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Intervention

Weight-related SMS texts promoting appropriate pregnancy weight gain: A pilot study

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ABSTRACT

Objectives: Excessive gestational weight gain (GWG) puts women and children at risk of obesity. We piloted an SMS-texting intervention to promote healthy GWG among overweight and obese women.
Methods: We recruited 35 women and randomized them in a 2:1 fashion to: a tailored SMS-texting intervention (Preg CHAT) vs. a generic texting intervention (Txt4baby). Preg CHAT texts provided personalized feedback based on women's intake of sweetened beverages, fruits and vegetables, fast food, daily steps taken, and weight. We abstracted women's weights from charts and surveyed women at baseline and 32 weeks gestation.
Results: Few women refused the study; many (30%) did not complete the study, however. Of those in the Preg CHAT arm, 86% responded to texts, and 80% said they would recommend this program to a friend. For women who completed the surveys ($n = 23$), those in the Preg CHAT arm had a mean gain of 6 less pounds than women in the Txt4Baby arm (95% CI −15.9, 4.0; $p = 0.24$).
Conclusions: This pilot study shows feasibility, acceptability, and potential efficacy of a low-intensity and disseminable intervention to help overweight and obese women reduce GWG.
Practice implications: An SMS texting program might help overweight women reduce excessive GWG.

1. Introduction

Excessive weight gain during pregnancy is a significant public health problem with as many as 57% of pregnant women gaining more weight than recommended by the Institute of Medicine [1,2]. Excessive gestational weight gain (GWG) puts both mother and baby at risk for obesity and subsequent obesity related chronic disease [1,3–6]. Interventions targeting GWG have only been somewhat successful, and more so for select groups [7]. For example, normal weight, higher income women, and those receiving exercise and/or nutritional counseling respond better to the interventions and are less likely to exceed GWG recommendations during pregnancy than overweight, lower income women, and those receiving no advice [8–11]. Interventions are needed to help these women, particularly those who are overweight or obese as they are at highest risk of complications.

Further, past interventions even those that are effective are not easily disseminable. Most interventions rely on face-to-face or telephone counseling or group sessions [7]. An innovative method for promoting healthy GWG that has not been tested among pregnant women is using Short Message Service (SMS) as a platform. Mobile phone use appears to be similar across all socioeconomic groups [12,13]. In fact, some socially disadvantaged populations are *more* likely to text daily than their more advantaged counterparts [14]. Thus, using an SMS intervention

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could have strong and low-cost impact and help hard-to-reach women if found effective. Although SMS interventions have been tested and found effective for weight management interventions among non-pregnant populations [15–19], none has attempted to promote healthy GWG via SMS texting.

The purpose of this pilot study was to assess the feasibility, acceptability, and preliminary efficacy of a SMS based intervention to help pregnant overweight and obese women gain an appropriate amount of weight.

2. Methods

2.1. Design

In 2012, we recruited participants from two prenatal clinics. We randomized eligible women in a 2:1 fashion to either a tailored SMS intervention arm (Preg CHAT text) or a generic texting intervention arm (Text4baby). The study was approved by our University's Institutional Review Board.

2.2. Participant recruitment

Study staff reviewed electronic obstetric medical records weekly to identify potentially eligible women scheduled for a prenatal visit. Clinic staff approached such women and asked whether they would be willing to talk to a research staff member who would explain the study. If women were interested, study staff obtained verbal consent to determine eligibility using a brief screener survey. Eligibility criteria included: age of 18 years or older, English-speaking, registered for prenatal care at participating clinics, pre-pregnancy BMI of 25–40, 12–21 weeks pregnant, and having a cell phone with an unlimited texting plan for the next five months. Exclusion criteria were: pre-existing diabetes, limited mobility or inability to walk, impaired cognition or mental health with inability to provide consent.

If eligible, studystaff obtained written consent and conducted a baseline survey. Then, staff randomized eligible patients, stratified by BMI category (overweight vs. obese)., Study staff administered two follow-up surveys at approximately 22 and 32 weeks gestation. Participants received $10 for each survey. Finally, staff abstracted all gestational weights from clinic charts at the end of women's pregnancy.

