Satisfaction with an Online Weight Gain Intervention for Women during Pregnancy:

e-Moms of Rochester

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Abstract

Background: Weight management during pregnancy is critical to health of both mothers and infants. Online weight management interventions have advantages of convenience, accessibility, and flexibility.

Objective: This paper examines the satisfaction of pregnant women with the weight management online intervention in the e-Moms of Rochester project and evaluates the satisfaction level by study arm and by demographic characteristic.

Methods: e-Moms of Rochester is a randomized controlled trial designed to help pregnant women achieve a recommended weight gain during pregnancy via an online intervention. The satisfaction survey was available online to the participants after their delivery. 942 out of 1512 pregnant women completed the satisfaction survey. Among the 942 participants, 621 women were in the intervention arm while the other 321 were in the control arm. The satisfaction level was measured on a 10-point Likert-scale from "0-strongly disagree" to "10-strongly agree". A score of 0-4 was counted as low satisfaction, 5-7 as medium satisfaction and 8-10 as high satisfaction. Chi-square test and Mann-Whitney U test were used for evaluating representativeness, satisfaction level across website features, and comparison of satisfaction by study arm and by demographic characteristic.

Results: 70%-91.2% participants had a moderate to high satisfaction with different website features. However, 59.3% participants rated social support negatively. The Resources (mean=7.29) and Articles & FAQ (mean=7.28) had the highest satisfaction levels on helpfulness. The weight gain tracker was rated highest in terms of ease of use (mean= 8.35). The satisfaction levels of helpfulness of Resources and Reminder were significantly different by arm (p= 0.035;

p= 0.002). Satisfaction levels for some website features were significantly different as well by demographic characteristic.

Conclusion: Overall, participants felt satisfied with the project website except for the aspect of social support. The sections of Articles & FAQ and Resources were the most helpful. Weight gain tracker was the easiest to use in the intervention group. The intervention group had higher satisfaction level with Resources and Reminder. Pregnant women, who were low-income, young, Hispanic, African American or had a lower education level, were more satisfied with the website features. And these women who were African American, young, with lower education, or with lower income, had significantly higher ratings of social support in this e-Moms Roc project.

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Introduction & Literature Review

Background

Good health during pregnancy is important for both mothers and infants. One way to keep healthy during pregnancy is to keep a progressive weight gain in different gestational periods that is within the range recommended by the Institute of Medicine (IOM). High gestational weight gain is positively associated with post-partum weight retention and increased risk of caesarean delivery, while low gestational weight gain is associated with poor fetal growth. Low gestational weight gain is also associated with failure of initiation of breastfeeding after delivery. In addition, both lower and higher gestational weight gains are associated with preterm birth compared to healthy weight gain during pregnancy (Rasmussen et al., 2009). Only 33-40% women in the United States gain the recommended amount of weight during their pregnancies (Olson, 2008), thus weight gain intervention among pregnant women is needed.

One novel approach to manage weight during pregnancy is through web-based interventions. The usage of computer to disseminate and acquire health-related information has increased in the last decade. The number of research papers published in the PubMed Database over the last five years that were titled as "web-based intervention" was four times as many as the number of interventions in the previous five years. The efficacy of online intervention has also been proven in different fields of studies (Bingham et al. 2010; Marsh-Tootle et al. 2011; Poddar et al. 2010). Users' satisfaction with web-based interventions towards weight management during pregnancy is an issue needing exploration because this is important for the improvement of efficacy and usage of online intervention.

Review of Previous Literature

I. Empirical and Theoretical Support for Online Weight Intervention during Pregnancy

i. Effectiveness of Web-based Health Intervention

One meta-analysis, which supported the effectiveness of web-based interventions for behavior change, documented improvement in behavioral outcomes such as increased exercise time, increased nutrition knowledge and long-term weight loss maintenance via effect size comparisons (Wantland et al. 2004). However, another systemic review evaluating the effectiveness of online intervention for weight loss maintenance among obese adults, pointed out that it was hard to determine the effectiveness of online weight management intervention due to heterogeneity and limited comparability of studies. This study also indicated that frequent use of website is positively associated with weight loss maintenance (Neve et al. 2010). User feedback and satisfaction surveys are needed to assist in determination of actual usefulness of features. The methods used to assess participants' attitude and satisfaction were usually online questionnaires, interviews, and sometimes group discussions (Ferney & Marshall 2006, Bossen 2013).

Because participation is voluntary, web-based intervention often exhibits selective enrollment bias. People who are relatively healthy and value health tend to participate more in this type of programs. In a Netherlands study with 9744 participants, its results showed that people, who were older, physically active, had more vegetable consumption and had never smoked, participated more actively in the follow-up intervention(Verheijden et al. 2007). The study of Van et al. in 2008 also showed that highly educated pregnant women with healthy lifestyle were more likely to use the web-based healthy lifestyle program than women with low education.

ii. Theory-based Health Intervention

The development of methods and approaches for web-based weight management intervention in pregnant women is based on a number of theories related to health behavior, such as theory of planned behavior, social cognitive theory, and the activation model of information exposure. These theoretical approaches mainly demonstrate how self-regulation, attitudes toward the behavior outcome and perceived social norms could change people's beliefs (Ajzen 1991, Bandura 2001) and how exposure to information and media could influence or affect people's specific beliefs and behaviors (Donohew, Lorch, & Palmgreen 1998). The integrated model of behavioral prediction theory and media priming theory, which resembles these theories above, is more comprehensive in terms of improving health behavior by changing attitudes. This model emphasizes the determination of population and the design of specific intervention methods for targeted populations in order to change behaviors effectively (Fishbein& Yzer, 2003). The integrated model of behavior prediction guides the development of the e-Moms Roc online intervention.

iii. Non-web-based Interventions on Weight Management in Pregnancy

Only a few studies examine online weight management interventions during pregnancy. Most interventions in weight management for pregnant women are conducted in an in-person setting. Among these web-based and face-to-face interventions, user satisfaction is not always examined. However, there is an increasing trend toward assessing user perceptions of interventions related to healthy behavior during pregnancy (Warren, Rance, & Hunter 2012).

One systemic review, which studied participants' enthusiasm regarding setting weight goals during pregnancy, revealed that women subjects tended to find these face-to-face interventions

too time-consuming (Brown et al. 2012). Another study, which focused on the satisfaction of obese pregnant women with a weight-gain intervention in a university hospital setting, illustrated the significance of continuous feedback, support and reinforcement from other people. More importantly, this study stated that self motivation to set a goal for weight control during pregnancy was the most critical component (Claesson et al. 2008).

II. User Satisfaction and Attitude in Different Types of Online Health Interventions

A great many health-related studies use the Internet to carry out their interventions. However, few take satisfaction of users into account as part of their studies. An evaluation of satisfaction of users is critical for establishment of effective web-based interventions. By understanding users' needs and preferences, web-based interventions are more likely to set up useful and attractive sections to motivate users to use the website.

Ways to evaluate satisfaction with web-based intervention programs are various, including website visit frequency counts, online surveys, and participant interviews on phone or face-to-face. Login counts and website click counts can provide objective information on how frequently participants actually use the whole website and certain modules. Online surveys or questionnaires are more subjective; however, the satisfaction level can be quantified by measuring across a range on a scale. Interviews are a good way to learn about feelings and perceptions of participants towards an intervention study. Interviews also provide researchers with a lot of thoughts for future improvement, but the records are hard to quantify (Papadaki & Scott 2006).

As studies that focus on satisfaction of pregnant women with web-based interventions on weight management, were few in number, similar studies of evaluation of satisfaction with web-based

interventions, related to nutrition education, physical activity and weight management of general population, were also examined in this review.

i. Web-based Intervention of Weight Management during Pregnancy

A series of studies for a nationwide web-based program of health promotion during pregnancy were carried out in the Netherlands. The pilot study, which primarily aimed at participants who attended midwifery practices in Amsterdam, indicated that women with low educational levels were less likely to continuously use the program than women with high levels of education. Its multivariate model showed that higher level of education was independently associated with intensity of program use. In addition, the study found that disadvantaged women, who were supposed to need the intervention most, were least easily reached because of selective enrollment and attrition (Van, Milder, & Bemelmans 2008). One later research paper, that investigated user perception in this pilot study, showed that users perceived the information as easy to understand and reliable. However, its satisfaction survey only had a response rate of 43%, partly due to the reason that not all pregnant women received the invitation to complete the satisfaction survey because they did not participate in the program at the beginning of their pregnancy. Only women who received three quiz emails or more received an invitation to complete the satisfaction survey. Suggestions from users included expansion of a variety of new in-depth information. This pilot study also conducted interviews with midwives. Half of them expressed the idea that they wanted to integrate the eHealth program into their standard care. There was, however, no association between satisfaction and education levels among participants in this pilot study (Van, Milder, & Bemelmans 2009). The official nationwide study with 13,946 pregnant women, which was launched after the pilot study, showed that women with less education were less active than women with higher education even though they had a higher satisfaction level. The degree of

satisfaction was assessed by an online questionnaire with a five-point scale from "totally disagree" to "totally agree". In the multivariate model of this study, being younger, being pregnant for the first time and not drinking alcohol were independently associated with positive program satisfaction. Variables such as education level and being overweight, however, did not show associations with satisfaction levels in this multivariate model (Bot, Milder, & Bemelmans 2009).

ii. Web-based Nutrition Education Interventions

A cross-sectional evaluation of an online nutrition education program that recruited 39,541 WIC participants showed a high degree of satisfaction with all measures of site usefulness, especially for the measures of helpfulness and easiness to use. Only 1.3% of participants gave negative feedback (Bensley et al. 2006). Another web-based tailored nutrition education intervention with a pre-test post-test design demonstrated that even though both intervention and control groups thought of the program as attractive, clear, credible and interesting, the tailored group appreciated the program more. They showed more willingness to consult the program again and intended to change their diet. Also, the tailored group responded that information on fat, vegetable and fruit was much more personally relevant and new to them. However, long-term effects, or behavior changes, still need justification (Oenema, Brug, & Lechner 2001).

Even though many online interventions claim to be interactive and tailored for the users (Oenema & Brug 2003, Winett 1999), there is still plenty of room for improvement in terms of interaction. Greater interaction can be achieved in various ways, such as goal setting sections, greater personalization and more regular updates.

iii. Web-based Intervention of Physical Activity

Ease of use, readability and navigation were shown in several web-based physical activity interventions (Bosak, Yates, & Pozehl 2009, Irvine et al. 2013, Bossen 2013). Participants were dissatisfied when a website intervention was inflexible and rigid (Bossen 2013). Two articles demonstrated the effect of environmental context components in the setting of online physical activity programs. One concluded that even though environmental context components, such as walking and cycling routes planning, did not increase appreciation of program, they were more used by participants than other intervention components. In addition, the study suggested that the integration of environmental components was able to propel active usage of intervention (Peels et al. 2013). One non-randomized controlled trial with a small sample size demonstrated that useful components, such as start-to-run program, strength program and stretching program, that were composed of specific exercise contents, were also used more frequently than other components, such as goal setting and weekly plan sections (Spittaels & De 2006). Another randomized-controlled trial of online intervention for physical activity promotion showed that some sections with higher frequency of use were rated as less helpful, and some sections rated as very helpful were actually less frequently used. This finding suggested that it was wrong to assume that sections with high frequency of use were the most helpful sections. It is important for future researchers who investigate user satisfaction of online interventions, to look at both frequency of use and participants' subjective feedback. Furthermore, the study concluded that self attitudes were important factors in health behavior change given that people in the "preparation" stage used the overall website of physical activity more frequently than people in the "contemplation" stage (Sciamanna et al. 2002).

Some physical-activity intervention studies also showed that web-based interventions needed to incorporate social support. In one intervention, that compared the impact of social interaction in face-to-face and internet-delivered programs, showed positive, though not significant, social support changes in face-to-face and combined groups, but no change in the Internet-only group (Steele, Mummery, & Dwyer 2009). Another small intervention program showed that the discussion board section was graded negatively and failed to play a role in promoting interaction (Bosak, Yates, & Pozehl 2009). Participants preferred to have simple interactive components together with information on opportunities for local community activities. Suggestions included online community notice board and information on specific local physical activity services (Ferney & Marshall 2006).

When comparing the difference between web-based and printed computer-tailored physical activity interventions, the clustered randomized controlled trial showed a higher usage of the printed intervention than the web-based intervention because articles were read, kept and discussed more frequently in the printed version. However, there was no significant difference in in-depth appreciation between two intervention conditions (Peels et al. 2013). A physical activity program promoting a daily 10,000-step walk suggested the feasibility and acceptability of this kind of online intervention, but it noted the limited potential to change participants' behavior in the long run. The feedback survey showed that reasons why certain people did not participate in the intervention included lack of time, the physical challenge of 10,000 steps, and the fact that some participants had already achieved 10,000 steps per day (Speck et al. 2010). In one tailored intervention, satisfaction with reminder emails was also evaluated, whose measurement included the number, frequency and usefulness of email (Spittaels et al. 2007).

iv. Web-based Combined Interventions of Nutrition Education and Physical Activity

Several interventions integrate both nutrition education and physical activity to promote a healthy lifestyle. One randomized controlled trial, evaluating the user and usage, indicated that older participants and those with no chronic condition were more likely to use the tool of healthy weight assistant. This indicated the possibility that demographic factors, such as age and medical history, could have an impact on the use of web-based health programs. The response rate of post-test survey in this study was 59%. People who filled out the survey had more positive attitudes and higher self-rating than people who dropped out in terms of their satisfaction with this study (Kelders et al. 2011).

In a clustered randomized controlled trial in 5 workplaces, female employees visited the intervention website more often than male employees to monitor their intake of fat, indicating a difference in usage by gender (Robroek et al. 2010). Another research project aimed at investigating the effect of student diversity on interest and design of a college-targeted web-based nutrition and physical activity program also provided some insight into the development of web-based program in a setting with diverse population (Quintiliani, De Jesus, & Wallington 2011).

v. Web-based Intervention for Weight Management

Online weight loss intervention programs designed for overweight and obese people show varying results from no weight loss to weight loss of 7.6 kilograms (Arem & Irwin 2011). The positive correlation between degree of weight change and frequency of use was shown in a commercial web-based cohort study (Neve, Morgan, & Collins 2011). In a randomized controlled trial, computer-tailored weight loss intervention was perceived as more relevant and

contained more new information compared to the generic group. This study, however, found that there was no significant difference in BMI change between study groups. A possible explanation might be sub-optimal use of website components (van Genugten et al. 2012).

Generally speaking, overall positive satisfaction was reported in interventions with weight management, but response rate of satisfaction surveys was usually very low (Stewart et al. 2011, McConnon, Kirk, & Ransley 2009, McCoy et al. 2005). A large-sample study with 2053 participants stated that it was hard to determine which components were successful and which were not without satisfaction evaluation. Results from this study also showed that participants who were Caucasian or had at least a college degree thought the intervention more effective than participants who were minority or had lower education degrees. But this study had an extremely high attrition rate of 75%, which may have had an impact on the validity of the results (Kaipainen, Paine, & Wansink 2012).

vi. Other Web-based Interventions

In web-based interventions, participants usually appreciate ease of accessibility, as well as trustworthy information and flexibility (Im et al. 2012, Pretorius et al. 2010). In one web-based intervention for Bulimia Nervosa treatment, the study found that the online intervention had the potential to increase accessibility to more effective treatment of BN (Pretorius et al. 2010). But one study, that promoted physical activity, and another study, that was related to healthy eating, both pointed out that greatest barriers to use the online intervention was lack of time (Sciamanna et al. 2002, Papadaki & Scott 2006). Even though online intervention provides people with flexibility so that they can decide when they want to log on the website, it is not as effective as other types of intervention because the frequency of use only depends on self motivation.

Quite a few interventions regarding user attitudes toward online interventions emphasize the importance of interpersonal interaction, support and feedback from other people (Im et al. 2012, Papadaki & Scott 2006, McTigue et al. 2011, Koch et al. 2009). Compared to traditional face-to-face intervention, web-based intervention may have the disadvantage of lacking immediate personal feedback. In one weight control web-based intervention, the social support module-- a chat room section-- was rated as least used and with the lowest satisfaction grade, as participants were seldom simultaneously online and in the chat room at the same time. This intervention also revealed that positive behavior change was hard to be achieved by merely information provided on the website (McConnon, Kirk, & Ransley 2009).

III. Other Components Related to User Usage and Satisfaction

i. Email and Cellphone Message Reminder

In order to resolve the problem of self as the driving force for using health intervention websites, regular reminder messages sent via emails, cell phones, or face-to-face by health-care providers are ways to effectively prompt users to log onto the website, check out the news, and use some specific sections (Chen et al. 2008, McTigue et al. 2011). It was shown in a weight loss program that 83.1% of the participants who filled out the satisfaction survey reported that they returned to the website due to the website links embedded in their weekly emails (McCoy et al. 2005).

In one study of promotion of health behaviors in work sites, Franklin et al. presented the potential of electronic means, such as email, as a reminder for using web-based health intervention. It documented that the email viewing rate did not vary between groups with different demographic characteristic such as age, gender and education (Franklin et al. 2006). However, in an email-based health program for pregnant women, women with little education

were less active in participating in this program than highly-educated pregnant women (Bot, Milder, & Bemelmans 2009). The discrepancy between these two studies regarding the influence of email by demographic characteristic may arise due to the difference in sample size. There were 345 participants in the former intervention and 13,946 participants in the latter intervention. Other electronic reminding approaches, such as text message and phone reminder, also turn out to significantly improve the attendance rate of participants, compared to the control group (Chen et al. 2008). A systematic review documented the positive association between usage of periodic prompts and effectiveness of limited contact interventions (Fry & Neff 2009).

In a randomized controlled trial to test the efficacy of email and phone reminders, participants were divided into three groups-- an observation group, a group with automated assistance, and a group with automated assistance plus phone reminders. The observation group contained people with the highest self motivation while both intervention groups included people with low self-monitoring ability. Results showed that automated email reminder and phone call indeed boosted the frequency of usage among intervention groups, which testified their effectiveness. The results, however, also revealed that self-monitoring rates were still greater in observation group with the highest self motivation (Greaney, 2012). The results shed some light on the important role of self beliefs to maintain health behavior. Changing one's beliefs proves to be an effective way to change his/her behavior.

ii. Attrition Rate

Attrition is a common issue in eHealth programs, since a high-dropout-rate will affect outcomes. Statistical measurement of the attrition curve is similar to the survival curve analysis, such as Kaplan-Meier analysis and proportional hazard regression analysis, given that both curves examine the half-life of targeted subjects (Eysenbach 2005).

One randomized controlled trial, aiming at promoting physical activity among sedentary older adults, analyzed the attrition rates between different categories such as treatment and control groups, male and female, and different races and ethnicity. The results revealed that treatment group, male and minority, had higher attrition rates than control group, female and Caucasian.This study provided insight into future research indicating that studies should pay extra attention to difference between participants with various demographic factors when designing the intervention (Irvine et al. 2013). Future studies, which aim at exploring how demographic characteristics of subjects such as gender, age, education and BMI and predicting program discontinuation, will be helpful to reduce dropout rates of eHealth programs. One study showed that eHealth intervention was more effective in weight change than for other health-related issues (Verheijden et al. 2007). A systemic review about weigh management for pregnant and postpartum women indicated that attrition rates were high in all selected studies. In addition, the attrition rate of control groups was higher than that of intervention groups in these studies (Kuhlmann et al. 2008).

IV. Summary of Literature Review

Web-based intervention of weight management during pregnancy is an approach to reach a potentially large population of pregnant women. Satisfaction evaluation of web-based interventions is helpful as it can increase participants' usage and improve users' experience during intervention. Web-based health interventions were overall viewed as easy, useful, helpful, and reliable. Participants in studies also appreciated the flexibility of online interventions because they always felt lack of time. However, lack of interactivity and social support were weakness of web-based programs. Integration of family and community support sections was suggested. Web-based tailored interventions were helpful to improve interactivity. Another

weakness of web-based intervention was the high attrition rate due to the nature that use of online intervention primarily depended on the self-motivation of participants. Email, text message, or phone reminders were shown to have a positive association with increased usage of program. Both objective measures, such as frequency of website usage, and subjective measures, such as satisfaction survey, should be evaluated together to gain a holistic picture of participant attitudes towards online interventions. Satisfaction of web-based health interventions varied among people with different demographic factors such as education, age, gender and race. In the future studies, it will be important to take demographic characteristics into account to develop a more effective online intervention. Long-term studies are also needed to document the effectiveness of web-based interventions on health behavior changes.

