinic is located in a metropolitan, urban area and may not be generalizable to other settings.

Despite these limitations, the qualitative study provided the opportunity to further investigate attitudes and perceptions regarding satisfaction with an intervention program meant for weight management during pregnancy. The original LIFE study consisted of an intense nutrition and physical activity intervention with structured counseling.

It also included a contingency management approach to behavioral modification that provided reinforcement through incentives to support positive behavior change. Contingency management is a

behavioral treatment in which tangible reinforcement is provided to individuals when target behaviors, such as exercise, are completed and objectively verified [18]. This is an innovative approach to weight management lifestyle intervention in obese pregnant women, and we sought to evaluate the acceptability of this intervention among obese women from our study cohort [19,20].

Evaluating and determining cost-effective and successful long-term programs for weight management during pregnancy is an area in the research literature that has yet to be fully developed. The objective of this qualitative study was to supplement the LIFE intervention program with direct participant perceptions of how to better integrate interpersonal and intrapersonal barriers and enablers into a more successful, larger scale intervention that is informed by a patient-centered approach to clinical interventions. The qualitative study demonstrated our intervention participants were eager to learn more about healthy behaviors, nutrition, and physical activity and those women may benefit from a variety of educational and support programs with appropriate provider involvement. Further research is needed to understand what additional components of behavioral intervention may be suited for women from diverse backgrounds and settings who are obese and at higher risk for maternal and infant complications.

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