2.3. Measures

The surveys included questions about pregnancy history, weight history, stress, worry, self-efficacy, motivation and outcome expectations for gaining adequate weight, and food intake using the PRIME screen [20]. The PRIME screen contains 18 questions that target fruits, vegetables, whole and low-fat dairy products, whole grains, fish and red meat (as well as other foods that are major contributors to the intake of saturated and trans fat), their weekly consumption of fast food French, 2001 #6700 and current physical activity using the validated Pregnancy Physical Activity Questionnaire (PPAQ, validated 24-h recall of 32 activities) [21]. Both follow-up surveys also had additional process questions to assess usability and acceptability of the text messages. At each survey point, study staff weighed women using a calibrated scale (height assessed at baseline only). For the primary outcome, staff abstracted clinical weights between baseline and delivery of the baby.

2.4. Interventions

We sent SMS text messages to women randomized to the Preg CHAT text arm for approximately 16 weeks. Text messages were based on counseling protocols developed by the research team from previous studies targeting GWG. These messages were based on Social Cognitive Theory [22] and designed to increase self-efficacy, improve outcome expectations, address barriers, and promote self-monitoring. We targeted four weight-related behaviors: (1) increase their daily walking to 10,000 steps, (2) avoiding sweetened drinks, (3) eating at least five fruits and vegetables per day, and (4) eliminating fast food intake. We also asked women to text us their weight weekly. For the first 10 weeks, women were asked to start slowly with just two goals rather than being overwhelmed with four: walking 10,000 steps and avoiding sweetened drinks. At the time of the 22-week survey, we added two more goals (four goals total): eating at least five fruits and vegetables per day and eliminating fast food intake.

We texted women three days per week. On Mondays and Wednesdays women received two messages related to their targeted goals. The first text each day asked women to report how well they met their goals from the previous day (*"Good morning. Please send me yesterday's: # steps, # sugary drinks. Separate with a comma (ex: 6123,1)."*) We composed these messages ahead of time and included them in a message library. Research assistants then manually sent the messages out at the designated times. After women responded, we sent another text message with feedback on how well they were meeting each goal and a tip on how to achieve those goals. On Fridays, women received two texts (similar to the ones listed above) related to their goals and an additional text requesting their weight as well as a text asking the women to confirm they receiving their weekly texts. Based on the weekly texts, we tracked their weight gain. Monthly, women received a text message reminding them of the guidelines for gaining appropriate weight.

If women did not respond to any text, we sent out a separate text reminding them to respond (*"We haven't heard from u regarding ur goals. Pls respond to my txts as it will help u keep on track. Thx*"). Also, at the end of each month, we sent women a text message stating the percentage of texts to which they had responded (*"Thx for responding to XXX% of the txts we sent this week! For the program to work, pls keep it up. Great job!"*). To encourage adherence, women who responded to at least 80% of the texts were entered into a raffle for a $25 gift card.

For women randomized to the control arm, study staff helped them sign up for "Text4Baby," a texting program sending three text messages a week, timed to a woman's due date, with general pregnancy information [23]. Text4baby is a free mobile information service developed by the National Healthy Mothers, Healthy Babies Coalition, designed to promote maternal and child health. A sample text message is "*Brush & floss your teeth each day. When you're pregnant, your gums can swell and bleed. See a dentist to check. Call 800-311-2229 to find a dentist*" (only a few of these texts were related to healthy eating or physical activity).

2.5. Analysis

This exploratory pilot study assessed preliminary feasibility, acceptability, and efficacy. Given the small sample size, the purpose of the analyses was to assess means and variations in outcome measures with a view to formal sample size calculations in a future study. For assessing feasibility, a priori, we considered the intervention feasible if (1) we could recruit 30 pregnant women into the pilot study in five months, (2) at least 80% of the 20 women in the Preg CHAT text arm would report reading some or all of the text messages, and (3) women in the Preg CHAT text would respond to 75% of the text messages upon receiving them. For assessing acceptability, we asked all women how useful the intervention was (1 = "Not at all useful" to 5 = "Extremely useful"), whether the intervention helped them gain the adequate amount of weight during pregnancy (1 = "Did not help at all" to 5 = "Helped a lot"), and whether they would recommend the program to a friend (1 = "Definitely would not recommend" to 5 = "Definitely