The Satisfaction Study

Purpose of the Satisfaction Study

This study focused on the satisfaction levels of pregnant women with the e-Moms Roc website during their pregnancy. Satisfaction levels of different website features were measured to see which features were most/least helpful and easy to use. Under the circumstance that few satisfaction studies regarding web-based health interventions during pregnancy exist, this paper examines the satisfaction levels by treatment arm, ethnicity, race, income, education, body mass index (BMI) and race in order to find the relationship between different demographic characteristics and the satisfaction levels of pregnant women with online health interventions.

Research Context for the Satisfaction Study – e-Moms Roc Project

The satisfaction study was embedded in the ongoing e-Moms Roc project, whose objective was to prevent excessive weight gain in pregnant women and to help them achieve a recommended weight during and after pregnancy by electronically mediated interventions.

Research Questions

1) Do the participants feel satisfied with different intervention components? **2)** Which ones do they feel are the most helpful or the easiest to use? **3)** Does the intervention group feel more satisfied with the program than the control group? **4)** Is there any difference in satisfaction between low-income and higher-income women, high-educated and low-educated women, normal-weight and overweight women, Hispanic and non-Hispanic women, women of different races, and women of different ages?

Hypotheses

1) The overall satisfaction is positive. **2)** The intervention group is more positive and satisfied with this program than the control group. **3)** Higher income, highly-educated, normal-weight, non-Hispanic, older, and white women are more satisfied than those without these characteristics.

Methods and Materials

Background on e-Moms Roc: The Source of Study Data

Design of the e-Moms-Roc Randomized Trial

e-Moms of Rochester is a double-blinded randomized controlled trial. The study started in August 2009 and is being carried out through May 31, 2014, with a 5-year duration. There were 6,215 pregnant women aged 18-35 with BMI of 18.5kg/m^2-35.0kg/m^2 in Rochester, Monroe County, NY screened for eligibility. The final number of participating pregnant women was 1,689. Criteria of eligibility included availability for a 24-month intervention, consent of participation in the study at or before 20 weeks of gestation, planning to keep the baby and to deliver in the study area, literacy in English, and a valid email address. The exclusion criteria included having past or planned weight loss surgery, attending weight loss program, multiple gestation, having a history of 3 or more consecutive miscarriages, taking regular medications of systemic steroid, medications for weight loss, diabetes, psychotropic conditions, hypertension, and having medical conditions which can influence weight during pregnancy such as eating disorder, cardiovascular diseases, malignancy, kidney disorders, or psychiatric conditions. An informed consent was required to be signed either online or in person by the pregnant women if they were willing to participate. The project asked a participant to log on the e-Moms website within 3 days of randomization and continue logging on the website at least once every month until 18 months after delivery.

After login, the participants had access to different sections of the website such as blogs, articles, other pregnant-related resources, and were able to set reminders for doctor appointments, taking pre-natal vitamins and water. All the materials were presented in English. Pregnant women were

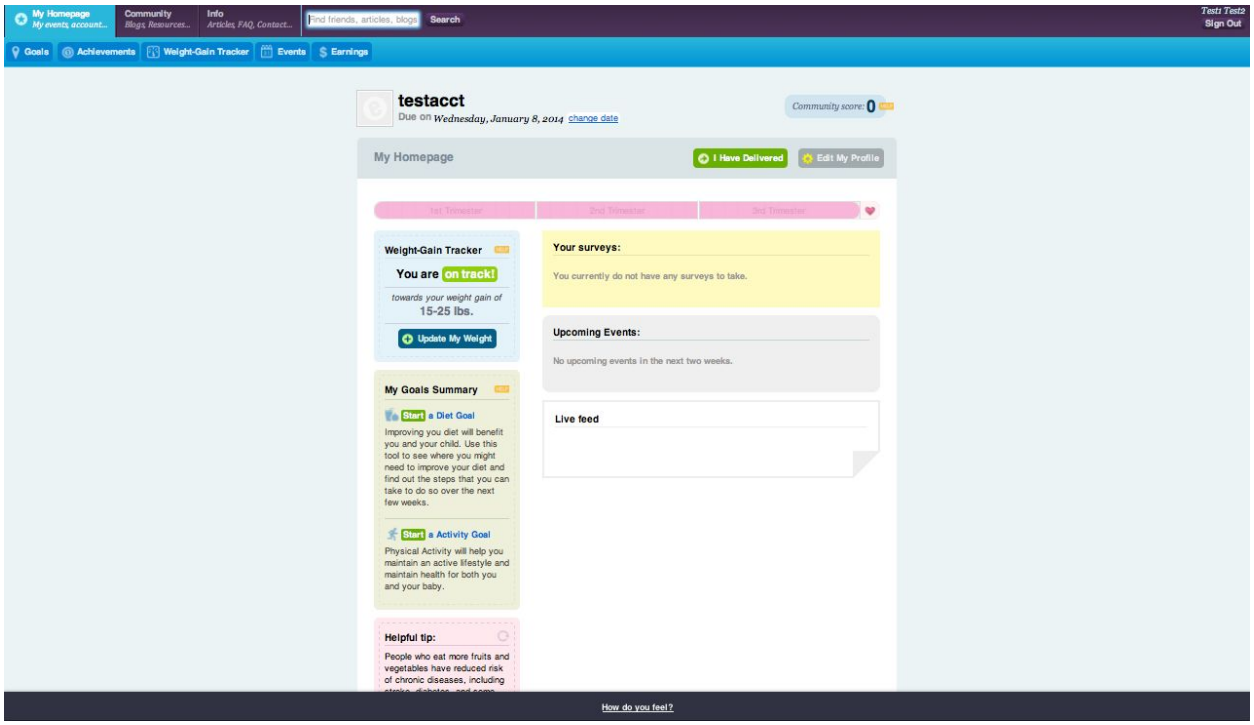
also asked to fill out different questionnaires related to their pregnancy, health habits, medical events, and medications during their pregnancy and until 18 months postpartum with incentives of up to $290. A weekly email reminder, along with two to three nutrition tips, was sent to each pregnant woman in order to remind them of logging on the website to use various features and check for updates. Program usage data such as login times and numbers of visits of different features were recorded automatically by the website.

The project randomized these pregnant women into three arms, each of which had 563 women, with equal probability within four strata defined by crossing BMI (normal vs. overweight) and income (less than 185% of poverty line vs. higher income). Participants in the first arm received electronically mediated intervention only during pregnancy and non-weight related content during postpartum. Participants in the second arm received electronically mediated intervention during pregnancy and continuing for 18-month postpartum. Participants in the third arm, as the control group, only received non-weight related content on the study website during and after pregnancy. The primary outcome for the intervention during pregnancy was the proportion of women who had excessive gestational weight gain.

Description of the Intervention and Its Features

The intervention group, besides receiving non-weight related content as the control group did, had access to sections of a weight gain tracker, a diet goal-setting tool, and a physical activity goal-setting tool. **Figure 1** shows the dashboard of the project website for pregnant women in the intervention arm, where there were sections of live feed for any new updates, such as blogs and articles, surveys to do, a weight gain tracker, a goal setting tool, and all the other features found in the menu bar. Intervention features are further discussed in the intervention paper in the e-Moms of Rochester project (Graham et al. 2014).

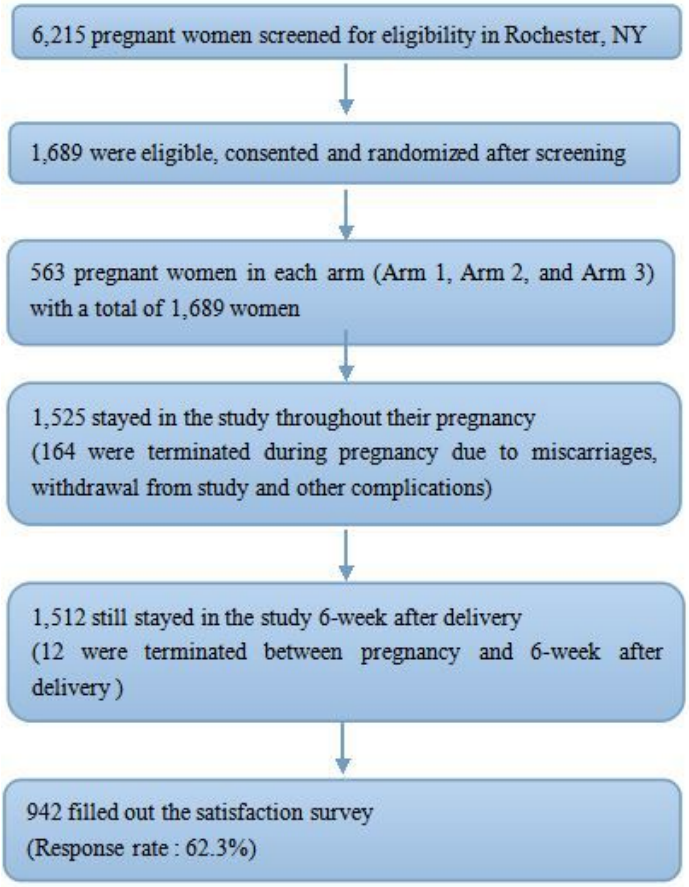
Figure 1. The dashboard of the e-Moms Roc website for participants in the intervention group



The Satisfaction Study

This satisfaction study embedded in the e-Moms Roc project evaluated the pregnant women's satisfaction with the project website so as to provide insights for improvement of website features, and to serve pregnant women better with the online intervention. The flow chart for the women participating in this satisfaction study is shown in **Figure 2**.

Figure 2. The flow chart of sample size dynamics from screening to the satisfaction study



Variables of Interest and the Measurements of Variables

In this study, the satisfaction levels were evaluated in terms of different demographic characteristics, such as maternal ethnicity, race, income, education level, BMI category, and age category. The satisfaction levels were also examined by treatment arm. The categories of the demographic features are shown in **Table 1**.

Table 1. Demographic characteristics included in the satisfaction study

Ethnicity	Hispanic/ Non-Hispanic
Race	The races asked in the baseline questionnaire included Caucasian/White, African American/Black, Asian, American Indian or Alaska Native, Native Hawaii or other Pacific Islanders, other races and unknown races. The groups of Asian, Native American, and Pacific Islanders were combined with "other races" due to small sample sizes. Therefore the race categories in this satisfaction study were Caucasian/White, African American/Black, other races and unknown races.
Income	Lower income and higher income, which means <185% of poverty line and >185% of poverty line.
Education level	The education degree asked in the baseline questionnaire included 1) did not finish elementary school 2) finished middle school (8^{th} grade) 3) finished some high school 4) high school graduate or G.E.D (General Educational Development) 5) vocational or training school after high school 6) some college or associate degree 7) college graduate or Baccalaureate degree 8) Master or Doctoral degree (PhD, MD, JD, etc). However, there was only one woman in the first category out of 1512 pregnant women. Because the first to the fifth categories did not have enough sample sizes to carry out valid chi-square tests, the 1^{st}, 2^{nd} and 3^{rd} categories were combined together into a category of "degree before high school", and the 4^{th} and 5^{th} categories were combined together into a category of "degree before college". Therefore the education categories in this satisfaction study were 1) degree before high school, 2) degree before college 3) some college or associate degree 4) college graduate or Baccalaureate degree 5) Master or Doctoral degree (PhD, MD, JD, etc).
BMI category	Normal (>=18.5 and <25), overweight (>=25 and <30) and obese Class I (>=30 and <35)
Age	Three categories which were 18-24, 25-30, and 31-36.

The dependent variables- satisfaction levels - were asked in the survey from different perspectives, including helpfulness, ease of use and engagingness of the web features. For example, the survey asked about satisfaction levels of pregnant women with website features such as Blogs, Reminders, Articles&FAQ related to pregnancy, and Resources. Other questions such as whether the women received social support from other study participants, whether they enjoyed participating in the study during their pregnancy, and whether they would recommend the e-Moms Roc study to other pregnant women were included as well. The intervention group had additional questions regarding the weight gain tracker, the diet goal-setting tool and the physical activity goal-setting tool, that were not included in the survey of the control group because they did not have access to these features.

Data Collection

Each randomized pregnant woman had an identification number. All participants received screening before they were enrolled in the project. During this screening, questions regarding their ethnicity, BMI, income, race, estimated delivery dates were asked.

The baseline questionnaire, completed after the pregnant women had joined the project, was filled out voluntarily by the pregnant women with an incentive of $10.00. This was an online survey, but women who did not complete the survey online were given the opportunity to complete it on the telephone through a personal interview. And even if women did not fill out the baseline questionnaire, they could still participate in the study and have access to the website and various features provided to them. The baseline questionnaire covered questions related to pregnant women's heath during pregnancy, lifestyle habits, and basic demographics. More specifically, the questionnaire asked about weight before and during pregnancy, cell phone and computer use, tobacco and alcohol use, mood, sleep quality, eating patterns, frequency of eating

away from home, feelings about eating, physical activity during pregnancy, sedentary behavior, supportive relationship, employment status, neighborhood environment, household income, relationship status and highest education the participants received.

The satisfaction survey was an online self-administered survey available on the website after each pregnant woman had delivered her baby. It was made available two or more weeks past her estimated delivery date. Pregnant women could fill out the survey anytime after their delivery with no deadline. There was no incentive or reminder to complete this survey. The survey, asked the pregnant women about their satisfaction with different features on the project website during their pregnancy. The response rate of the satisfaction survey was the number of pregnant women who filled out this survey divided by the number of women who were still in the study after their delivery. Participants who had miscarriage, stillbirths, or withdrew from the study during pregnancy were excluded from the analysis of satisfaction and the total sample who had filled out the baseline demographic questionnaire. In this satisfaction study, the first two arms were both the intervention group while the third arm was the control group because both the first and the second arm received electronically-mediated intervention during their pregnancy, while the third arm only received non-weight related content. The response categories for the satisfaction survey items were based on a 10-point scale, from "0-strongly disagree" to "10-strong agree" (See **Appendix A** for the satisfaction survey). In the analysis of the satisfaction survey, the values of 0-4 were classified as low satisfaction, the values of 5-7 were classified as medium satisfaction, and the values of 8-10 were classified as high satisfaction.

Statistical Analysis

Descriptive statistics, mean and standard deviation, were used to show the satisfaction levels of each website feature. Chi-square test for categorical variables and analysis of variances for continuous variables were used for examining associations and differences. In order to evaluate the most helpful feature and the easiest feature, one sample Wilcoxon signed rank test was used to test the difference among the features due to skewed distribution of satisfaction data. The nonparametric Mann-Whitney U test was applied to compare the satisfaction level between the intervention group and the control group due to the non-normal distribution of satisfaction responses. Chi-square test was used to test the association between satisfaction and different demographic characteristics in three conditions, which were within control group only, within intervention group only, and within total sample who had filled out the satisfaction survey. Different aspects of satisfaction such as attractiveness, easiness and helpfulness of the website features were analyzed by chi-square test as well. The significant levels of all the tests in this study were set at a confidence level of 0.05. The statistical software used to carry out the data analysis was SPSS Version 21.0 (SPSS Inc, Chicago, IL).

Results

Representativeness of the Participants in the Satisfaction Study

The total number of pregnant women who filled out the satisfaction survey after their delivery was 942 while the total number of pregnant women who still stayed in the study 6 weeks postpartum was 1,512, excluding those women who had stillbirths, miscarriages, withdrew from the study and other complications. Therefore the response rate was 62.3% shown in **Figure 2**. As seen in **Table 2**, the proportions of participants in the intervention arm and the control arm in the satisfaction study (N=942) represented those in the entire e-Moms Roc study (N=1512) , with a p-value of 0.646. The proportion comparison by chi-square test was carried out between the sample group who filled out the satisfaction survey (N=942) and the group who did not fill out the survey (N=570) because these two groups were independent from each other. Results showed that there were significant differences between these two groups in terms of ethnicity, race, income, education, BMI, and age. Pregnant women who were Non-Hispanic (89.6% in the satisfaction study sample vs. 83.4% in the group who did not complete the survey), Caucasian (74.5% vs. 44.1%), aged from 25-30 (44.3% vs. 34.8%) or 31-36 (34.8% vs. 26.3%), had a higher-income (68.6% vs. 36.6 %), received a higher education of bachelor (27.9% vs.14.5%), master, or doctoral degree (28.4% vs. 14.8%), or had a normal BMI (57.0% vs. 46.0%) tended to have a larger proportion of completing the satisfaction survey. Women who were Hispanic, African American, obese, young (18-24), had low-income, or received lower degrees tended not to respond to the satisfaction survey.

Table 2. Demographic characteristics in the total sample, the satisfaction study sample and the sample that did not complete the satisfaction survey.

		Sample Group							
		Total sample (N=1512)		Satisfaction sample (N=942)		Not filling out satisfaction survey (N=570)		Between satisfaction group and the group who did not fill out the survey	
		Count	Column N %	Count	Column N %	Count	Column N %	Chi-square	p-value
Arm	Control Group	508	33.60%	321	34.10%	189	32.90%	0.211	0.646
	Intervention Group	1004	66.40%	621	65.90%	385	67.10%		
Ethnicity	Non-Hispanic	1321	87.40%	844[a]	89.60%	479	83.40%	12.131	0.000*
	Hispanic	191	12.60%	98	10.40%	95[a]	16.60%		
Race	Caucasian/ White	953	63.00%	702[a]	74.50%	253	44.10%	168.324	0.000*
	African American/ Black	342	22.60%	120	12.70%	224[a]	39.00%		
	Other races	78	5.20%	49	5.20%	29	5.10%		
	Unknown races	139	9.20%	71	7.50%	68[a]	11.80%		
Income	Higher-income	854	56.50%	646[a]	68.60%	210	36.60%	148.501	0.000*
	Low-income	658	43.50%	296	31.40%	364[a]	63.40%		
Education	Degree before high school	93	7.50%	40	4.40%	53[a]	15.70%	96.403	0.000*
	Degree before college	203	16.30%	124	13.60%	79[a]	23.40%		

	Some college or associate degree	336	27.00%	233	25.60%	107[a]	31.70%		
	Bachelor degree	303	24.40%	254[a]	27.90%	49	14.50%		
	Master or Doctoral degree	308	24.80%	258[a]	28.40%	50	14.80%		
BMI Category	Normal	787	52.10%	537[a]	57.00%	264	46.00%	21.025	0.000*
	Overweight	445	29.40%	268	28.50%	184	32.10%		
	Obese	280	18.50%	137	14.50%	126[a]	22.00%		
Age	18-24	411	27.20%	197	20.90%	223[a]	38.90%	57.385	0.000*
	25-30	583	38.60%	417[a]	44.30%	200	34.80%		
	31-36	518	34.30%	328[a]	34.80%	151	26.30%		

The representativeness of the satisfaction study was measured by the chi-square test between the satisfaction study sample (N=942) and the sample of not filling out the survey (N=570) because these two sample groups were independent to each other.

*. The Chi-square statistic is significant at the .05 level.

a. The subcategory with an "a" at the cell's top right means this subcategory has a larger proportion in the intervention sample/ control sample than in the control sample/ intervention sample at a significance level of 0.05.

Satisfaction Levels of Different Website Features

The proportions of high, medium and low satisfactions with each feature were measured in **Table 3.** Most of website features were rated as being highly satisfactory (>=8 and <=10) in the total satisfaction sample (N=942).

Engaging: The engaging level of the Blogs had a larger proportion of medium satisfaction (>=5 and < 8), which was 43.1%.

Easy-to-use: Women (75.2%) in the intervention group (N=621) felt highly satisfied with ease of use of weight gain tracker. And 65.3% of women in the satisfaction study (N=942) had a high satisfaction in Articles&FAQ with respect to ease of use.

Helpful: For features only in the intervention group, pregnant women tended to feel neutral in satisfaction of the helpfulness of diet goal setting tool (35.3% of the women) and the physical activity goal setting tool (37.6% of the women). All the other features in the intervention group had high satisfaction level.

Overall Assessment: 59.7% women had a high level of enjoying participating. Only the social support had a larger proportion of low satisfaction (>=0 and < 5), which was 59.3%. And 68.7% of the total sample would recommend this program to other pregnant women.

Table 3. The counts and proportions of satisfaction levels for each website feature

		Count	Column N %
Blogs- Engaging	Low	257	27.8%
	Moderate	398	43.1%
	High	268	29.0%
Blogs- Easy to use	Low	131	14.2%
	Moderate	258	28.0%
	High	533	57.8%
Blogs- Helpful	Low	194	21.2%
	Moderate	320	35.0%
	High	399	43.7%
Reminder- Helpful	Low	275	30.0%
	Moderate	226	24.6%
	High	417	45.4%
Articles and FAQ- Easy to understand	Low	81	8.8%
	Moderate	238	25.9%
	High	601	65.3%

Articles and FAQ- Interesting	Low	104	11.3%
	Moderate	289	31.5%
	High	524	57.1%
Articles and FAQ- Helpful	Low	110	12.1%
	Moderate	274	30.1%
	High	526	57.8%
Resources- Helpful	Low	116	12.8%
	Moderate	278	30.6%
	High	515	56.7%
Social support	Low	543	59.3%
	Moderate	175	19.1%
	High	197	21.5%
Enjoy participating	Low	122	13.2%
	Moderate	251	27.1%
	High	553	59.7%
Recommend to others	Low	88	9.5%
	Moderate	201	21.8%
	High	635	68.7%
Weight gain tracker- Easy to use*	Low	33	7.1%
	Moderate	82	17.7%
	High	349	75.2%
Weight gain tracker- Helpful*	Low	90	19.4%
	Moderate	120	25.9%
	High	253	54.6%
Diet goal-setting- Easy to use*	Low	89	19.8%
	Moderate	141	31.3%
	High	220	48.9%
Diet goal-setting- Helpful*	Low	141	31.5%
	Moderate	158	35.3%
	High	149	33.3%
Physical activity goal-setting- Easy to use*	Low	95	20.8%
	Moderate	138	30.2%
	High	224	49.0%

Physical activity goal-setting- Helpful*	Low	140	30.8%
	Moderate	171	37.6%
	High	144	31.6%

*. Questions regarding these features were only provided to the intervention group, which had 621 pregnant women in total.

Table 4 shows the means and standard deviations for the satisfaction ratings as continuous variables for each of the e-Moms Roc website features. Most of the means of website features, shown in **Table 4,** were in the category of medium satisfaction level (>=5 and <=8), and ranged from 5.72-7.94 in the total satisfaction sample (N=942). For features that only the intervention group had access to, the satisfaction levels ranged from 5.67-8.35. The feature of weight gain tracker had a mean of 8.35 in terms of easiness of use. This could be seen as high satisfaction (>=8 and <=10).

Table 4. The number of responses, mean, and standard deviation of each satisfaction question in the total sample (N=942) in the satisfaction study.

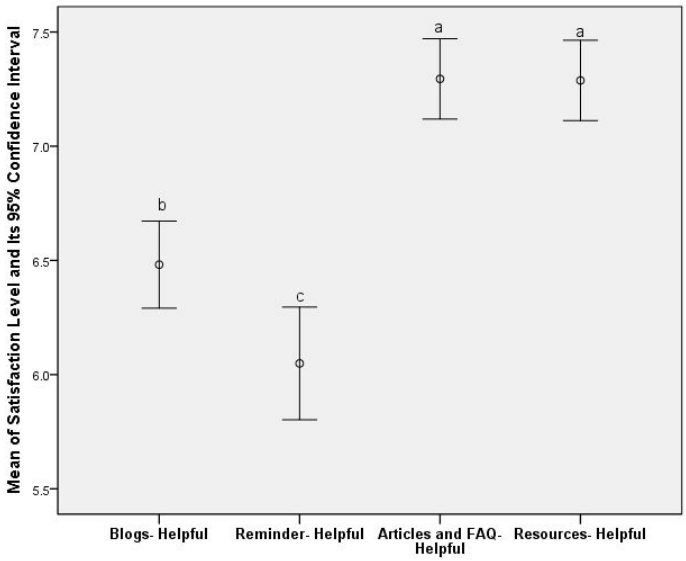
Descriptive Statistics			
	N	Mean (on a scale of 0-10)	Std. Deviation
Blogs- Engaging	923	5.72	2.777
Blogs- Easy to use	922	7.28	2.761
Blogs- Helpful	913	6.47	2.855
Reminder- Helpful	918	6.06	3.682
Articles and FAQ- Easy to understand	920	7.77	2.530
Articles and FAQ- Interesting	917	7.30	2.551
Articles and FAQ- Helpful	910	7.28	2.635

Resources- Helpful	909	7.29	2.624
Social support	915	3.55	3.748
Enjoy participating	926	7.43	2.682
Recommend to others	924	7.94	2.550
Weight gain tracker- Easy to use*	464	8.35	2.465
Weight gain tracker- Helpful*	463	7.05	3.061
Diet goal-setting- Easy to use*	450	6.74	3.020
Diet goal-setting- Helpful*	448	5.67	3.186
Physical activity goal-setting- Easy to use*	457	6.67	3.090
Physical activity goal-setting- Helpful*	455	5.58	3.205

*. Questions regarding these features were only provided to the intervention group, which had 621 pregnant women in total.

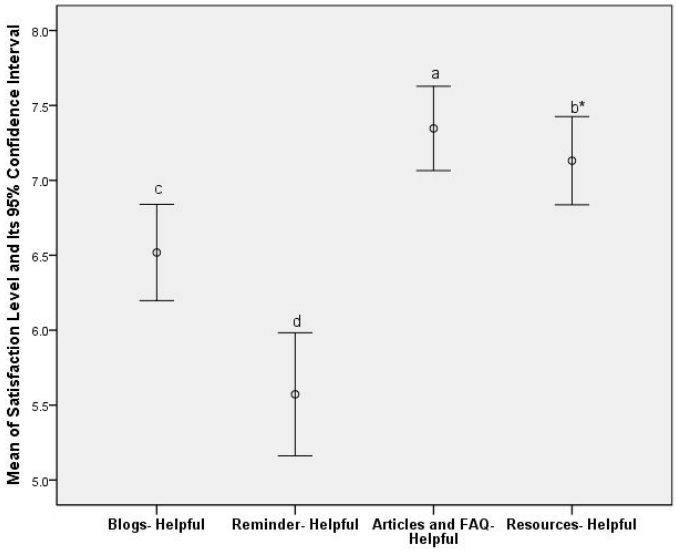
Helpfulness was one aspect of satisfaction that was asked about most consistently across web site features, which allowed for comparisons. In the total satisfaction sample, there were four features, about which helpfulness was asked. They were Blogs, Reminder, Articles & FAQ, and Resources. The satisfaction levels for Articles & FAQ and Resources were the highest while the satisfaction level of Reminder was the lowest among these four features. Blogs were rated in between these features, which can be seen in **Figure 3**. There was no significant difference of satisfaction between Articles & FAQ and Resources. In the control sample, the order from the most helpful feature to the least helpful feature was Articles &FAQ, Resources, Blogs, and Reminder with significant differences between each feature, which can be seen in **Figure 4**.

Figure 3. The means of helpfulness and their confidence intervals of website features in the total satisfaction study sample (N=942)



*. Letters a, b, and c denote a difference in the mean of satisfaction with a significant level of 0.05 from the highest satisfaction to the lowest satisfaction.

Figure 4. The means of helpfulness and their confidence intervals of website features in the control group of the satisfaction study (N=321)



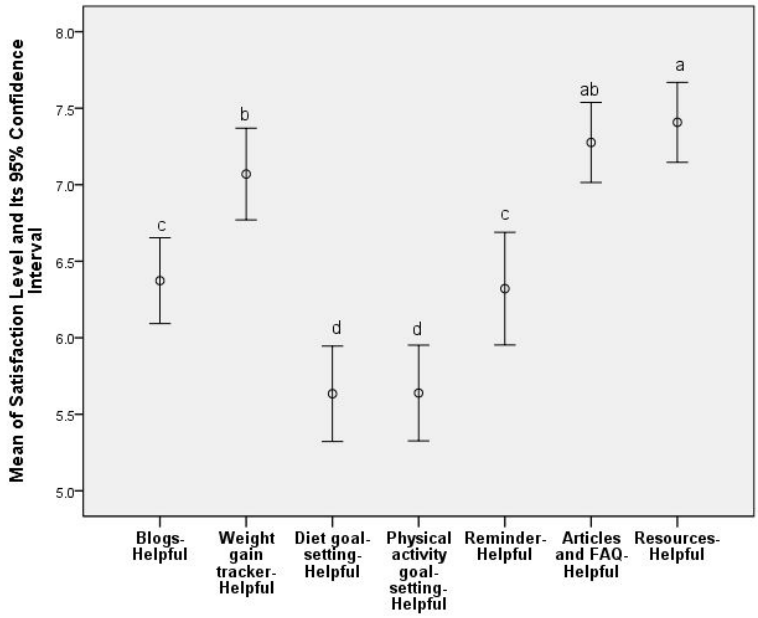
*. Letters a, b, c, and d denote a difference in the mean of satisfaction with a significant level of 0.05 from the highest satisfaction to the lowest satisfaction.

**. Even though the mean of Resources-Helpful was in the 95% confidence interval of Articles and FAQ-Helpful, the p-value of non-parametric Wilcoxon Signed Ranks Test (due to non-normal distribution of the response variable) was 0.025, which was less than the significance level of 0.05. Therefore these two variables were considered as significantly different from each other in the graph.

In the intervention group, helpfulness was asked about seven features. They were Blogs, Reminder, Weight gain tracker, Diet goal-setting tool, Physical activity goal-setting tool, Articles & FAQ, and Resources. The equally most helpful features were Articles & FAQ and Resources, while the equally least helpful features were the two goal-setting tools for diet and physical activity. The order from the most helpful feature to the least helpful feature was Resource, Articles &FAQ, Weight gain tracker, Blogs, Reminder, Diet goal-setting tool, and Physical activity goal-setting tool, which can be seen in **Figure 5**.

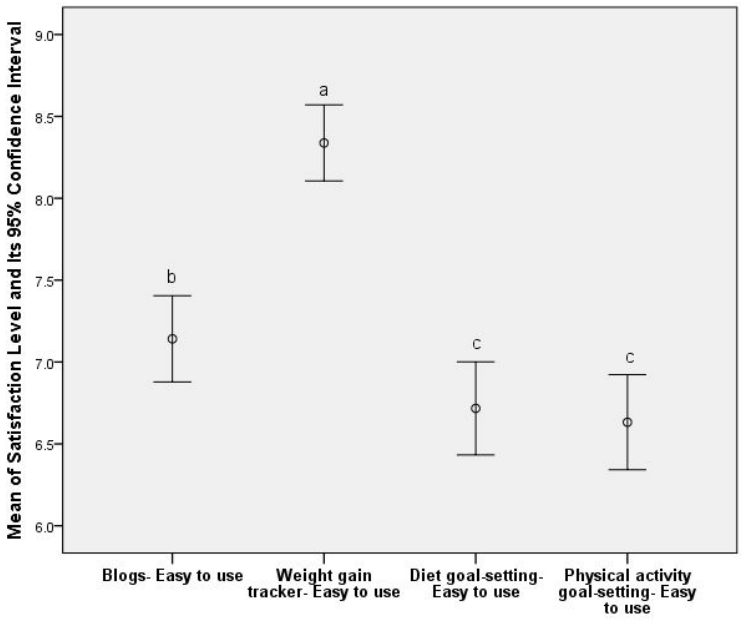
In terms of ease of use, four features were asked about, including Blogs, Weight Gain Tracker, Diet goal-setting tool and Physical activity goal-setting tool. The weight gain tracker as shown in **Figure 6** was rated the easiest to use, while the Diet goal-setting tool and Physical activity goal-setting tool were least easy to use.

Figure 5. The means of helpfulness and their confidence intervals of website features in the intervention group of the satisfaction study (N=621)



*. Letters a, b, c, and d denote a difference in the mean of satisfaction with a significant level of 0.05 from the highest satisfaction to the lowest satisfaction.

Figure 6. The means of ease of use and their confidence intervals of website features in the intervention group of the satisfaction study (N=621)



*. Letters a, b, and c denote a difference in the mean of satisfaction with a significant level of 0.05 from the highest satisfaction to the lowest satisfaction.

Satisfaction Levels by Arms

Satisfaction with the e-Moms Roc website features was also compared by treatment arm. Helpfulness of the Reminder differed significantly between the intervention group and the control group (p= 0.002). There was also a significant difference in helpfulness of Resources between the intervention group and the control group (p=0.035). For both of these features, the intervention group ranked the features more highly than the control group did. All the other features did not have significant differences between the two arms, which are shown in **Table 5**.

Table 5: The associations between treatment arms and satisfaction levels of website features with a significant level of 0.05 (*).

Ranks						
	Arm	N	Mean Rank	Sum of Ranks	Mann-Whitney U Test Statistics	P-value (two-tailed)
Blogs- Engaging	Control Group	314	460.27	144524.50	95069.500	0.886
	Intervention Group	609	462.89	281901.50		
Blogs- Easy to use	Control Group	314	466.15	146372.00	93995.000	0.698
	Intervention Group	608	459.10	279131.00		
Blogs- Helpful	Control Group	314	457.06	143516.50	94024.500	0.996
	Intervention Group	599	456.97	273724.50		
Reminder- Helpful	Control Group	315	423.43	133382.00	83612.000	0.002*
	Intervention Group	603	478.34	288439.00		
Articles and FAQ- Easy to understand	Control Group	315	458.95	144569.50	94799.500	0.896
	Intervention Group	605	461.31	279090.50		
Articles and FAQ- Interesting	Control Group	312	457.02	142589.00	93761.000	0.869
	Intervention Group	605	460.02	278314.00		
Articles and FAQ- Helpful	Control Group	315	456.96	143942.50	93252.500	0.902
	Intervention Group	595	454.73	270562.50		
Resources- Helpful	Control Group	310	429.78	133232.00	85027.000	0.035*
	Intervention Group	599	468.05	280363.00		
Social support	Control Group	316	451.60	142705.00	92619.000	0.580
	Intervention Group	599	461.38	276365.00		
Enjoy participating	Control Group	318	441.82	140499.00	89778.000	0.069
	Intervention Group	608	474.84	288702.00		
Recommend to others	Control Group	318	456.46	145154.50	94433.500	0.604
	Intervention Group	606	465.67	282195.50		

Satisfaction Levels by Ethnicity

Here the satisfaction with the e-Moms Roc website features was compared by ethnicity. There were significant differences by ethnicity in the features of Reminder, social support, and general recommendation of the program in the total sample of satisfaction study.

General Features:

Engaging: Compared with Non-Hispanic women, a larger proportion of Hispanic pregnant women thought the Blogs and the Articles & FAQ were interesting and engaging.

Helpful: Hispanic women thought the Reminder and the Resources were more helpful. Non-Hispanic women in the intervention group felt lower satisfaction with the helpfulness of the Blogs and the Reminder.

Overall Assessment: **Table 6 (See Appendix B)** shows that Hispanic women were more satisfied with social support, enjoyed participating, and felt more willing to recommend this online program to other pregnant women. Non-Hispanic women in the total sample of the satisfaction survey had low satisfaction level toward Blogs, Reminder, and social support. Hispanic women's satisfaction levels with features of Reminder and social support were all significantly higher than Non-Hispanic women in the total sample group (N=942), the intervention group (N=621), and the control group (N=321) respectively. As shown by **Table 6,** the difference of satisfaction levels by ethnicity was not obvious in the control group. However, the differences stood out in the intervention group. In addition, 75.8% Hispanic women in the intervention group had high satisfaction in participating in the program while there were only 62.9% Hispanic women in the control group enjoyed participation. Besides, 82.0% Hispanic women in the intervention group

said they would highly recommend this program to other pregnant women while only 77.1% Hispanic women in the control group said so.

Intervention Features:

Table 7 (See Appendix B) shows that there was no significant difference in satisfaction with these features by ethnicity. If looking at pairwise comparison, there were 20.7% Non-Hispanic women feeling low satisfaction with the helpfulness of weight gain tracker, while only 8.5% Hispanic had low satisfaction with this feature.

Satisfaction Levels by Race

The satisfaction with the e-Moms Roc website features was compared by race as well, shown in **Table 8 (See Appendix B)**.

General Features:

Engaging: The engaging levels of the Blogs differed significantly by race. Caucasian women tended to be more neutral in satisfaction (45.7% of Caucasian vs. 30.8% of African American in the total satisfaction sample). In contrast, there was a larger proportion of African American/Black women feeling high satisfaction of the engagingness of the Blogs (45.8% of African American vs. 24.7% of Caucasian in total satisfaction sample).

Easy-to use: African American women in the intervention group felt more highly satisfied with the ease of the use of Blogs than Caucasian/White women (71.8% of African American vs. 54.1% of Caucasian).

Helpful: The helpful levels of the Reminder were significantly different by race. The satisfaction level of helpfulness of Articles&FAQ was significantly different in the control group, but not in the intervention group. There was also a larger proportion of African American/Black women

feeling high satisfaction of the helpfulness of the Blogs and the Reminder than Caucasian/White women (Blogs: 45.8% of African American vs. 24.7% of Caucasian in total satisfaction sample, Reminder: 63.0% of African American vs. 39.0% of Caucasian in total satisfaction sample).

Overall Assessment: Satisfaction of Blogs, of participation, and of the willingness to recommend this program were significantly different by race in the intervention group. Women of different races rated the social support differently in the total satisfaction study sample (N=942). African American had a higher rating of social support (39.5% of African American vs. 16.6% of Caucasian in total satisfaction sample) and were more willing to recommend to other pregnant women (80.5% of African American vs. 65.1% of Caucasian). White pregnant women had a significantly larger proportion of not being satisfied with the Reminder (33.9% of Caucasian vs. 13.7% of African American in the total satisfaction study sample, 31.0% of Caucasian vs. 12.0% of African American in the intervention group, and 39.6% of Caucasian vs. 16.7% of African American in the control group) and social support (63.9% of Caucasian vs. 45.4% of African American in the total satisfaction study sample).

Intervention Features:

In terms of intervention features, there were significant difference in helpfulness and ease of use of each features (weight gain tracker, diet goal-setting tool, physical activity goal-setting tool) by race, except for the ease of use of weight gain tracker, shown in **Table 9 (See Appendix B)**.

Easy-to-use: African American women had a lower satisfaction level in ease of use of weight gain tracker than Caucasian women (15.0% African American women with low satisfaction vs. 5.2% Caucasian women with low satisfaction).

Helpful: In pairwise comparison, African American women had larger proportions of high satisfaction with helpfulness of diet goal-setting tool (51.7% vs. 28.4% of Caucasian women) and with helpfulness of physical activity goal-setting tool (51.7% vs 26.8% of Caucasian women). Caucasian women, on the other hand, had larger proportion of medium satisfaction with helpfulness of the diet goal-setting tool and the physical activity goal-setting tool.

Satisfaction Levels by Income

Here the satisfaction with the e-Moms Roc website features was compared by income in **Table 10 (See Appendix B)**.

General Features:

Helpful: In the feature of Reminder, 19.1% women with low-income in the intervention group had low satisfaction while 32.0% women with low-income in the control group felt unsatisfied. In the intervention group, 63.3% of low-income women thought the reminder very helpful while only 45.0% of low-income women in the control group thought this feature highly helpful. Besides, low-income women in the control group had higher proportion of feeling neutral in satisfaction, compared with those in the intervention group. For example, 32.0% low-income women in the control group felt moderately satisfied with the helpfulness of Articles&FAQ, compared with 22.0% in the intervention group.

Overall Assessment: Significant differences in satisfaction levels existed in the total satisfaction group (N=942) and the intervention group (N=621), in terms of social support, enjoying participation and features of the Blogs (engagingness, helpfulness, and ease of use), Reminder (helpfulness), and Articles&FAQ (helpfulness). The control group (N=321) only had significant difference in the satisfaction level of social support, where 25.5% of pregnant women of low

income felt highly satisfied, while only 14.5% of higher-income women thought the support from others was highly appreciated. Women with low-income had larger proportion of being highly satisfied with the Blogs (engagingness, helpfulness, and ease of use), the Reminder, the Articles&FAQ, the Resources, social support and participation in the program. In contrast, women with higher-income had higher proportion of feeling low or moderate satisfaction in these features. 71.0% of low-income women in the intervention group enjoyed participating very much, and only 53.9% of low-income women in the control group highly enjoyed participating.

Intervention Features:

In the intervention features, there were significant differences by income in the helpfulness of physical activity goal-setting tool and diet goal-setting tool, and the ease of use of physical activity goal setting tool.

Easy-to-use: 60.4% low-income women had high satisfaction with the physical activity goal-setting tool about ease of use while only 44.0% high-income women had high satisfaction, as shown in **Table 11 (See Appendix B)**.

Helpful: Low-income women had higher satisfaction with the goal-setting tools compared to higher-income women (44.1% low-income women vs. 28.5% high-income women regarding helpfulness of diet goal-setting tool; 45.7% low-income women vs. 25.4% high-income women regarding helpfulness of physical activity goal-setting tool).

Satisfaction Levels by Education

The satisfaction with the e-Moms Roc website features was also compared by education, shown in **Table 12 (See Appendix B)**.

General Features:

Engaging: In the feature of engagingness of Blogs, 39.8% women with Master or Doctoral degree had low satisfaction in the intervention group while only 30.6% women with Master or Doctoral degree in the control group had low satisfaction. Still in the feature of the Blogs, 47.8% women with high school degree had high satisfaction in the intervention group while 39.4% women with high school degree in the control group had high satisfaction.

Easy-to-use: In the feature of Articles&FAQ, a significant 29.2% pregnant women with middle school degree felt low satisfaction with ease of use of this feature, while only 7.1% women with Bachelor degree and 8.9% women with Master or Doctoral degree felt low satisfaction with regard to ease of use of Articles&FAQ in the invention group.

Helpful: In terms of helpfulness of Blogs, Resources, Reminder, and Articles&FAQ, women with higher degrees (Bachelor, Master or Doctoral degrees) had a larger proportion of feeling low or intermediate satisfaction, while women with lower degree (high school degree or associate degree) had a larger proportion of having high satisfaction. However, even though the difference was not significant, for people with middle school degree, the helpfulness of Resources and Articles&FAQ was rated lowest (only 50.0% women with middle school degree had high satisfaction with these two features) compared with the helpfulness level rated by women with any other degrees.

Overall Assessment: A significantly larger number of pregnant women with high school degree would recommend this program to other pregnant women than pregnant women with Master or Doctoral degree (77.0% women with high school degree vs. 61.2% women with Master or Doctoral degree in the total satisfaction sample). Women with high school degree had the largest proportion(71.5% of women with high school degree in the total satisfaction sample) of enjoying

participation, compared with women with other degrees, such as women with Master or Doctoral degree who least enjoyed participating (only 18.2% of women with Master or Doctoral degree in the total satisfaction sample). Social support and the helpfulness of website features were all significantly different by education levels in the total satisfaction sample, in the intervention group and in the control group. Pregnant women with lower degrees (degree before a Bachelor degree) felt more supported and had higher satisfaction level with social support than women with higher degrees (Bachelor, Master or Doctoral degree). Among the entire participants in the satisfaction survey, 40.2% women with high school degree felt most satisfied with social support while 75.8% women with Master or Doctoral degree felt low satisfaction with support.

Intervention features:

Easy-to-use: In pairwise comparison, the women with the highest degree had the largest proportion (81.3%) of thinking the weight gain tracker was easy to use.

Helpful: There was significant difference in the helpfulness of physical activity goal-setting tool by education level, shown in **Table 13 (See Appendix B)**. The women with high school degree or some college degree felt the physical activity goal-setting tool more helpful than the women with Master or Doctoral degree (41.8% of women with high school degree vs. 40.0% of women with some college degree vs. 22.8% of women with Master or Doctoral degree).

Satisfaction Levels by BMI Categories

Here the satisfaction with the e-Moms Roc website features was compared by BMI categories, shown in **Table 14 (See Appendix B)**. Results showed that BMI categories did not significantly influence the satisfaction levels of pregnant women. BMI only had slight effect on the difference of satisfaction levels by pairwise comparison.

General Features:

Helpful: In terms of helpfulness of the Reminder, only 36.2% obese women in the control group had high satisfaction of this feature while 60.2% obese women in the intervention group had high satisfaction regarding the reminder.

Overall Assessment: session: Pregnant women with normal BMI felt more unsatisfied with social support in either the intervention group or the control group than overweight women. 58.7% obese women in the control group had low satisfaction of social support while only 47.7% obese women in the intervention group had low satisfaction.

Intervention Features:

Table 15 (See Appendix B) showed that there were no significant differences of intervention features by BMI categories.

Satisfaction Levels by Age

The satisfaction levels of different features were highly influenced by age. Proportions of satisfaction levels of social support, Resources (helpfulness), Articles&FAQ (helpfulness and interestingness), Reminder (helpfulness), and Blogs (helpfulness, engagingness, and ease of use) were significantly different by age.

General Features:

Helpful: Older women (18-24) had larger proportions of feeling low satisfaction with the Reminder section than young women (25-36) did, shown in **Table 16 (See Appendix B)**.

Overall Assessment: The willingness of recommendation of this program to other pregnant women and the satisfaction level of participation were only significantly different in the intervention group. Young women aging 18-24 felt significantly higher satisfaction with all the

website features compared with older women aging 25-36. Older pregnant women who aged 25-36 tended to be intermediately satisfied with the Blogs in the three aspects--helpfulness, ease of use, and engagingness--than the young women (18-24) did. There were no significant differences between women aging 25-30 and women aging 31-36 in terms of satisfaction levels for website features. Regarding social support, a larger proportion of older pregnant women had low satisfaction compared with young pregnant women (61.4% of women aging 25-30 & 69.0% of women aging 31-36 vs. 39.5% of women aging 18-24 in the total satisfaction sample). Only 3.9% of young women in the intervention group did not enjoy participating in this program and did not want to recommend the program to others, while 10.4% of young women did not enjoy participating and 9.1% of young women did not like to recommend in the control group. 13.1% women of age 31-36 and 11.4% women of age 25-30 in the intervention group would not like to recommend this program. Older women (25-36) in the intervention group, however, were less likely to recommend the program to other pregnant women, compared with women in the control group.

Intervention Features:

There were significant differences of satisfaction levels of the two goal-setting tools (diet and physical activity). Young pregnant women of age 18-24 felt higher satisfaction with the helpfulness and ease of use of these features than older pregnant women of age 25-36, according to **Table 17 (See Appendix B)**.

Helpful: Older women felt the goal-setting tools less helpful than young women did (38.1% women of age 30-36 vs. 20.4% women of age 18-24 in the category of low satisfaction with helpfulness of diet goal-setting tool; 33.5% women of age 25-30 and 35.2% women of age 31-36

vs. 17.2% of age 18-24 in the category of low satisfaction with helpfulness of physical activity goal-setting tool).

Summary of the major findings on satisfaction levels

The proportions of women with high satisfaction shown in **Table 3** and the mean of satisfaction with each website feature shown in **Table 4** indicate a positive satisfaction of participants with different e-Moms Roc website components. The Articles&FAQ and Resources were rated as the most helpful in the intervention group (N=621) and also in the total sample for the satisfaction study (N=942), seen in **Figure 3** and **Figure 5**. The weight gain tracker was the easiest to use in the intervention group, shown in **Figure 6**. The associations of satisfaction levels with study arms and demographic measures are summarized below in **Table 18**. The intervention group felt more satisfied with the Reminder and Resources sections than the control group did. The satisfaction levels were not strongly associated with BMI. The satisfaction levels were more significantly associated with race, income, education, and age. In terms of satisfaction with specific website features, there were no or very few significant associations of demographic characteristics and satisfaction for Articles&FAQ and Weight gain tracker, shown in **Table 18**.

Table 18: Summary of associations of satisfaction levels with study arms and demographic characteristics in each website feature with a significant level of 0.05 by chi-square test in the satisfaction study (N=942).

	Arm	Ethnicity	Race	Income	Education	BMI	Age
Blogs- Engaging			▪	▪	▪		▪
Blogs- Easy to use				▪	▪		▪
Blogs- Helpful			▪	▪	▪		▪
Reminder- Helpful	▪	▪	▪	▪	▪		▪
Articles and FAQ- Easy to understand							▪
Articles and FAQ- Interesting							▪
Articles and FAQ- Helpful			▪	▪	▪		▪
Resources- Helpful	▪		▪	▪	▪		▪
Weight gain tracker- Easy to use*							
Weight gain tracker- Helpful*			▪				
Diet goal-setting- Easy to use*			▪				▪
Diet goal-setting- Helpful*			▪	▪			▪
Physical activity goal-setting- Easy to use*			▪	▪			▪
Physical activity goal-setting- Helpful*			▪	▪	▪		▪
Social support		▪	▪	▪	▪	▪	▪
Enjoy participating			▪	▪	▪		▪
Recommend to others		▪	▪		▪		▪

(*. Features that only the intervention arm had access to. The sample size of * was 621 women. Otherwise, it is the total sample size of the satisfaction study, which was 942 women.)

Discussion

This study examines the satisfaction levels of women, especially women with different demographic characteristics, in the online intervention of weight management during their pregnancy in the e-Moms Rochester project with a significance level of 0.05. The project website had an overall high satisfaction level for various features, except the medium satisfaction with engagingness of Blogs, helpfulness of diet goal-setting tool, helpfulness of physical activity goal-setting tool, and the low satisfaction with social support, shown in **Table 3**. A medium satisfaction level of goal-setting tools and a high satisfaction level of the weight gain tracker appeared corresponding to the program use in the engagement paper of e-Moms Roc project that 70% of women in the intervention group used weight gain tracker while only 40% of women used the goal-setting tool of diet and physical activity (Graham et al. 2014). There was an overall high satisfaction with this web-based project, similar to the results of overall satisfaction in other studies of online weight and lifestyle interventions (Lyden et al. 2013; Stewart et al. 2011).

The response rate of 62.3% of the satisfaction survey could be counted as high, given that it was voluntary without any reminder or compensation. Compared with other online health interventions, whose response rates of satisfaction survey were 21%~43% (Van, Milder, & Bemelmans 2009; Bot, Milder, & Bemelmans 2009; McCoy et al. 2005), the participants in this study were more likely to complete the satisfaction survey. In the study of Bot et al., it showed that pregnant women, who were young and had low education levels, were less likely to respond to the survey. This association was also found in the satisfaction study of e-Moms Roc project. Besides low education level and young age, women who were Hispanic, African American, obese, or had low income were less likely to fill out the satisfaction survey as well. Because of the significant differences in demographic characteristics of people who filled out the survey and

people who did not, the representativeness of satisfaction levels was likely to be influenced. As a larger proportion of pregnant women who were older, non-Hispanic, Caucasian, had higher income, had normal BMI, or received higher education filled out the survey, these populations might have a greater impact on the satisfaction levels with each feature. Therefore the mean of satisfaction values (0-10) or the proportion of satisfaction levels (low, medium, and high) may reflect more of the opinions of an advantaged population, and underestimate the real satisfaction levels of people with the disadvantaged demographic characteristics such as people who had low socioeconomic status. It might be possible that, among these disadvantaged women, only those who were really satisfied with the project website had completed the survey, which caused an overrepresented satisfaction level of the women with these demographic characteristics. On the other hand, satisfaction level of women with advantaged demographic characteristics might even be underrated given that some of these women filled out the survey to complain about the project by leaving negative comments. Therefore, the representativeness of the sample in this satisfaction study may not give an accurate estimate of the real satisfaction of women with different demographic characteristics.

In terms of overall helpfulness, the Articles&FAQ and Resources were both the most helpful features in the intervention group and in the control group. Reminder was least helpful in the control group but it was more helpful in the intervention group. This may be due to the reason that reminder could remind people in the intervention group of using weight-related intervention tools such as the weight gain tracker and the goal-setting tools during their pregnancy, that the control group had no access to. The diet and physical goal-setting tools were rated as the least helpful features in the intervention group and least easy to use while the weight gain tracker was the easiest-to-use feature. Goal-setting is critical in accomplishing health behaviors so that

improvement of goal-setting features in future web-based interventions is recommended. Possible improvement may include setting up small, achievable goals with social support to resist relapsing.

In terms of satisfaction level by arm, the Reminder and the Resources had significant difference. This may be due to the accessibility of more features for women in intervention group, compared with women in the control group who had only non-weight related contents.

The results of satisfaction levels by ethnicity showed that Hispanic women had a higher appreciation and satisfaction with the program than non-Hispanic did. Hispanic women felt the Articles&FAQ, Blogs, Resources were very helpful to them and received more social support than Non-Hispanic women did. This might be due to the reason that they had limited resources in their daily life, so that this program actually provided a platform for them to communicate with other people who were also pregnant and to gain pregnancy-related health knowledge and resources for free. Besides, the result that there was a significant difference between Hispanic and non-Hispanic in the intervention group, but not in the control group, may indicate that the intervention features, such as the weight gain tracker, was more helpful to Hispanic women to manage their weight. In addition, a higher proportion of satisfaction of Hispanic women in the intervention group than those in the control group implied the helpfulness of intervention features as well.

The satisfaction level by income was similar to the satisfaction level by ethnicity in terms of the following aspects. First, the difference of satisfaction level by income was significant in the intervention group, but not in the control group, except that both arms had significant difference of satisfaction level for social support. People with low-income felt more supported than people

with high-income in both groups. The reason might be that people with low-income probably did not have a supportive community, or they had limited access to high-quality healthcare services. Second, the intervention had positive impact on the satisfaction level of women with low income. Goal-setting tools in the intervention group were appreciated more by women with lower-income, which may indicate the importance of self-management and self-efficacy of maintaining healthy behavior in pregnant women with low income.

Considering the difference of satisfaction levels by race, African American had a higher appreciation of the project website than Caucasian women. This might due to the reason that Caucasian women may have more resources where they can receive health messages and social support while African American may have limited resources. African American felt the goal-setting tools for diet and physical activity more helpful than Caucasian women did, which indicated that goal-setting tools may have greater impact on African American and may help this population with healthy lifestyle changes. However, in **Table 9** (see **Appendix B**), the African American did not feel the weight gain tracker as easy as Caucasian felt. This suggested that future studies should take literacy level into account when designing interfaces of online intervention programs, especially if the primarily targeted population is African American. However, a pilot study designed for pregnant women with low income across multiple ethnic groups showed that there was no significant difference in satisfaction by races (Mauriello et al. 2011). Discrepancy of the results of satisfaction levels by race might be due to the small sample size of 87 pregnant women in this pilot study, which was much smaller than 1512 pregnant in the e-Moms Roc study.

In terms of satisfaction levels by education, helpfulness of the website and the satisfaction with social support were significantly different between women with low-education and with higher-

education. Women with high school degrees enjoyed the program most while the women with Master or Doctoral degree enjoyed the least. This suggested that women with high school degree achieved most out of the project website and this website did not meet as much expectancy as that of women with higher degrees had. One possible explanation might be that people with higher degrees could receive enough health information from various channels, such as courses they had taken and scientific articles they had read before. Women with high school degrees in the intervention group had higher satisfaction than those in the control group, demonstrating the positive impact of intervention features. However, women with master or higher degrees in the intervention group had lower satisfaction than those in the control group with engagingness of Blogs, indicating that intervention features may worsen the satisfaction level of Blogs among these women in this project. It was also possible that these women felt the intervention features more engaging, and comparing to the intervention features, the Blogs may appear less engaging. According to feedback of pregnant women in this project that women with higher degrees thought that they did not find a niche in the Blogs while women with high school degrees had more common topics with each other on the Blogs. This comment complemented with the result of satisfaction level with the Blogs. In addition, it was noticeable that women with only middle school degree had low satisfaction level, though not significant, with Articles&FAQ and Resources. Around 30% of them thought the feature of Articles&FAQ was difficult to understand, which might be one reason that they did not appreciate it. In the intervention group, the physical activity goal-setting tool was appreciated more by women with high school degree than women with Master/Doctoral degree, which may imply the efficacy of goal-setting tool with people with low education. In terms of weight gain tracker, pregnant women with Master/Doctoral degree felt it easier to use this feature than any other pregnant women, which

was reasonable as this population was the most intellectual group. Similar result was shown in one nationwide study in Netherland that low-educated women had higher appreciation of the program and this may be due to the reason that the program was too easy and basic for women with high education (Bot, Milder, & Bemelmans 2009).

No significant association was found between satisfaction level and BMI. Pregnant women felt in a similar way with satisfaction level no matter whether they were normal, overweight, or obese. Obese women in the intervention group felt more satisfied with social support than those in the control group. And the Reminder was more helpful for obese pregnant women in the intervention group, which indicated that the importance of the Reminder with regard to reminding the obese women of tracking their weight and setting their goals of diet and physical activity during pregnancy. One study of Bot et al. in 2009 also found that there was no association between overweight and satisfaction level.

Regarding satisfaction level by age, there were significant differences in different features. Overall young women aged 18-24 were highly satisfied with the project website while older women aged 25-36 were neutral in satisfaction. There was no significant difference in satisfaction level between women aged 25-30 and women aged 31-36. Young women in the intervention group would like to recommend the program to other pregnant women more than those in the control group, indicating the effectiveness of intervention features. However, older women in the intervention group would be less likely to recommend this program to others than older women in the control group. This may be due to the reason that the intervention features did not meet the needs of older pregnant women. It was also possible that older women might have had previous deliveries so that they were more experienced than young women to be pregnant. In the intervention features, young women found the goal setting tools of diet and

physical activity more helpful than older women did. This may insinuate the usefulness of goal-setting tool to young pregnant women in terms of self-control and self-management.

The demographic characteristics of race, income, education and age had more impact on the satisfaction levels for the website features (except Articles&FAQ and Weight Gain tracker) while BMI categories barely had any effect on the satisfaction levels, seen in **Table 18**.

In terms of social support, participants in the e-Moms Roc rated low in social support. In another web-based weight intervention, the characteristics of social support was also rated low (McConnon, Kirk, & Ransley 2009). It is hard for social support to be a reasonable expectation in this kind of intervention. However, social support is critically helpful in maintaining healthy eating and exercising behaviors (Mackert, Stanforth, & Garcia 2011). An online intervention with more community involvement, family support, communication with expert, and participants' interaction is needed (Herman et al. 2005). The results shown in one online support program, that adolescent who benefited most were those who felt most isolated, indicated the helpfulness of social support (Stewart et al. 2011). In the satisfaction study of the eMoms Roc project, pregnant women who had a lower socioeconomic status also appeared more satisfied with social support, which showed the importance of online weight intervention programs to these women, where they could have access to informational and emotional support from the experts and peers. In one study, the discussion board turned out to be the most effective and useful section for low-income African American women during pregnancy (Herman et al. 2005). For the e-Moms Roc project, Blog was overall helpful but not as helpful as Resources and Articles&FAQ. This might be due to the reason that people with higher education did not find themselves fit into the blog discussion with people with low education. Blogs which are tailored to people with different demographic backgrounds may be helpful in the future. Another study

about computer-mediated support groups suggested that demographic characteristics, such as race and education, had influence on how people rated the social support received from the computer program(Smyth et al. 2007). The study did not state explicitly whether African American or people with low education had a higher or lower satisfaction level regarding social support. However, this study gave researchers an insight that demographic characteristics did have an impact on the satisfaction level of social support. And again, tailored programs which can meet the needs of people in various demographic subgroups will be helpful.

Strengths

One of the strengths of this study was that the satisfaction of pregnant women with online weight management intervention was analyzed. There were only a few studies of web-based health intervention during pregnancy, and among these studies, there were only two studies evaluating the satisfaction level of pregnant women (Bot, Milder & Bemelmans 2009, Mauriello et al. 2011). Another strength of the study was that the satisfaction level by various demographic characteristics was analyzed. In the study of Bot el al., only the association between education and satisfaction level was measured. And compared with the study of Mauriello et al, this study analyzed satisfaction by several additional demographic characteristics, such as income, BMI, and age. In addition, the e-Moms Roc was a randomized controlled trial while the two previous satisfaction studies were not. The intervention arm and the control arm in this satisfaction study (N=942) were representative of both arms in the total sample (N=1512) with a response rate of 62.3%. The response rate could be regarded as high given that the satisfaction survey was voluntary with no incentive and reminder.

Limitations

One limitation of this study was the representativeness of the satisfaction sample compared to the total sample in the e-Moms Roc project. Since there were significant differences in the proportions of women with different demographic characteristics in the sample who had filled out the satisfaction survey and in the sample who had not filled it out, the satisfaction levels from the survey might not be able to represent the true satisfaction level. It was possible that women, who were non-Hispanic, Caucasian, older, had higher-income, received higher education, or had normal BMI, had more influence on the satisfaction levels shown in this study because they were better represented in the satisfaction study samples. In addition, many statistical tests of associations between demographic characteristics and website features were conducted with a p-value of 0.05. That is to say, there was only a 5% probability of Type I error that we rejected the null hypothesis given that it was true. And in this case, the null hypothesis was that there was no difference in satisfaction levels by study arm and by demographic characteristic.

Another limitation was that the cut-offs of high, medium, and low satisfaction level (8-10, 5-7, and 0-4) were somewhat arbitrary since the distribution of dependent variables (satisfaction level) were extremely skewed. The rationale for the percentile cut-offs in this study was based on the distribution of the dependent variables (the satisfaction questions). And also, since the satisfaction study had a small proportion of minority races such as Asian, Native Americans and Pacific Islanders, satisfaction of these pregnant women was not fully represented in this study. However, because these pregnant women were recruited in the area of Rochester, NY, where the population composition was made up almost by Caucasian and African American, a small proportion of Asian, Native Americans, and other races in this study was tenable. And therefore

the results of this study can not be generalized and applied to pregnant women all across the country and it can only be applied in the Rochester area.

Implications

For future web-based interventions for pregnant women, a reminder tool will be helpful when the program has self-monitoring components such as a weight tracker and goal-setting tools. Providing articles and other resources on the website will be beneficial for pregnant women. In addition, when designing online health interventions during pregnancy, demographic features including race, income, education, and age should be taken into account. A tailored program that designs the content to meet various needs of women with different demographic characteristics will have higher overall satisfaction level. The feature of social support in web-based health interventions still needs improvement and development. Strategies such as a motivation meeting at the beginning can increase the use and satisfaction of social support of pregnant women (Houston & Ford 2008).

For future assessment of satisfaction with web-based interventions, multivariable linear regression of satisfaction levels by predictors of various demographic features and their interactions should be analyzed so that key predictors of satisfaction level with online interventions during pregnancy can be identified. Future research should also ensure that the satisfaction study samples are representative of the total samples in the program so that the collected data of satisfaction can be an accurate and precise reflection of the true satisfaction level. In addition, in the future, the collected data of the satisfaction survey can be analyzed together with the engagement and program usage data so as to sort out the relationship between the objective website usage frequency and the subjective satisfaction level of the participants.

Conclusion

Pregnant women participating in the e-Moms Roc project had an overall positive satisfaction with the website features, except the social support. Resources and Articles&FAQ were the most helpful features. Weight gain tracker was the easiest-to-use feature for people in the intervention group. The intervention group had higher satisfaction level than the control group in the features of Reminder and Resources. There was significant difference of satisfaction levels by ethnicity, race, income, education, and age. No significant difference of satisfaction was shown by BMI categories. Pregnant women who were young (18-24), Hispanic, African American, had low income, or received lower education had higher satisfaction with the website features. They also felt more satisfied with social support of this project. But there was no significant difference in social support between non-Hispanic and Hispanic women. In addition, women with these demographic characteristics, although appreciating the project website more, had a lower rate of filling out the satisfaction survey. On the other hand, women who were older (25-36), Non-Hispanic, Caucasian, had higher income, or received high education, were less satisfied with the project website, even though they had a higher rate of completing the survey. Future programs which are tailored to meet the needs of women with different demographic characteristics will have higher satisfaction level, including the satisfaction with social support.

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References

Ajzen, Icek. (1991) "The Theory of Planned Behavior." Organizational Behavior and Human Decision Processes. 50.2 : 179-211. Print.

Arem, H., & Irwin, M. (May 01, 2011). A review of web-based weight loss interventions in adults. *Obesity Reviews, 12,* 501.)

Bandura, A. (2001) "Social Cognitive Theory: an Agentic Perspective." Annual Review of Psychology. 52 : 1-26. Print

Bensley, R., Brusk J., Anderson, J., Mercer, N., Rivas, J., & Broadbent, L. (July 01, 2006). wichealth.org: Impact of a Stages of Change-Based Internet Nutrition Education Program. *Journal of Nutrition Education and Behavior, 38,* 4, 222-229.

Bingham, C. R., Barretto, A. I., Walton, M. A., Bryant, C. M., Shope, J. T., & Raghunathan, T. E. (January 01, 2010). Efficacy of a web-based, tailored, alcohol prevention/intervention program for college students: initial findings.*Journal of American College Health : J of Ach, 58,* 4.)

Bosak, K. A., Yates, B., & Pozehl, B. (January 01, 2009). Feasibility of an internet physical activity intervention. *Western Journal of Nursing Research, 31,*5, 648-61.

Bossen, D., Veenhof, C., Dekker, J., & de, B. D. (January 01, 2013). The usability and preliminary effectiveness of a web-based physical activity intervention in patients with knee and/or hip osteoarthritis. *Bmc Medical Informatics and Decision Making, 13.*

Bot, M., Milder, I. E. J., & Bemelmans, W. J. E. (July 30, 2009). Nationwide Implementation of Hello World: A Dutch Email-Based Health Promotion Program for Pregnant Women. *Journal of Medical Internet Research, 11,* 3.

Brown, M. J., Sinclair, M., Liddle, D., Hill, A. J., Madden, E., & Stockdale, J. (January 01, 2012). A systematic review investigating healthy lifestyle interventions incorporating goal setting strategies for preventing excess gestational weight gain. *Plos One, 7,* 7.

Chen, Z. W., Fang, L. Z., Chen, L. Y., & Dai, H. L. (January 01, 2008). Comparison of an SMS text messaging and phone reminder to improve attendance at a health promotion center: a randomized controlled trial. *Journal of Zhejiang University. Science. B, 9,* 1, 34-8.

Claesson, I., Josefsson, A., Cedergren, M., Bryhhildsen, J., Jeppsson, A., Nystrom, F., Sydsjo, A., ... Sydsjo, G. (June 01, 2008). Consumer satisfaction with a weight-gain intervention programme for obese pregnant women. *Midwifery, 24,* 2, 163-167.

Donohew, Lewis, Elizabeth P. Lorch, and Philip Palmgreen. (1998) "Applications of a Theoretic Model of Information Exposure to Health Interventions." *Human Communication Research.* 24.3 : 454-68. Print.

Eysenbach, G. (March 31, 2005). The Law of Attrition. *Journal of Medical Internet Research,7,*1.)

Ferney, S. L., & Marshall, A. L. (August 01, 2006). Website Physical Activity Interventions: Preferences of Potential Users. *Health Education Research, 21,*4, 560-566.

Fishbein, M, and M.C Yzer. (2003) "Using Theory to Design Effective Health Behavior Interventions." Communication Theory. 13.2 : 164-183. Print.

Franklin, P. D., Rosenbaum, P. F., Carey, M. P., & Roizen, M. F. (March 30, 2006). Using Sequential Email Messages to Promote Health Behaviors: Evidence of Feasibility and Reach in a Worksite Sample. *Journal of Medical Internet Research, 8,* 1.

Fry, J. P., & Neff, R. A. (January 01, 2009). Periodic prompts and reminders in health promotion and health behavior interventions: systematic review. *Journal of Medical Internet Research, 11,* 2.

Graham, M., Uesugi, K.H., Niederdeppe, J., Gay, G.K., & Olson, C.M. (in press). The theory, development, and implementation of an e- Intervention to prevent excessive gestational weight gain: e-Moms Roc. *Telemedicine and e-Health*.

Greaney, M. L., Sprunck-Harrild, K., Bennett, G. G., Puleo, E., Haines, J., Viswanath, K. V., & Emmons, K. M. (July 27, 2012). Use of Email and Telephone Prompts to Increase Self-Monitoring in a Web-Based Intervention: Randomized Controlled Trial. *Journal of Medical Internet Research, 14,* 4.

Herman, J. A., Mock, K., Blackwell, D., & Hulsey, T. (January 01, 2005). Use of a Pregnancy Support Web Site by Low-Income African American Women. *Jognn: Journal of Obstetric, Gynecologic, and Neonatal Nursing, 34,* 6, 713-720.

Houston, T. K., & Ford, D. E. (January 01, 2008). A tailored Internet-delivered intervention for smoking cessation designed to encourage social support and treatment seeking: usability testing and user tracing. *Informatics for Health & Social Care, 33,* 1, 5-19.

Im, E.-O. (10/2012). "Attitudes of women in midlife to web-based interventions for promoting physical activity". *Journal of telemedicine and telecare* (1357-633X), 18 (7), p. 419.

Irvine, A. B., Gelatt, V. A., Seeley, J. R., Macfarlane, P., & Gau, J. M. (February 05, 2013). Web-based Intervention to Promote Physical Activity by Sedentary Older Adults: Randomized Controlled Trial. *Journal of Medical Internet Research, 15,*2.

Jane Koch, Sharon Andrew, Yenna Salamonson, Bronwyn Everett, Patricia M. Davidson, Nursing students' perception of a web-based intervention to support learning, Nurse Education Today, Volume 30, Issue 6, August 2010, Pages 584-590, ISSN 0260-6917, 10.1016/j.nedt.2009.12.005. (http://www.sciencedirect.com/science/article/pii/S0260691709002354)

Kaipainen, K., Payne, C. R., & Wansink, B. (December 17, 2012). Mindless Eating Challenge: Retention, Weight Outcomes, and Barriers for Changes in a Public Web-Based Healthy Eating and Weight Loss Program. *Journal of Medical Internet Research, 14,* 6.

Kelders, S. M., Van, G.-P. J. E. W. C., Werkman, A., Nijland, N., & Seydel, E. R. (April 14, 2011). Effectiveness of a Web-based Intervention Aimed at Healthy Dietary and Physical

Activity Behavior: A Randomized Controlled Trial About Users and Usage. *Journal of Medical Internet Research, 13,* 2.

Kuhlmann, A. K., Dietz, P. M., Galavotti, C., & England, L. J. (January 01, 2008). Weight-management interventions for pregnant or postpartum women. *American Journal of Preventive Medicine,34,*6, 523-8.

Lyden, J. R., Zickmund, S. L., Bhargava, T. D., Bryce, C. L., Conroy, M. B., Fischer, G. S., Hess, R., ... McTigue, K. M. (September 01, 2013). Implementing Health Information Technology in a Patient-Centered Manner: Patient Experiences With an Online Evidence-Based Lifestyle Intervention.*Journal for Healthcare Quality, 35,* 5, 47-57.

Mackert, M., Stanforth, D., & Garcia, A. A. (September 01, 2011). Undermining of Nutrition and Exercise Decisions: Experiencing Negative Social Influence.*Public Health Nursing, 28,* 5, 402-410.

Marsh-Tootle, W. L., McGwin, G., Kohler, C. L., Kristofco, R. E., Datla, R. V., & Wall, T. C. (January 01, 2011). Efficacy of a web-based intervention to improve and sustain knowledge and screening for amblyopia in primary care settings.*Investigative Ophthalmology & Visual Science, 52,* 10, 7160-7.

Mauriello, L., Dyment, S., Prochaska, J., Gagliardi, A., & Weingrad-Smith, J. (January 01, 2011). Acceptability and Feasibility of a Multiple-Behavior, Computer-Tailored Intervention for Underserved Pregnant Women. *The Journal of Midwifery & Women's Health, 56,* 1, 75-80.

McConnon, A., Kirk, S. F. L., & Ransley, J. K. (July 01, 2009). Process Evaluation of an Internet-based Resource for Weight Control: Use and Views of an Obese Sample. *Journal of Nutrition Education and Behavior, 41,* 4, 261-267.

McCoy, M. R., Couch, D., Duncan, N. D., & Lynch, G. S. (January 01, 2005). Evaluating an internet weight loss program for diabetes prevention. *Health Promotion International, 20,* 3, 221-8.

McTigue, K. M., Bhargava, T., Bryce, C. L., Conroy, M., Fischer, G. S., Hess, R., Simkin-Silverman, L. R., ... Zickmund, S. (May 01, 2011). Patient perspectives on the integration of an intensive online behavioral weight loss intervention into primary care. *Patient Education and Counseling*, 83, 2, 261-264.

Neve, M., Morgan, P. J., & Collins, C. E. (October 12, 2011). Weight Change in a Commercial Web-Based Weight Loss Program and its Association With Website Use: Cohort Study. *Journal of Medical Internet Research, 13,* 4.)

Neve, M., Morgan, P. J., Jones, P. R., & Collins, C. E. (January 01, 2010). Effectiveness of web-based interventions in achieving weight loss and weight loss maintenance in overweight and obese adults: a systematic review with meta-analysis. *Obesity Reviews : an Official Journal of the International Association for the Study of Obesity, 11,* 4, 306-21.

Oenema A, Brug J. (2003) Feedback strategies to raise awareness of personal dietary intake: results of a randomised controlled trial. *Prev Med*; 36: 429–39.

Oenema, A., Brug, J., & Lechner, L. (January 01, 2001). Web-based tailored nutrition education: results of a randomized controlled trial. *Health Education Research, 16,* 6, 647-60.

Olson, C. M. (January 01, 2008). Achieving a healthy weight gain during pregnancy. *Annual Review of Nutrition*, 28, 411-23.

Papadaki, A., & Scott, J. A. (January 01, 2006). Process evaluation of an innovative healthy eating website promoting the Mediterranean diet. *Health Education Research*, 21, 2, 206-18.

Peels, D. A., de, V. H., Bolman, C., Golsteijn, R. H. J., van, S. M. M., Mudde, A. N., & Lechner, L. (January 01, 2013). Differences in the use and appreciation of a web-based or printed computer-tailored physical activity intervention for people aged over 50 years. *Health Education Research, 28,* 4, 715-731.

Poddar, K. H., Hosig, K. W., Anderson, E. S., Nickols-Richardson, S. M., & Duncan, S. E. (January 01, 2010). Web-based nutrition education intervention improves self-efficacy and self-regulation related to increased dairy intake in college students. *Journal of the American Dietetic Association, 110,* 11, 1723-7.

Pretorius, N., Rowlands, L., Ringwood, S., & Schmidt, U. (n.d.). Young people's perceptions of and reasons for accessing a web-based cognitive behavioural intervention for bulimia nervosa. *European Eating Disorders Review*, 18, 3, 197-206.

Quintiliani, L. M., De, J. M., & Wallington, S. F. (January 01, 2011). The Impact of Student Diversity on Interest, Design, and Promotion of Web-based Tailored Nutrition and Physical Activity Programs for Community Colleges. *Journal of Nutrition Education and Behavior, 43,* 5, 379-384.

Rasmussen, K. M., Yaktine, A. L., & Institute of Medicine (U.S.). (2009). Weight gain during pregnancy: Reexamining the guidelines. *Washington, D.C: National Academies Press*.

Robroek, S. J. W., Brouwer, W., Lindeboom, D., Oenema, A., & Burdorf, A. (September 30, 2010).Demographic, Behavioral, and Psychosocial Correlates of Using the Website Component of a Worksite Physical Activity and Healthy Nutrition Promotion Program: A Longitudinal Study. *Journal of Medical Internet Research, 12,* 3.

Sciamanna, C. N., Lewis, B., Tate, D., Napolitano, M. A., Fotheringham, M., & Marcus, B. H. (January 01, 2002). User attitudes toward a physical activity promotion website. *Preventive Medicine*, 35, 6, 612-5.

Smyth, K., Rose, J., McClendon, M. K., & Lambrix, M. (January 01, 2007). Relationships Among Caregivers' Demographic Characteristics, Social Support Ratings, and Expectations of Computer-Mediated Support Groups.*Journal of Applied Gerontology, 26,* 1, 58-77.

Speck, R. M., Hill, R. K., Pronk, N. P., Becker, M. P., & Schmitz, K. H. (January 01, 2010). Assessment and outcomes of HealthPartners 10,000 Steps program in an academic work site. *Health Promotion Practice, 11,* 5, 741-50.

Spittaels, H., & De, B. I. (January 01, 2006). Implementation of an online tailored physical activity intervention for adults in Belgium. *Health Promotion International, 21,* 4, 311-9.

Spittaels, H., De, B. I., Brug, J., & Vandelanotte, C. (January 01, 2007). Effectiveness of an online computer-tailored physical activity intervention in a real-life setting. *Health Education Research, 22,* 3, 385-96.

Steele, R. M., Mummery, W. K., & Dwyer, T. (January 01, 2009). A comparison of face-to-face or internet-delivered physical activity intervention on targeted determinants. *Health Education & Behavior : the Official Publication of the Society for Public Health Education, 36,* 6, 1051-64.

Stewart, M., Masuda, J., Letourneau, N., Anderson, S., Cicutto, L., McGhan, S., & Watt, S. (December 01, 2011). Online Support Intervention for Adolescents With Asthma and Allergies: Ingredients and Insights. *Journal of Asthma & Allergy Educators, 2,* 6, 306-317.

Stewart, T., Han, H., Allen, R. H., Bathalon, G., Ryan, D. H., Newton, R. L. J., & Williamson, D. A. (January 01, 2011). H.E.A.L.T.H.: efficacy of an internet/population-based behavioral weight management program for the U.S. Army. *Journal of Diabetes Science and Technology, 5,* 1, 178-87.

Van, G. L., van, E. P., Boon, B., Borsboom, G., Visscher, T., & Oenema, A. (March 14, 2012). Results from an Online Computer-Tailored Weight Management Intervention for Overweight Adults: Randomized Controlled Trial.*Journal of Medical Internet Research, 14,* 2.

Van, Z. M., Milder, I. E., & Bemelmans, W. J. (January 01, 2008). Usage of an online healthy lifestyle program by pregnant women attending midwifery practices in Amsterdam. *Preventive Medicine, 46,* 6, 552-7.

Van, Z. M., Milder, I. E., & Bemelmans, W. J. (February 26, 2009). Integrating an eHealth Program for Pregnant Women in Midwifery Care: A Feasibility Study Among Midwives and Program Users. *Journal of Medical Internet Research,11,* 1.

Verheijden, M. W., Jans, M. P., Hildebrandt, V. H., & Hopman-Rock, M. (January 22, 2007). Rates and Determinants of Repeated Participation in a Web-Based Behavior Change Program for Healthy Body Weight and Healthy Lifestyle. *Journal of Medical Internet Research,9,*1.

Wantland, D. J., Portillo, C. J., Holzemer, W. L., Slaughter, R., & McGhee, E. M. (November 10, 2004). The Effectiveness of Web-Based vs. Non-Web-Based Interventions: A Meta-Analysis of Behavioral Change Outcomes. *Journal of Medical Internet Research, 6,* 4.

Warren, L., Rance, J., & Hunter, B. (January 01, 2012). Feasibility and acceptability of a midwife-led intervention programme called 'Eat Well Keep Active' to encourage a healthy lifestyle in pregnancy. *Bmc Pregnancy and Childbirth, 12,* 1, 27.

Winett RA, Roodman AA, Winett SG, Bajzek W, Rovniak LS, Whiteley JA. (1999)The effects of the Eat4Life Internet-based health behavior program on the nutrition and activity practices of high school girls. *J Gend Cult Health*; 4: 239–54.

Appendix

Appendix A: Satisfaction Survey (Intervention Group & Control Group)

I. Process Evaluation: Intervention Arm (Pregnancy)

Your opinion is important to us. The eMomsRoc team would like feedback from you about your participation in the study thus far. Please rate the degree to which you agree or disagree with the following statement about the eMomsRoc study; 0 = strongly disagree, and 10 = strongly agree.

1. **The blogs on the e-Moms website during my pregnancy were:**

   a. Engaging: 0 1 2 3 4 5 6 7 8 9 10
   b. Easy to use: 0 1 2 3 4 5 6 7 8 9 10
   c. Helpful: 0 1 2 3 4 5 6 7 8 9 10

2. **The weight gain tracker was:**

   a. Easy to use: 0 1 2 3 4 5 6 7 8 9 10
   b. Helpful: 0 1 2 3 4 5 6 7 8 9 10

3. **The diet goal-setting tool was:**

   a. Easy to use: 0 1 2 3 4 5 6 7 8 9 10
   b. Helpful: 0 1 2 3 4 5 6 7 8 9 10

4. **The physical activity goal-setting tool was:**

   a. Easy to use: 0 1 2 3 4 5 6 7 8 9 10
   b. Helpful: 0 1 2 3 4 5 6 7 8 9 10

5. **The pre-natal vitamin, water and appointment reminders were helpful during my pregnancy.**

   0 1 2 3 4 5 6 7 8 9 10

6. **The articles and FAQ related to pregnancy were:**
   a. Easy to understand: 0 1 2 3 4 5 6 7 8 9 10

b. Interesting: 0 1 2 3 4 5 6 7 8 9 10
c. Helpful: 0 1 2 3 4 5 6 7 8 9 10

7. **The resources (including pregnancy-related resources) on the eMomsRoc website were helpful.**

0 1 2 3 4 5 6 7 8 9 10

8. **I received social support from other eMomsRoc study participants during my pregnancy.**

0 1 2 3 4 5 6 7 8 9 10

9. **I enjoyed participating in the eMomsRoc study during my pregnancy.**

0 1 2 3 4 5 6 7 8 9 10

10. **I would recommend the eMomsRoc study to other pregnant women.**

0 1 2 3 4 5 6 7 8 9 10

11. **Is there anything you would like to add about your experience in the study so far? Yes/No. Please add comments below.**

II. Control Arm (Pregnancy)

Your opinion is important to us. The eMomsRoc team would like feedback from you about your participation in the study thus far. Please rate the degree to which you agree or disagree with the following statement about the eMomsRoc study; 0 = strongly disagree, and 10 = strongly agree.

1. **The blogs on the e-Moms website during my pregnancy were:**

a. Engaging: 0 1 2 3 4 5 6 7 8 9 10
b. Easy to use: 0 1 2 3 4 5 6 7 8 9 10
c. Helpful: 0 1 2 3 4 5 6 7 8 9 10

2. **The pre-natal vitamin, water and appointment reminders were helpful during my pregnancy.**

0 1 2 3 4 5 6 7 8 9 10

3. **The articles and FAQ related to pregnancy were:**
   a. Easy to understand: 0 1 2 3 4 5 6 7 8 9 10
   b. Interesting: 0 1 2 3 4 5 6 7 8 9 10
   c. Helpful: 0 1 2 3 4 5 6 7 8 9 10

4. **The resources (including pregnancy-related resources) on the eMomsRoc website were helpful.**

0 1 2 3 4 5 6 7 8 9 10

5. **I received social support from other eMomsRoc study participants during my pregnancy.**

0 1 2 3 4 5 6 7 8 9 10

6. **I enjoyed participating in the eMomsRoc study during my pregnancy.**

0 1 2 3 4 5 6 7 8 9 10

7. **I would recommend the eMomsRoc study to other pregnant women.**

0 1 2 3 4 5 6 7 8 9 10

8. **Is there anything you would like to add about your experience in the study so far? Yes/No. Please add comments below.**

Appendix B: Tables of Satisfaction Levels by Demographic Characteristics

Table 6. The satisfaction levels (high, medium, low) of website features by ethnicity (Non-Hispanic and Hispanic) in the total satisfaction group, the intervention group, and the control group by chi-square test.

		Total satisfaction sample/ Intervention group/ Control Group														
		Total samples of the satisfaction study					Intervention group					Control group				
		Ethnicity					Ethnicity					Ethnicity				
		Non-Hispanic (a)		Hispanic (b)			Non-Hispanic (a)		Hispanic (b)			Non-Hispanic (a)		Hispanic (b)		
		Count	Column N %	Count	Column N %	chi-square value	Count	Column N %	Count	Column N %	chi-square value	Count	Column N %	Count	Column N %	chi-square value
Blogs- Engaging	Low	235	28.40%	22	23.20%		156	28.50%	15	24.20%		79	28.10%	7	21.20%	
	Moderate	361	43.60%	37	38.90%	4.125	237	43.30%	22	35.50%	3.982	124	44.10%	15	45.50%	.849
	High	232	28.00%	36[a]	37.90%		154	28.20%	25[a]	40.30%		78	27.80%	11	33.30%	
Blogs- Easy to use	Low	116	14.10%	15	15.50%		83	15.20%	11	17.70%		33	11.80%	4	11.40%	
	Moderate	237	28.70%	21	21.60%	2.158	157[a]	28.80%	9	14.50%	5.698	80	28.70%	12	34.30%	.482
	High	472	57.20%	61	62.90%		306	56.00%	42	67.70%		166	59.50%	19	54.30%	
Blogs- Helpful	Low	183[b]	22.30%	11	11.80%		119[b]	22.10%	6	10.00%		64	22.80%	5	15.20%	
	Moderate	285	34.80%	35	37.60%	.5.629	190	35.30%	23	38.30%	4.921	95	33.80%	12	36.40%	1.010
	High	352	42.90%	47	50.50%		230	42.70%	31	51.70%		122	43.40%	16	48.50%	
Reminder- Helpful	Low	259[b]	31.50%	16	16.70%		157[b]	29.00%	9	14.80%		102	36.40%	7	20.00%	
	Moderate	204	24.80%	22	22.90%	11.752*	128	23.60%	13	21.30%	7.195*	76	27.10%	9	25.70%	5.033
	High	359	43.70%	58[a]	60.40%		257	47.40%	39[a]	63.90%		102	36.40%	19[a]	54.30%	
Articles and FAQ- Easy to understand	Low	72	8.70%	9	9.50%		54	9.90%	7	11.50%		18	6.40%	2	5.90%	
	Moderate	221	26.80%	17	17.90%	3.524	131	24.10%	10	16.40%	1.832	90	32.00%	7	20.60%	1.993
	High	532	64.50%	69	72.60%		359	66.00%	44	72.10%		173	61.60%	25	73.50%	
Articles and FAQ- Interesting	Low	95	11.60%	9	9.40%		68	12.50%	7	11.30%		27	9.70%	2	5.90%	
	Moderate	267	32.50%	22	22.90%	4.976	167	30.80%	14	22.60%	2.165	100	36.00%	8	23.50%	3.263
	High	459	55.90%	65[a]	67.70%		308	56.70%	41	66.10%		151	54.30%	24	70.60%	
Articles and FAQ- Helpful	Low	103	12.60%	7	7.50%		72	13.40%	5	8.50%		31	11.00%	2	5.90%	
	Moderate	250	30.60%	24	25.80%	3.828	157	29.30%	15	25.40%	1.997	93	33.10%	9	26.50%	1.915
	High	464	56.80%	62	66.70%		307	57.30%	39	66.10%		157	55.90%	23	67.60%	
Resources- Helpful	Low	108	13.20%	8	8.60%		65	12.10%	4	6.70%		43	15.50%	4	12.10%	
	Moderate	255	31.30%	23	24.70%	4.397	163	30.20%	15	25.00%	2.901	92	33.20%	8	24.20%	1.819
	High	453	55.50%	62[a]	66.70%		311	57.70%	41	68.30%		142	51.30%	21	63.60%	
Social support	Low	495[b]	60.40%	48	50.00%		321	59.70%	30	49.20%		174	61.90%	18	51.40%	
	Moderate	158	19.30%	17	17.70%	.7.460*	97	18.00%	11	18.00%	3.603	61	21.70%	6	17.10%	4.783
	High	166	20.30%	31[a]	32.30%		120	22.30%	20	32.80%		46	16.40%	11[a]	31.40%	
Enjoy participating	Low	113	13.60%	9	9.30%		74	13.60%	5	8.10%		39	13.80%	4	11.40%	
	Moderate	232	28.00%	19	19.60%	5.872	142	26.00%	10	16.10%	5.584	90	31.80%	9	25.70%	.899
	High	484	58.40%	69[a]	71.10%		330	60.40%	47[a]	75.80%		154	54.40%	22	62.90%	
Recommend to others	Low	81	9.80%	7	7.30%		60	11.00%	3	4.90%		21	7.40%	4	11.40%	
	Moderate	189[b]	22.80%	12	12.50%	6.834*	120	22.00%	8	13.10%	5.818	69	24.40%	4	11.40%	3.273
	High	558	67.40%	77[a]	80.20%		365	67.00%	50[a]	82.00%		193	68.20%	27	77.10%	

*. Results were based on two-sided tests with a significance level of 0.05. For each significant pair, the key of the category with the smaller column proportion appears under the category with the larger column proportion.

Table 7. The satisfaction levels (high, medium, low) of website weight-related features by ethnicity (Non-Hispanic and Hispanic) in the intervention group by chi-square test.

		Ethnicity				Chi-suqare value
		Non-Hispanic (a)		Hispanic (b)		
		Count	Column N %	Count	Column N %	
Weight gain tracker- Easy to use	Low	29	7.00%	4	8.50%	0.702
	Moderate	72	17.30%	10	21.30%	
	High	316	75.80%	33	70.20%	
Weight gain tracker- Helpful	Low	86[b]	20.70%	4	8.50%	4.621
	Moderate	104	25.00%	16	34.00%	
	High	226	54.30%	27	57.40%	
Diet goal-setting- Easy to use	Low	79	19.50%	10	22.20%	3.009
	Moderate	132	32.60%	9	20.00%	
	High	194	47.90%	26	57.80%	
Diet goal-setting- Helpful	Low	127	31.50%	14	31.10%	1.263
	Moderate	145	36.00%	13	28.90%	
	High	131	32.50%	18	40.00%	
Physical activity goal-setting- Easy to use	Low	87	21.10%	8	17.80%	1.546
	Moderate	127	30.80%	11	24.40%	
	High	198	48.10%	26	57.80%	
Physical activity goal-setting- Helpful	Low	128	31.20%	12	26.70%	1.614
	Moderate	156	38.00%	15	33.30%	
	High	126	30.70%	18	40.00%	

*. Results weer based on two-sided tests with a significance level of 0.05. For each significant pair, the key of the category with the smaller column proportion appears under the category with the larger column proportion.

Table 8. The satisfaction levels (high, medium, low) of website features by race (Caucasian/White, African

		Total samples of the satisfaction study								
		Race								chi-square value
		Caucasian/White (a)		African American/ Black (b)		Other races (c)		Unknown races(d)		
		Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	
Blogs- Engaging	Low	204	29.5%	28	23.3%	10	21.7%	15	22.7%	28.319*
	Moderate	316[b]	45.7%	37	30.8%	21	45.7%	24	36.4%	
	High	171	24.7%	55[a]	45.8%	15	32.6%	27[a]	40.9%	
Blogs- Easy to use	Low	98	14.2%	16	13.6%	6	13.0%	11	15.9%	10.721
	Moderate	208[b]	30.2%	20	16.9%	14	30.4%	16	23.2%	
	High	383	55.6%	82[a]	69.5%	26	56.5%	42	60.9%	
Blogs- Helpful	Low	158	23.1%	19	16.0%	7	15.2%	10	15.6%	28.284*
	Moderate	259[b]	37.9%	25	21.0%	14	30.4%	22	34.4%	
	High	267	39.0%	75[a]	63.0%	25	54.3%	32	50.0%	
Reminder- Helpful	Low	232[b]	33.9%	16	13.7%	14	29.2%	13	19.1%	51.806*
	Moderate	185[b]	27.0%	17	14.5%	11	22.9%	13	19.1%	
	High	268	39.1%	84[a,c]	71.8%	23	47.9%	42[a]	61.8%	
Articles and FAQ- Easy to understand	Low	58	8.4%	12	10.2%	4	8.5%	7	10.4%	2.792
	Moderate	184	26.7%	31	26.3%	9	19.1%	14	20.9%	
	High	446	64.8%	75	63.6%	34	72.3%	46	68.7%	
Articles and FAQ- Interesting	Low	80	11.6%	11	9.5%	4	8.5%	9	13.4%	10.374
	Moderate	231	33.6%	35	30.2%	9	19.1%	14	20.9%	
	High	376	54.7%	70	60.3%	34	72.3%	44	65.7%	
Articles and FAQ- Helpful	Low	90	13.1%	10	8.8%	4	8.7%	6	9.2%	15.459*
	Moderate	224	32.7%	25	21.9%	9	19.6%	16	24.6%	
	High	371	54.2%	79[a]	69.3%	33	71.7%	43	66.2%	
Resources- Helpful	Low	94	13.8%	11	9.7%	3	6.4%	8	11.6%	15.608*
	Moderate	225	33.1%	24	21.2%	14	29.8%	15	21.7%	
	High	361	53.1%	78[a]	69.0%	30	63.8%	46	66.7%	
Social support	Low	434[b,d]	63.9%	54	45.4%	24	50.0%	31	44.9%	48.667*
	Moderate	132	19.4%	18	15.1%	14	29.2%	11	15.9%	
	High	113	16.6%	47[a]	39.5%	10	20.8%	27[a]	39.1%	
Enjoy participating	Low	91	13.2%	18	15.3%	6	12.5%	7	10.1%	17.022*
	Moderate	209[b]	30.2%	19	16.1%	12	25.0%	11	15.9%	
	High	391	56.6%	81	68.6%	30	62.5%	51[a]	73.9%	
Recommend to others	Low	69	10.0%	12	10.2%	3	6.5%	4	5.8%	15.399*
	Moderate	169[b]	24.5%	14	11.9%	8	17.4%	10	14.5%	
	High	453	65.6%	92[a]	78.0%	35	76.1%	55	79.7%	

*. Results were based on two-sided tests with a significance level of 0.05. For each significant pair, the key

#: Minimum expected cell count is too small. Chi-square results may be invalid. Fisher's Exact test is used

American/ Black, other races and unknown races) in the total satisfaction group, the intervention group, and the control group by chi-square test

Total satisfaction sample/ Intervention group/ Control Group																	
Intervention group									Control group								
Race								chi-square value	Race								chi-square value
Caucasian/White (a)		African American/ Black (b)		Other races (c)		Unknown races(d)			Caucasian/White (a)		African American/ Black (b)		Other races (c)		Unknown races(d)		
Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %		Count	Column N %	Count	Column N %	Count	Column N %	Count	%	
135	29.3%	20	25.6%	6	22.2%	10	22.7%		69	29.9%	8	19.0%	4	21.1%	5	22.7%	
208	45.2%	25	32.1%	13	48.1%	13	29.5%	17.858*	108	46.8%	12	28.6%	8	42.1%	11	50.0%	15.948*
117	25.4%	33[a]	42.3%	8	29.6%	21[a]	47.7%		54	23.4%	22[a]	52.4%	7	36.8%	6	27.3%	
72	15.7%	10	12.8%	4	14.8%	8	17.8%		26	11.3%	6	15.0%	2	10.5%	3	12.5%	
138[b]	30.1%	12	15.4%	10	37.0%	6	13.3%	15.197*	70	30.3%	8	20.0%	4	21.1%	10	41.7%	4.644#
248	54.1%	56[a]	71.8%	13	48.1%	31	68.9%		135	58.4%	26	65.0%	13	68.4%	11	45.8%	
101	22.3%	14	17.9%	5	18.5%	5	11.9%		57	24.6%	5	12.2%	2	10.5%	5	22.7%	
175b	38.7%	15	19.2%	9	33.3%	14	33.3%	19.888*	84	36.2%	10	24.4%	5	26.3%	8	36.4%	11.796
176	38.9%	49[a]	62.8%	13	48.1%	23	54.8%		91	39.2%	26[a]	63.4%	12	63.2%	9	40.9%	
141[b]	31.0%	9	12.0%	10	33.3%	6	14.0%		91[b]	39.6%	7	16.7%	4	22.2%	7	28.0%	
117	25.7%	10	13.3%	4	13.3%	10	23.3%	32.247*	68	29.6%	7	16.7%	7	38.9%	3	12.0%	27.073*
197	43.3%	56[a]	74.7%	16	53.3%	27	62.8%		71	30.9%	28[a]	66.7%	7	38.9%	15[a]	60.0%	
43	9.4%	10	13.2%	3	10.7%	5	11.4%		15	6.5%	2	4.8%	1	5.3%	2	8.7%	
112	24.5%	14	18.4%	7	25.0%	8	18.2%	2.769	72	31.2%	17	40.5%	2	10.5%	6	26.1%	6.245#
302	66.1%	52	68.4%	18	64.3%	31	70.5%		144	62.3%	23	54.8%	16	84.2%	15	65.2%	
56	12.3%	9	11.8%	4	14.3%	6	13.6%		24	10.4%	2	5.0%	0	0.0%	3	13.0%	
145	31.7%	21	27.6%	6	21.4%	9	20.5%	3.841	86	37.4%	14	35.0%	3	15.8%	5	21.7%	10.548#
256	56.0%	46	60.5%	18	64.3%	29	65.9%		120	52.2%	24	60.0%	16[a]	84.2%	15	65.2%	
61	13.4%	9	12.5%	3	11.1%	4	9.5%		29	12.6%	1	2.4%	1	5.3%	2	8.7%	
141	31.1%	13	18.1%	8	29.6%	10	23.8%	7.242	83[c]	35.9%	12	28.6%	1	5.3%	6	26.1%	15.885*#
252	55.5%	50	69.4%	16	59.3%	28	66.7%		119	51.5%	29	69.0%	17[a]	89.5%	15	65.2%	
55	12.2%	8	10.7%	2	6.9%	4	9.1%		39	17.0%	3	7.9%	1	5.6%	4	16.0%	
143	31.7%	15	20.0%	11	37.9%	9	20.5%	8.961	82	35.8%	9	23.7%	3	16.7%	6	24.0%	12.131
253	56.1%	52	69.3%	16	55.2%	31	70.5%		108	47.2%	26	68.4%	14	77.8%	15	60.0%	
280[d]	62.5%	36	46.8%	16	55.2%	19	42.2%		154[b]	66.7%	18	42.9%	8	42.1%	12	50.0%	
85	19.0%	8	10.4%	8	27.6%	7	15.6%	33.777*	47	20.3%	10	23.8%	6	31.6%	4	16.7%	19.049*#
83	18.5%	33[a]	42.9%	5	17.2%	19[a]	42.2%		30	13.0%	14[a]	33.3%	5	26.3%	8[a]	33.3%	
59	12.9%	12	15.8%	4	13.8%	4	8.9%		32	13.7%	6	14.3%	2	10.5%	3	12.5%	
129	28.2%	11	14.5%	7	24.1%	5	11.1%	13.516*	80	34.3%	8	19.0%	5	26.3%	6	25.0%	5.235
270	59.0%	53	69.7%	18	62.1%	36[a]	80.0%		121	51.9%	28	66.7%	12	63.2%	15	62.5%	
52	11.4%	7	9.1%	2	7.4%	2	4.5%		17	7.3%	5	12.2%	1	5.3%	2	8.0%	
108	23.6%	8	10.4%	7	25.9%	5	11.4%	13.988*	61	26.2%	6	14.6%	1	5.3%	5	20.0%	7.708#
298	65.1%	62[a]	80.5%	18	66.7%	37	84.1%		155	66.5%	30	73.2%	17	89.5%	18	72.0%	

of the category with the smaller column proportion appears under the category with the larger column proportion.

here instead of the chi-square test.

Table 9. The satisfaction levels (high, medium, low) of website weight-related features by race (Caucasian/White, African American/ Black, other races and unknown races) in the intervention group by chi-square test.

		Race								Chi-square value
		Caucasian/White (a)		African American/ Black (b)		Other races (c)		Unknown races (d)		
		Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	
Weight gain tracker- Easy to use	Low	18	5.20%	9[a]	15.00%	3	14.30%	3	8.60%	9.996[#]
	Moderate	63	18.10%	8	13.30%	4	19.00%	7	20.00%	
	High	267	76.70%	43	71.70%	14	66.70%	25	71.40%	
Weight gain tracker- Helpful	Low	67	19.30%	13	22.00%	7	33.30%	3	8.30%	13.820*
	Moderate	95	27.40%	7	11.90%	4	19.00%	14[b]	38.90%	
	High	185	53.30%	39	66.10%	10	47.60%	19	52.80%	
Diet goal-setting- Easy to use	Low	64	19.00%	15	25.40%	5	23.80%	5	14.70%	13.555*
	Moderate	118[b]	35.10%	8	13.60%	7	33.30%	8	23.50%	
	High	154	45.80%	36	61.00%	9	42.90%	21	61.80%	
Diet goal-setting- Helpful	Low	109	32.60%	19	32.80%	6	28.60%	7	20.00%	20.310*
	Moderate	130[b]	38.90%	9	15.50%	8	38.10%	11	31.40%	
	High	95	28.40%	30[a]	51.70%	7	33.30%	17	48.60%	
Physical activity goal-setting- Easy to use	Low	69	20.20%	16	27.10%	5	23.80%	5	14.30%	12.799*
	Moderate	115[b]	33.60%	8	13.60%	7	33.30%	8	22.90%	
	High	158	46.20%	35	59.30%	9	42.90%	22	62.90%	
Physical activity goal-setting- Helpful	Low	107	31.60%	18	30.00%	8	36.40%	7	20.60%	21.827*
	Moderate	141[b]	41.60%	11	18.30%	8	36.40%	11	32.40%	
	High	91	26.80%	31[a]	51.70%	6	27.30%	16	47.10%	

*. Results were based on two-sided tests with a significance level of 0.05. For each significant pair, the key of the category with the smaller column proportion appears under the category with the larger column proportion.

[#]. Minimum expected cell count is too small. Chi-square results may be invalid. Fisher's Exact test is used here instead of the chi-square test.

Table 10. The satisfaction levels (high, medium, low) of website features by income

		Total samples of the satisfaction study				
		Income				chi-square value
		Higher-income (a)		Low-income (b)		
		Count	Column N %	Count	Column N %	
Blogs- Engaging	Low	185	29.3%	72	24.7%	10.971*
	Moderate	284	45.0%	114	39.0%	
	High	162	25.7%	106[a]	36.3%	
Blogs- Easy to use	Low	93	14.8%	38	13.0%	7.481*
	Moderate	191[b]	30.4%	67	22.9%	
	High	345	54.8%	188[a]	64.2%	
Blogs- Helpful	Low	144	23.0%	50	17.4%	17.505*
	Moderate	237[b]	37.9%	83	28.8%	
	High	244	39.0%	155[a]	53.8%	
Reminder- Helpful	Low	207[b]	32.9%	68	23.6%	22.464*
	Moderate	170[b]	27.0%	56	19.4%	
	High	253	40.2%	164[a]	56.9%	
Articles and FAQ- Easy to understand	Low	53	8.4%	28	9.6%	3.405
	Moderate	174	27.7%	64	22.0%	
	High	402	63.9%	199	68.4%	
Articles and FAQ- Interesting	Low	75	12.0%	29	10.0%	3.347
	Moderate	206	32.9%	83	28.5%	
	High	345	55.1%	179	61.5%	
Articles and FAQ- Helpful	Low	85[b]	13.6%	25	8.7%	11.317*
	Moderate	201[b]	32.2%	73	25.5%	
	High	338	54.2%	188[a]	65.7%	
Resources- Helpful	Low	86	13.8%	30	10.4%	7.422*
	Moderate	202	32.5%	76	26.4%	
	High	333	53.6%	182[a]	63.2%	
Social support	Low	403[b]	65.0%	140	47.5%	28.591*
	Moderate	110	17.7%	65	22.0%	
	High	107	17.3%	90[a]	30.5%	
Enjoy participating	Low	94[b]	14.9%	28	9.5%	6.997*
	Moderate	176	27.9%	75	25.4%	
	High	361	57.2%	192[a]	65.1%	
Recommend to others	Low	65	10.3%	23	7.9%	5.475
	Moderate	148	23.4%	53	18.2%	
	High	419	66.3%	216[a]	74.0%	

*. Results were based on two-sided tests with a significance level of 0.05. For each

(Higher-income and low-income) in the total satisfaction group, the intervention group, and the control group by chi-square test.

Total satisfaction sample/ Intervention group/ Control Group									
Intervention group					Control group				
Income				chi-square value	Income				chi-square value
Higher-income (a)		Low-income (b)			Higher-income (a)		Low-income (b)		
Count	Column N %	Count	%		Count	%	Count	%	
125	30.0%	46	23.8%		60	27.9%	26	26.3%	
186	44.7%	73	37.8%	10.983*	98	45.6%	41	41.4%	1.141
105	25.2%	74[a]	38.3%		57	26.5%	32	32.3%	
67	16.1%	27	14.0%		26	12.1%	11	11.0%	
125[b]	30.1%	41	21.2%	6.999*	66	30.8%	26	26.0%	1.037
223	53.7%	125[a]	64.8%		122	57.0%	63	63.0%	
95[b]	23.2%	30	15.9%		49	22.8%	20	20.2%	
159[b]	38.8%	54	28.6%	16.193*	78	36.3%	29	29.3%	2.592
156	38.0%	105[a]	55.6%		88	40.9%	50	50.5%	
130[b]	31.3%	36	19.1%		77	35.8%	32	32.0%	
108[b]	26.0%	33	17.6%	22.176*	62	28.8%	23	23.0%	2.804
177	42.7%	119[a]	63.3%		76	35.3%	45	45.0%	
42	10.2%	19	9.9%		11	5.1%	9	9.1%	
103	24.9%	38	19.8%	2.078	71	32.9%	26	26.3%	2.745
268	64.9%	135	70.3%		134	62.0%	64	64.6%	
55	13.3%	20	10.4%		20	9.4%	9	9.1%	
130	31.5%	51	26.6%	3.335	76	35.7%	32	32.3%	.388
228	55.2%	121	63.0%		117	54.9%	58	58.6%	
58	14.2%	19	10.2%		27	12.6%	6	6.0%	
131[b]	32.0%	41	22.0%	10.245*	70	32.6%	32	32.0%	3.414
220	53.8%	126[a]	67.7%		118	54.9%	62	62.0%	
53	13.0%	16	8.4%		33	15.5%	14	14.4%	
127	31.1%	51	26.7%	5.070	75	35.2%	25	25.8%	3.287
228	55.9%	124[a]	64.9%		105	49.3%	58	59.8%	
261[b]	64.3%	90	46.6%		142[b]	66.4%	50	49.0%	
69	17.0%	39	20.2%	19.379*	41	19.2%	26	25.5%	9.360*
76	18.7%	64[a]	33.2%		31	14.5%	26[a]	25.5%	
64[b]	15.4%	15	7.8%		30	13.9%	13	12.7%	
111	26.7%	41	21.2%	11.204*	65	30.1%	34	33.3%	.356
240	57.8%	137[a]	71.0%		121	56.0%	55	53.9%	
48	11.6%	15	7.8%		17	7.8%	8	8.0%	
98[b]	23.7%	30	15.6%	8.505*	50	22.9%	23	23.0%	.004
268	64.7%	147[a]	76.6%		151	69.3%	69	69.0%	

significant pair, the key of the category with the smaller column proportion appears under the category with the larger column proportion.

Table 11. The satisfaction levels (high, medium, low) of website weight-related features by by income (Higher-income and low-income) in the intervention group by chi-square test.

		Income				Chi-square value
		Higher-income (a)		Low-income (b)		
		Count	Column N %	Count	Column N %	
Weight gain tracker- Easy to use	Low	21	6.5%	12	8.6%	1.031
	Moderate	60	18.5%	22	15.8%	
	High	244	75.1%	105	75.5%	
Weight gain tracker- Helpful	Low	65	20.1%	25	18.0%	1.546
	Moderate	88	27.2%	32	23.0%	
	High	171	52.8%	82	59.0%	
Diet goal-setting- Easy to use	Low	60	19.2%	29	21.0%	5.208
	Moderate	108[b]	34.6%	33	23.9%	
	High	144	46.2%	76	55.1%	
Diet goal-setting- Helpful	Low	105	33.7%	36	26.5%	10.375*
	Moderate	118	37.8%	40	29.4%	
	High	89	28.5%	60[a]	44.1%	
Physical activity goal-setting- Easy to use	Low	72	22.6%	23	16.5%	10.446*
	Moderate	106[b]	33.3%	32	23.0%	
	High	140	44.0%	84[a]	60.4%	
Physical activity goal-setting- Helpful	Low	108[b]	34.3%	32	22.9%	18.794*
	Moderate	127	40.3%	44	31.4%	
	High	80	25.4%	64[a]	45.7%	

*. Results were based on two-sided tests with a significance level of 0.05. For each significant pair, the key of the category with the smaller column proportion appears under the category with the larger column proportion.

Table 12. The satisfaction levels (high, medium, low) of website features by education (middle school degree, high school

		Total samples of the satisfaction study										
		Education										Chi-square value
		Middle school and some high school (a)		High school degree and vocational training after high school (b)		Some college or associate degree (c)		Bachelor degree (d)		Master or PhD degree (e)		
		Count	%	Count	Column N %	Count	Column N %	Count	%	Count	Column N %	
Blogs- Engaging	Low	11	28.9%	24	19.5%	61	26.4%	60	24.2%	$92^{b,d}$	36.7%	
	Moderate	14	36.8%	43	35.0%	90	39.0%	124	50.0%	115	45.8%	44.588*
	High	13	34.2%	$56^{d,e}$	45.5%	80^{e}	34.6%	64	25.8%	44	17.5%	
Blogs- Easy to use	Low	7	17.5%	17	13.7%	30	13.1%	31	12.6%	41	16.3%	
	Moderate	12	30.0%	23	18.5%	49	21.4%	$88^{b,c}$	35.8%	80	31.9%	23.697*
	High	21	52.5%	$84^{d,e}$	67.7%	$150^{d,e}$	65.5%	127	51.6%	130	51.8%	
Blogs- Helpful	Low	6	15.4%	19	15.4%	43	19.0%	51	20.8%	70	28.2%	
	Moderate	15	38.5%	29	23.6%	60	26.5%	$97^{b,c}$	39.6%	$108^{b,c}$	43.5%	53.735*
	High	18	46.2%	$75^{d,e}$	61.0%	$123^{d,e}$	54.4%	97	39.6%	70	28.2%	
Reminder- Helpful	Low	7	17.5%	24	19.5%	59	25.9%	79	31.9%	$100^{b,c}$	40.2%	
	Moderate	7	17.5%	21	17.1%	54	23.7%	65	26.2%	71	28.5%	47.198*
	High	26^{e}	65.0%	$78^{d,e}$	63.4%	115^{e}	50.4%	104	41.9%	78	31.3%	
Articles and FAQ- Easy to understand	Low	8^{d}	21.1%	11	8.9%	22	9.7%	16	6.4%	20	7.9%	
	Moderate	9	23.7%	25	20.3%	63	27.8%	70	28.1%	63	24.9%	12.594
	High	21	55.3%	87	70.7%	142	62.6%	163	65.5%	170	67.2%	
Articles and FAQ- Interesting	Low	7	17.9%	9	7.4%	24	10.5%	21	8.5%	40	15.9%	
	Moderate	12	30.8%	31	25.4%	73	32.0%	86	34.8%	76	30.3%	15.062
	High	20	51.3%	82	67.2%	131	57.5%	140	56.7%	135	53.8%	
Articles and FAQ- Helpful	Low	6	15.8%	8	6.7%	22	9.6%	25	10.2%	46^{b}	18.3%	
	Moderate	13	34.2%	24	20.2%	65	28.5%	79	32.2%	85	33.9%	29.193*
	High	19	50.0%	$87^{d,e}$	73.1%	141^{e}	61.8%	141	57.6%	120	47.8%	
Resources- Helpful	Low	8	20.0%	7	5.8%	21	9.4%	28	11.4%	$49^{b,c}$	19.8%	
	Moderate	10	25.0%	23	19.0%	69	30.8%	84^{b}	34.3%	81	32.8%	37.116*
	High	22	55.0%	$91^{c,d,e}$	75.2%	134	59.8%	133	54.3%	117	47.4%	
Social support	Low	19	47.5%	50	41.0%	117	51.3%	157^{b}	63.8%	$188^{a,b,c,d}$	75.8%	
	Moderate	7	17.5%	23	18.9%	47	20.6%	54	22.0%	38	15.3%	79.090*
	High	$14^{d,e}$	35.0%	$49^{d,e}$	40.2%	$64^{d,e}$	28.1%	35	14.2%	22	8.9%	
Enjoy participating	Low	4	10.3%	7	5.7%	26	11.4%	35	13.9%	46^{b}	18.2%	
	Moderate	10	25.6%	28	22.8%	54	23.6%	71	28.3%	79	31.2%	22.415*
	High	25	64.1%	88^{e}	71.5%	149^{e}	65.1%	145	57.8%	128	50.6%	
Recommend to others	Low	5	12.8%	5	4.1%	20	8.8%	20	8.0%	36^{b}	14.1%	
	Moderate	6	15.4%	23	18.9%	44	19.4%	57	22.8%	63	24.7%	17.131*
	High	28	71.8%	94^{a}	77.0%	163	71.8%	173	69.2%	156	61.2%	

*. Results were based on two-sided tests with a significance level of 0.05. For each significant pair, the key of the category with

#: Minimum expected cell count is too small. Chi-square results may be invalid. Fisher's Exact test is used here instead of

degree, some college degree, Bachelor degree, and Master or PhD degree) in the total satisfaction group, the

Total satisfaction sample/ Intervention group/ Control Group										
Intervention group										
Education										Chi-square value
Middle school and some high school (a)		High school degree and vocational training after high school (b)		Some college or associate degree (c)		Bachelor degree (d)		Master or PhD degree (e)		
Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	
8	33.3%	17	18.9%	37	24.5%	36	23.2%	66[b,c,d]	39.8%	
8	33.3%	30	33.3%	60	39.7%	80	51.6%	71	42.8%	40.031*
8	33.3%	43[d,e]	47.8%	54[e]	35.8%	39	25.2%	29	17.5%	
6	25.0%	12	13.2%	21	14.0%	20	13.0%	31	18.7%	
4	16.7%	16	17.6%	33	22.0%	58[b,c]	37.7%	50	30.1%	22.009*
14	58.3%	63[d]	69.2%	96	64.0%	76	49.4%	85	51.2%	
3	12.5%	15	16.7%	26	17.7%	30	19.7%	47	28.8%	
10	41.7%	19	21.1%	43	29.3%	63[b]	41.4%	69[b]	42.3%	37.243*
11	45.8%	56[d,e]	62.2%	78[e]	53.1%	59	38.8%	47	28.8%	
3	12.5%	17	18.9%	36	24.5%	46	29.7%	61[b]	36.7%	
5	20.8%	13	14.4%	33	22.4%	40	25.8%	44	26.5%	27.897*
16	66.7%	60[d,e]	66.7%	78[e]	53.1%	69	44.5%	61	36.7%	
7[d,e]	29.2%	8	8.9%	17	11.6%	11	7.1%	15	8.9%	
3	12.5%	17	18.9%	36	24.5%	48	31.0%	31	18.5%	20.785*
14	58.3%	65	72.2%	94	63.9%	96	61.9%	122	72.6%	
6[b]	25.0%	5	5.6%	18	12.2%	14	9.0%	29	17.3%	
7	29.2%	24	27.0%	45	30.4%	53	34.2%	44	26.2%	15.148
11	45.8%	60	67.4%	85	57.4%	88	56.8%	95	56.5%	
5	20.8%	6	7.0%	17	11.6%	14	9.3%	32	19.2%	
7	29.2%	17	19.8%	42	28.6%	51	33.8%	50	29.9%	19.399*
12	50.0%	63[e]	73.3%	88	59.9%	86	57.0%	85	50.9%	
5	20.8%	4	4.5%	14	9.5%	14	9.2%	30[b]	18.4%	
7	29.2%	17	19.1%	44	29.7%	59[b]	38.6%	45	27.6%	28.007*
12	50.0%	68[d,e]	76.4%	90	60.8%	80	52.3%	88	54.0%	
11	45.8%	38	42.7%	76	51.7%	97[b]	63.4%	121[b,c]	73.8%	
4	16.7%	12	13.5%	29	19.7%	33	21.6%	26	15.9%	52.539*
9[e]	37.5%	39[d,e]	43.8%	42[d,e]	28.6%	23	15.0%	17	10.4%	
2	8.7%	5	5.6%	16	10.7%	21	13.4%	32[b]	19.2%	
5	21.7%	18	20.0%	33	22.1%	44	28.0%	46	27.5%	17.577*
16	69.6%	67[e]	74.4%	100	67.1%	92	58.6%	89	53.3%	
3	12.5%	5	5.6%	12	8.2%	14	9.0%	27	16.0%	
5	20.8%	13	14.6%	29	19.9%	37	23.7%	39	23.1%	14.110
16	66.7%	71[e]	79.8%	105	71.9%	105	67.3%	103	60.9%	

the smaller column proportion appears under the category with the larger column proportion.

the chi-square test.

intervention group, and the control group by chi-square test.

Control group										
Education										
Middle school and some high school (a)		High school degree and vocational training after high school (b)		Some college or associate degree (c)		Bachelor degree (d)		Master or PhD degree (e)		
Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Chi-square value
3	21.4%	7	21.2%	24	30.0%	24	25.8%	26	30.6%	
6	42.9%	13	39.4%	30	37.5%	44	47.3%	44	51.8%	9.230
5	35.7%	13	39.4%	26	32.5%	25	26.9%	15	17.6%	
1	6.3%	5	15.2%	9	11.4%	11	12.0%	10	11.8%	
8	50.0%	7	21.2%	16	20.3%	30	32.6%	30	35.3%	9.922#
7	43.8%	21	63.6%	54	68.4%	51	55.4%	45	52.9%	
3	20.0%	4	12.1%	17	21.5%	21	22.6%	23	27.1%	
5	33.3%	10	30.3%	17	21.5%	34	36.6%	39c	45.9%	20.121*
7e	46.7%	19e	57.6%	45e	57.0%	38	40.9%	23	27.1%	
4	25.0%	7	21.2%	23	28.4%	33	35.5%	39	47.0%	
2	12.5%	8	24.2%	21	25.9%	25	26.9%	27	32.5%	21.817*
10	62.5%	18e	54.5%	37e	45.7%	35	37.6%	17	20.5%	
1	7.1%	3	9.1%	5	6.3%	5	5.3%	5	5.9%	
6	42.9%	8	24.2%	27	33.8%	22	23.4%	32	37.6%	7.030#
7	50.0%	22	66.7%	48	60.0%	67	71.3%	48	56.5%	
1	6.7%	4	12.1%	6	7.5%	7	7.6%	11	13.3%	
5	33.3%	7	21.2%	28	35.0%	33	35.9%	32	38.6%	6.053
9	60.0%	22	66.7%	46	57.5%	52	56.5%	40	48.2%	
1	7.1%	2	6.1%	5	6.2%	11	11.7%	14	16.7%	
6	42.9%	7	21.2%	23	28.4%	28	29.8%	35	41.7%	15.879*#
7	50.0%	24e	72.7%	53e	65.4%	55	58.5%	35	41.7%	
3	18.8%	3	9.4%	7	9.2%	14	15.2%	19	22.6%	
3	18.8%	6	18.8%	25	32.9%	25	27.2%	36	42.9%	20.649*
10	62.5%	23e	71.9%	44e	57.9%	53e	57.6%	29	34.5%	
8	50.0%	12	36.4%	41	50.6%	60b	64.5%	67b,c	79.8%	
3	18.8%	11	33.3%	18	22.2%	21	22.6%	12	14.3%	30.963*
5e	31.3%	10e	30.3%	22e	27.2%	12	12.9%	5	6.0%	
2	12.5%	2	6.1%	10	12.5%	14	14.9%	14	16.3%	
5	31.3%	10	30.3%	21	26.3%	27	28.7%	33	38.4%	6.770#
9	56.3%	21	63.6%	49	61.3%	53	56.4%	39	45.3%	
2	13.3%	0	0.0%	8	9.9%	6	6.4%	9	10.5%	
1	6.7%	10	30.3%	15	18.5%	20	21.3%	24	27.9%	9.887#
12	80.0%	23	69.7%	58	71.6%	68	72.3%	53	61.6%	

Table 13. The satisfaction levels (high, medium, low) of website weight-related features by education (middle school degree, high school degree, some college degree, Bachelor degree, and Master or PhD degree) in the intervention group by chi-square test.

		Education											Chi-square value
		Middle school and some high school (a)		High school degree and vocational training after high school (b)		Some college or associate degree (c)		Bachelor degree (d)		Master or PhD degree (e)			
		Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %		
Weight gain tracker- Easy to use	Low	3	16.7%	8	11.6%	8	7.8%	6	5.1%	5	3.6%		14.324[#]
	Moderate	6	33.3%	9	13.0%	20	19.6%	23	19.5%	21	15.1%		
	High	9	50.0%	52	75.4%	74	72.5%	89	75.4%	113[a]	81.3%		
Weight gain tracker- Helpful	Low	2	11.1%	14	20.0%	22	21.6%	23	19.5%	25	18.2%		3.147
	Moderate	7	38.9%	15	21.4%	26	25.5%	32	27.1%	36	26.3%		
	High	9	50.0%	41	58.6%	54	52.9%	63	53.4%	76	55.5%		
Diet goal-setting- Easy to use	Low	6	35.3%	12	17.4%	21	21.0%	22	18.8%	25	19.1%		6.563
	Moderate	5	29.4%	19	27.5%	27	27.0%	41	35.0%	47	35.9%		
	High	6	35.3%	38	55.1%	52	52.0%	54	46.2%	59	45.0%		
Diet goal-setting- Helpful	Low	6	33.3%	19	27.9%	25	25.0%	34	29.1%	55	42.3%		13.932
	Moderate	5	27.8%	21	30.9%	38	38.0%	46	39.3%	45	34.6%		
	High	7	38.9%	28	41.2%	37	37.0%	37	31.6%	30	23.1%		
Physical activity goal-setting- Easy to use	Low	5	27.8%	11	16.2%	18	17.6%	25	21.4%	30	22.2%		8.594
	Moderate	4	22.2%	18	26.5%	27	26.5%	44	37.6%	42	31.1%		
	High	9	50.0%	39	57.4%	57	55.9%	48	41.0%	63	46.7%		
Physical activity goal-setting- Helpful	Low	5	27.8%	15	22.4%	24	24.0%	34	28.8%	57[c]	42.2%		20.233*
	Moderate	7	38.9%	24	35.8%	36	36.0%	53	44.9%	48	35.6%		
	High	6	33.3%	28[a]	41.8%	40[a]	40.0%	31	26.3%	30	22.2%		

*. Results were based on two-sided tests with a significance level of 0.05. For each significant pair, the key of the category with the smaller column proportion appears under the category with the larger column proportion.

[#]: Minimum expected cell count is too small. Chi-square results may be invalid. Fisher's Exact test is used here instead of the chi-square test.

Table 14. The satisfaction levels (high, medium, low) of website features by BMI categories (normal,

		Total samples of the satisfaction study						
		BMI Category						Chi-square value
		Normal BMI (a)		Overweight BMI (b)		Obese BMI (c)		
		Count	Column N %	Count	Column N %	Count	Column N %	
Blogs- Engaging	Low	150	28.5%	75	28.7%	32	23.5%	4.551
	Moderate	235	44.7%	102	39.1%	61	44.9%	
	High	141	26.8%	84	32.2%	43	31.6%	
Blogs- Easy to use	Low	68	13.0%	42	16.0%	21	15.6%	6.832
	Moderate	164	31.2%	62	23.7%	32	23.7%	
	High	293	55.8%	158	60.3%	82	60.7%	
Blogs- Helpful	Low	110	21.1%	61	23.7%	23	17.0%	4.730
	Moderate	193	37.0%	81	31.5%	46	34.1%	
	High	218	41.8%	115	44.7%	66	48.9%	
Reminder- Helpful	Low	172	32.9%	73	27.5%	30	23.1%	6.238
	Moderate	127	24.3%	66	24.9%	33	25.4%	
	High	224	42.8%	126	47.5%	67	51.5%	
Articles and FAQ- Easy to understand	Low	44	8.4%	23	8.8%	14	10.4%	4.558
	Moderate	126	24.1%	69	26.3%	43	31.9%	
	High	353	67.5%	170	64.9%	78	57.8%	
Articles and FAQ- Interesting	Low	60	11.5%	28	10.7%	16	12.0%	.255
	Moderate	166	31.8%	82	31.3%	41	30.8%	
	High	296	56.7%	152	58.0%	76	57.1%	
Articles and FAQ- Helpful	Low	65	12.5%	29	11.2%	16	12.0%	.592
	Moderate	158	30.4%	75	29.1%	41	30.8%	
	High	296	57.0%	154	59.7%	76	57.1%	
Resources- Helpful	Low	65	12.6%	37	14.3%	14	10.4%	2.419
	Moderate	165	32.0%	74	28.7%	39	28.9%	
	High	286	55.4%	147	57.0%	82	60.7%	
Social support	Low	329[c]	63.3%	145	55.6%	69	51.5%	9.540*
	Moderate	95	18.3%	52	19.9%	28	20.9%	
	High	96	18.5%	64	24.5%	37	27.6%	
Enjoy participating	Low	69	13.1%	38	14.4%	15	11.1%	4.808
	Moderate	154	29.2%	59	22.3%	38	28.1%	
	High	304	57.7%	167	63.3%	82	60.7%	
Recommend to others	Low	54	10.2%	21	8.1%	13	9.7%	1.763
	Moderate	113	21.3%	55	21.2%	33	24.6%	
	High	363	68.5%	184	70.8%	88	65.7%	

*. Results were based on two-sided tests with a significance level of 0.05. For each significant pair, the key

overweight, and obese) in the total satisfaction group, the intervention group, and the control group by chi-square test.

Total satisfaction sample/ Intervention group/ Control Group													
Intervention group							Control group						
BMI Category							BMI Category						
Normal BMI (a)		Overweight BMI (b)		Obese BMI (c)		Chi-square value	Normal BMI (a)		Overweight BMI (b)		Obese BMI (c)		Chi-square value
Count	Column N %	Count	Column N %	Count	Column N %		Count	Column N %	Count	Column N %	Count	Column N %	
99	28.7%	50	28.6%	22	24.7%		51	28.2%	25	29.1%	10	21.3%	
149	43.2%	71	40.6%	39	43.8%	1.096	86	47.5%	31	36.0%	22	46.8%	5.132
97	28.1%	54	30.9%	28	31.5%		44	24.3%	30	34.9%	15	31.9%	
50	14.6%	29	16.5%	15	16.9%		18	9.9%	13	15.1%	6	13.0%	
105	30.6%	41	23.3%	20	22.5%	4.386	59	32.4%	21	24.4%	12	26.1%	3.003
188	54.8%	106	60.2%	54	60.7%		105	57.7%	52	60.5%	28	60.9%	
71	20.9%	39	22.8%	15	16.9%		39	21.4%	22	25.6%	8	17.4%	
123	36.3%	59	34.5%	31	34.8%	1.653	70	38.5%	22	25.6%	15	32.6%	5.312
145	42.8%	73	42.7%	43	48.3%		73	40.1%	42	48.8%	23	50.0%	
102	29.8%	49	27.5%	15	18.1%		70	38.7%	24	27.6%	15	31.9%	
77	22.5%	46	25.8%	18	21.7%	6.488	50	27.6%	20	23.0%	15	31.9%	7.023
163	47.7%	83	46.6%	50	60.2%		61	33.7%	43[a]	49.4%	17	36.2%	
36	10.6%	15	8.5%	10	11.4%		8	4.4%	8	9.3%	4	8.5%	
75	22.0%	38	21.6%	28	31.8%	5.440	51	28.0%	31	36.0%	15	31.9%	5.513
230	67.4%	123	69.9%	50	56.8%		123	67.6%	47	54.7%	28	59.6%	
44	12.9%	19	10.8%	12	13.6%		16	8.8%	9	10.5%	4	8.9%	
103	30.2%	52	29.5%	26	29.5%	.733	63	34.8%	30	34.9%	15	33.3%	.257
194	56.9%	105	59.7%	50	56.8%		102	56.4%	47	54.7%	26	57.8%	
47	14.0%	18	10.4%	12	14.0%		18	9.8%	11	12.9%	4	8.5%	
94	28.0%	52	30.1%	26	30.2%	1.584	64	35.0%	23	27.1%	15	31.9%	2.156
195	58.0%	103	59.5%	48	55.8%		101	55.2%	51	60.0%	28	59.6%	
38	11.3%	21	12.0%	10	11.4%		27	15.0%	16	19.3%	4	8.5%	
105	31.3%	50	28.6%	23	26.1%	1.095	60	33.3%	24	28.9%	16	34.0%	2.950
193	57.4%	104	59.4%	55	62.5%		93	51.7%	43	51.8%	27	57.4%	
208	61.7%	101	58.0%	42	47.7%		121[b]	66.1%	44	50.6%	27	58.7%	
62	18.4%	28	16.1%	18	20.5%	7.924	33	18.0%	24	27.6%	10	21.7%	6.172
67	19.9%	45	25.9%	28	31.8%		29	15.8%	19	21.8%	9	19.6%	
45	13.1%	24	13.6%	10	11.4%		24	13.0%	14	16.1%	5	10.6%	
92	26.8%	38	21.5%	22	25.0%	2.065	62	33.7%	21	24.1%	16	34.0%	3.081
206	60.1%	115	65.0%	56	63.6%		98	53.3%	52	59.8%	26	55.3%	
40	11.6%	13	7.5%	10	11.5%		14	7.6%	8	9.3%	3	6.4%	
68	19.7%	41	23.6%	19	21.8%	2.897	45	24.3%	14	16.3%	14	29.8%	3.721
237	68.7%	120	69.0%	58	66.7%		126	68.1%	64	74.4%	30	63.8%	

of the category with the smaller column proportion appears under the category with the larger column proportion.

Table 15. The satisfaction levels (high, medium, low) of website weight-related features by BMI categories (normal,overweight, and obese) in the intervention group by chi-square test.

		BMI Category						Chi-square value
		Normal BMI (a)		Overweight BMI (b)		Obese BMI (c)		
		Count	Column N %	Count	Column N %	Count	Column N %	
Weight gain tracker- Easy to use	Low	14	5.3%	9	7.0%	10[a]	13.7%	9.249
	Moderate	46	17.5%	19	14.8%	17	23.3%	
	High	203[c]	77.2%	100	78.1%	46	63.0%	
Weight gain tracker- Helpful	Low	45	17.1%	27	20.9%	18	25.4%	5.477
	Moderate	63	24.0%	36	27.9%	21	29.6%	
	High	155	58.9%	66	51.2%	32	45.1%	
Diet goal-setting- Easy to use	Low	50	20.0%	21	16.3%	18	25.4%	4.677
	Moderate	84	33.6%	36	27.9%	21	29.6%	
	High	116	46.4%	72	55.8%	32	45.1%	
Diet goal-setting- Helpful	Low	80	32.0%	39	30.2%	22	31.9%	.573
	Moderate	85	34.0%	47	36.4%	26	37.7%	
	High	85	34.0%	43	33.3%	21	30.4%	
Physical activity goal-setting- Easy to use	Low	56	22.0%	22	16.7%	17	23.9%	4.118
	Moderate	81	31.9%	36	27.3%	21	29.6%	
	High	117	46.1%	74	56.1%	33	46.5%	
Physical activity goal-setting- Helpful	Low	78	30.7%	37	28.7%	25	34.7%	1.811
	Moderate	98	38.6%	46	35.7%	27	37.5%	
	High	78	30.7%	46	35.7%	20	27.8%	

*. Results were based on two-sided tests with a significance level of 0.05. For each significant pair, the key of the category with the smaller column proportion appears under the category with the larger column proportion.

Table 16. The satisfaction levels (high, medium, low) of website features by age categories (18-24, 25-30, 31-36)

		Total samples of the satisfaction study						
		Age Category						Chi-square value
		18-24 (a)		25-30 (b)		31-36 (c)		
		Count	Column N %	Count	Column N %	Count	Column N %	
Blogs- Engaging	Low	41	21.1%	119	29.1%	97	30.3%	42.826*
	Moderate	60	30.9%	190[a]	46.5%	148[a]	46.3%	
	High	93[b,c]	47.9%	100	24.4%	75	23.4%	
Blogs- Easy to use	Low	21	10.7%	65	15.9%	45	14.2%	26.536*
	Moderate	31	15.8%	124[a]	30.3%	103[a]	32.5%	
	High	144[b,c]	73.5%	220	53.8%	169	53.3%	
Blogs- Helpful	Low	26	13.5%	87	21.5%	81[a]	25.6%	38.314*
	Moderate	46	24.0%	150[a]	37.0%	124[a]	39.2%	
	High	120[b,c]	62.5%	168	41.5%	111	35.1%	
Reminder- Helpful	Low	28	14.5%	126[a]	31.0%	121[a]	37.9%	64.089*
	Moderate	30	15.5%	113[a]	27.8%	83[a]	26.0%	
	High	135[b,c]	69.9%	167	41.1%	115	36.1%	
Articles and FAQ- Easy to understand	Low	17	8.9%	37	9.1%	27	8.4%	10.584*
	Moderate	33	17.3%	120[a]	29.4%	85	26.5%	
	High	141[b]	73.8%	251	61.5%	209	65.1%	
Articles and FAQ- Interesting	Low	18	9.4%	45	11.1%	41	12.8%	19.229*
	Moderate	40	20.8%	149[a]	36.9%	100[a]	31.2%	
	High	134[b,c]	69.8%	210	52.0%	180	56.1%	
Articles and FAQ- Helpful	Low	15	8.0%	45	11.2%	50[a]	15.6%	30.264*
	Moderate	33	17.6%	141[a]	35.0%	100[a]	31.3%	
	High	139[b,c]	74.3%	217	53.8%	170	53.1%	
Resources- Helpful	Low	16	8.4%	49	12.3%	51[a]	16.0%	23.703*
	Moderate	39	20.4%	140[a]	35.0%	99[a]	31.1%	
	High	136[b,c]	71.2%	211	52.8%	168	52.8%	
Social support	Low	77	39.5%	248[a]	61.4%	218[a]	69.0%	72.661*
	Moderate	35	17.9%	81	20.0%	59	18.7%	
	High	83[b,c]	42.6%	75	18.6%	39	12.3%	
Enjoy participating	Low	12	6.2%	57[a]	13.8%	53[a]	16.6%	26.990*
	Moderate	36	18.6%	121[a]	29.3%	94[a]	29.5%	
	High	146[b,c]	75.3%	235	56.9%	172	53.9%	
Recommend to others	Low	11	5.7%	41	10.0%	36	11.2%	18.361*
	Moderate	26	13.4%	93[a]	22.7%	82[a]	25.5%	
	High	157[b,c]	80.9%	275	67.2%	203	63.2%	

*. Results were based on two-sided tests with a significance level of 0.05. For each significant pair, the key of the

in the total satisfaction group, the intervention group, and the control group by chi-square test.

Total satisfaction sample/ Intervention group/ Control Group													
Intervention group							Control group						
Age Category							Age Category						
18-24 (a)		25-30 (b)		31-36 (c)		Chi-square value	18-24 (a)		25-30 (b)		31-36 (c)		Chi-square value
Count	Column N %	Count	Column N %	Count	Column N %		Count	Column N %	Count	Column N %	Count	%	
27	20.9%	77	28.9%	67	31.3%		14	21.5%	42	29.4%	30	28.3%	
41	31.8%	121[a]	45.5%	97[a]	45.3%	25.684*	19	29.2%	69[a]	48.3%	51[a]	48.1%	17.884*
61[b,c]	47.3%	68	25.6%	50	23.4%		32[b,c]	49.2%	32	22.4%	25	23.6%	
13	10.0%	46	17.4%	35	16.4%		8	12.1%	19	13.2%	10	9.6%	
22	16.9%	80[a]	30.2%	64[a]	30.0%	17.053*	9	13.6%	44[a]	30.6%	39[a]	37.5%	12.103*
95[b,c]	73.1%	139	52.5%	114	53.5%		49[b,c]	74.2%	81	56.3%	55	52.9%	
17	13.4%	56	21.5%	52[a]	24.6%		9	13.8%	31	21.5%	29	27.6%	
32	25.2%	100[a]	38.3%	81[a]	38.4%	21.823*	14	21.5%	50	34.7%	43[a]	41.0%	18.026*
78[b,c]	61.4%	105	40.2%	78	37.0%		42[b,c]	64.6%	63	43.8%	33	31.4%	
16	12.7%	74[a]	28.0%	76[a]	35.7%		12	17.9%	52[a]	36.6%	45[a]	42.5%	
18	14.3%	68[a]	25.8%	55[a]	25.8%	40.878*	12	17.9%	45	31.7%	28	26.4%	25.385*
92[b,c]	73.0%	122	46.2%	82	38.5%		43[b,c]	64.2%	45	31.7%	33	31.1%	
12	9.5%	29	11.0%	20	9.3%		5	7.7%	8	5.6%	7	6.6%	
21	16.7%	73	27.7%	47	21.9%	7.328	12	18.5%	47	32.6%	38[a]	35.8%	6.337
93[b]	73.8%	162	61.4%	148	68.8%		48	73.8%	89	61.8%	61	57.5%	
12	9.5%	34	12.9%	29	13.4%		6	9.1%	11	7.8%	12	11.4%	
28	22.2%	91[a]	34.6%	62	28.7%	9.292	12	18.2%	58[a]	41.1%	38[a]	36.2%	11.961*
86[b]	68.3%	138	52.5%	125	57.9%		48[b,c]	72.7%	72	51.1%	55	52.4%	
12	9.8%	33	12.7%	32	15.0%		3	4.6%	12	8.4%	18	16.8%	
21	17.2%	86[a]	33.1%	65[a]	30.5%	14.942*	12	18.5%	55[a]	38.5%	35	32.7%	18.048*
89[b,c]	73.0%	141	54.2%	116	54.5%		50[b,c]	76.9%	76	53.1%	54	50.5%	
8	6.3%	29	11.2%	32[a]	15.1%		8	12.5%	20	14.3%	19	17.9%	
28	22.0%	90[a]	34.6%	60	28.3%	14.811*	11	17.2%	50[a]	35.7%	39[a]	36.8%	11.682*
91[b,c]	71.7%	141	54.2%	120	56.6%		45[b,c]	70.3%	70	50.0%	48	45.3%	
52	40.6%	155[a]	59.6%	144[a]	68.2%		25	37.3%	93[a]	64.6%	74[a]	70.5%	
19	14.8%	52	20.0%	37	17.5%	44.840*	16	23.9%	29	20.1%	22	21.0%	30.192*
57[b,c]	44.5%	53	20.4%	30	14.2%		26[b,c]	38.8%	22	15.3%	9	8.6%	
5	3.9%	38[a]	14.1%	36[a]	17.0%		7	10.4%	19	13.2%	17	15.9%	
23	18.1%	70	26.0%	59	27.8%	21.079*	13	19.4%	51	35.4%	35	32.7%	8.179
99[b,c]	78.0%	161	59.9%	117	55.2%		47[b,c]	70.1%	74	51.4%	55	51.4%	
5	3.9%	30[a]	11.4%	28[a]	13.1%		6	9.1%	11	7.6%	8	7.5%	
17	13.3%	59	22.3%	52[a]	24.3%	16.946*	9	13.6%	34	23.4%	30	28.0%	4.844
106[b,c]	82.8%	175	66.3%	134	62.6%		51	77.3%	100	69.0%	69	64.5%	

category with the smaller column proportion appears under the category with the larger column proportion.

Table 17. The satisfaction levels (high, medium, low) of website weight-related features by age categories (18-24, 25-30, 31-36) in the intervention group by chi-square test.

		Age Category						
		18-24 (a)		25-30 (b)		31-36 (c)		Chi-square value
		Count	Column N %	Count	Column N %	Count	Column N %	
Weight gain tracker- Easy to use	Low	8	8.3%	12	6.0%	13	7.7%	1.006
	Moderate	16	16.7%	34	17.1%	32	18.9%	
	High	72	75.0%	153	76.9%	124	73.4%	
Weight gain tracker- Helpful	Low	16	16.5%	34	17.1%	40	24.0%	3.523
	Moderate	25	25.8%	53	26.6%	42	25.1%	
	High	56	57.7%	112	56.3%	85	50.9%	
Diet goal-setting- Easy to use	Low	15	16.0%	39	19.8%	35	22.0%	11.296*
	Moderate	19	20.2%	69[a]	35.0%	53	33.3%	
	High	60[b,c]	63.8%	89	45.2%	71	44.7%	
Diet goal-setting- Helpful	Low	19	20.4%	61	31.3%	61[a]	38.1%	20.504*
	Moderate	26	28.0%	78	40.0%	54	33.8%	
	High	48[b,c]	51.6%	56	28.7%	45	28.1%	
Physical activity goal-setting- Easy to use	Low	14	14.9%	41	20.6%	40	24.4%	10.984*
	Moderate	21	22.3%	70	35.2%	47	28.7%	
	High	59[b,c]	62.8%	88	44.2%	77	47.0%	
Physical activity goal-setting- Helpful	Low	16	17.2%	66[a]	33.5%	58[a]	35.2%	23.339*
	Moderate	29	31.2%	80	40.6%	62	37.6%	
	High	48[b,c]	51.6%	51	25.9%	45	27.3%	

*. Results were based on two-sided tests with a significance level of 0.05. For each significant pair, the key of the category with the smaller column proportion appears under the category with the larger column proportion.