

Texting Older Sisters to Step to Manage Obesity in Older Black Women: A Feasibility Study



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Introduction: Black women are disproportionately classified as overweight or obese and physically inactive. Social support and culturally relevant and age-appropriate physical active interventions are needed to reduce inactivity and to prevent weight gain among this group. Mobile-health text messages have shown to be an acceptable, feasible and interactive way to promote physical activity among older Black women.

Study Design: This feasibility, 12-week RCT, deployed between August 2020 and December 2020, aimed to determine the feasibility and effectiveness of a mobile health intervention that focused on increasing physical activity behaviors among community-dwelling, older Black women who were age ≥ 60 years and classified with overweight or obesity.

Setting/participants: Community-dwelling, older Black women.

Intervention: The intervention group received physical activity promotion text messages daily, whereas the control group received 1 neutral message related to general health information weekly.

Measures: At baseline and post intervention assessments, researchers obtained HbA1c levels, weight, BMI, waist circumference, and questionnaires related to physical activity. Post-intervention satisfaction was also collected through a survey.

Results: The intervention group had an average increase of approximately 700 steps per day more than the control group, lost more waist circumference inches (2.2) than the controls, and averaged more pound loss (2.5) than controls. The control group had a greater HbA1c reduction, whereas the intervention group remained stable. The text messages were 100% readable, and 95% of the women stated the study was motivational. Overall, 12% of participants suggested that future studies should include more in-person social support, and 8.3% said that daily text messages were too much.

Conclusions: Findings suggest that a mobile health physical activity intervention that uses self-monitoring techniques in conjunction with motivational cues, is an acceptable delivery method and a promising strategy to increase physical activity behaviors among this population, which is feasible, potentially efficacious, and low cost.

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INTRODUCTION

Black women are disproportionately burdened with overweight and obesity ($\text{BMI} \geq 25 \text{ kg/m}^2$), weight-related illnesses, functional limitations, and lack of regular physical activity (PA) when compared with other race and sex groups in the U.S.^{1–4} In Black women aged ≥ 60 years, 58% are classified as obese, and 75% are classified as overweight, compared with 38% (obese) and 60% (overweight) for older White women.^{3,5,6} Obesity is a preventable but complex, chronic, public health problem that involves socioeconomic, environmental, behavioral, and metabolic factors.^{7,8} Healthy lifestyle behaviors that include PA can help lower the risk of many conditions such as obesity, diabetes, cardiovascular disease, and anxiety and reduce the risk of Alzheimer's and other related dementias.^{9–11} Furthermore, obesity and inadequate PA can lead to functional and cognitive declines that are often associated with aging and may further exacerbate the prevalence of overweight and obesity.^{10,12,13}

PA is defined as any that gets your body moving.¹⁴ Regular PA is achieved when adults obtain 150 minutes or more a week, which is equivalent to 30 minutes a day and 5–7 days a week.¹⁴ In the U.S., 28% of Black Americans are physically inactive, and of this percentage, Black women (25%) are more likely to be inactive than Black men at 21%, and these percentages increase with age.¹⁵ Moreover, physical inactivity increases to 31% in Black adults aged ≥ 65 years, and Black adults in the South tend to be more inactive than those in other regions.¹⁵

Among older Black women with overweight and obesity, interventions aimed to promote regular PA have not been successful because of inadequate peer support and motivation to engage despite knowledge of PA benefits.^{16–18} In addition, older Black women are underrepresented in overweight and obesity research that examines the health impact and the relationship of overweight, obesity, PA, and social support,^{16,17} which makes regular PA among this population a significant challenge to address.

Behavioral interventions that use text messaging as the delivery channel for health promotion messages are a promising approach for increasing PA in older adults and may meet the criteria of being low cost, acceptable, feasible, and scalable.^{19–21} The use of mobile technology

among older adults has increased over the past 10 years, and this form of communication transfer is easily translated into everyday usage.^{22,23} Over the past 2 years, nationally, 81% of older adults aged 60–69 years and 62% of older adults aged ≥ 70 years use smartphones.²⁴ Moreover, 23% of older adults purchased smartphones, 12% purchased computers/laptops, and 7% purchased wearable devices. With the increased proportion of cell phone use (99%) among Black adults^{25,26} and 83% owning smartphones,²⁶ text messaging strategies may improve PA behaviors and remove barriers to health information among older Black adults.²⁷ Older Black adults who received motivational text messages 3 times a week for 6 weeks had an increase in their perceived PA behavior and their number of daily steps.¹⁹ Previous qualitative work was used in Texting Older Sisters to Step (TOSS) study to inform the development of a library of culturally relevant PA promotion text messages based on the background, attitude, knowledge, and experiences of older Black women to inform message development as an acceptable and appropriate strategy to motivate older Black women to increase their PA behaviors and decrease sedentary lifestyle behaviors.¹⁷ Four focus groups were conducted among older Black women. The first 2 focus groups provided particulars about what type of messages would motivate PA, what types and kinds of text messages they would like to receive, preferences on when and how they would like to receive messages, and the content and meaning of the text messages to be developed. The second 2 focus groups received daily TOSS messages for 2 weeks and provided feedback on perceptions, relevance, and acceptability of text messages; comprehensibility (meanings and clarity of messages); whether messages were motivational, informative, or confusing; and any likes and dislikes of the messages. During these sessions, participants self-reported that receiving the TOSS messages led to increases in their PA behaviors.¹⁷ However, the current feasibility study aimed to objectively measure the PA behaviors of the women who received the TOSS messages rather than to rely on self-reported PA assessments.

Although modifying PA behaviors can be difficult to achieve and objectively measure, social cognitive theory (SCT) posits that using self-monitoring techniques, such as a Fitbit device, in combination with at least 1 other behavioral strategy such as TOSS messages may yield positive behavior changes.²⁸ To better understand how

older Black women adopt and maintain behavioral changes for this complex problem of physical inactivity, SCT, an integrative framework to direct, ground, and provide scientific validation,^{14,17,28–30} was used. SCT suggests that knowledge; desire; and anticipation to positively change a needed health behavior, such as increasing PA, may encourage a person to set a realistic goal and get started; however, individuals must be able to self-regulate PA behaviors regardless of environmental influences to increase self-efficacy and to sustain the behavior.^{31–35} A Fitbit device can function in 2 roles—as an objective self-monitoring tool and a facilitator for digital peer support through the Fitbit community (FBC) function.³⁶ Social support is important for PA engagement among Black women, particularly during the phase of initiating PA behaviors.^{37,38} However, the relationship between text messaging, objective PA self-monitoring (Fitbit), and peer support (FBC) as a strategy to promote regular PA and potentially reduce overweight and obesity among older Black women is unknown. The purpose of this pilot study was to determine the feasibility and acceptability and to estimate the

effect of the TOSS RCT among older, insufficiently active Black women with overweight or obesity.

METHODS

Study Population

The University of Alabama at Birmingham IRB approved this study. Participants, located in Jefferson County, AL, were recruited through flyers emailed to community contacts, word of mouth, and media (e.g., Facebook, Instagram, and the university newspaper). Interested participants contacted the principal investigator by phone. A telephone screening tool was used to determine whether Black women who responded met the eligibility criteria, including being aged ≥ 60 years, having BMI ≥ 25 , having PA level below 150 minutes per week, having mobile phone access with the capability to receive and send text messages, and readiness to increase PA levels. A total of 47 potential community-dwelling participants were screened, and 30 were enrolled. A total of 17 women were excluded because 2 lived out of state, 1 used a cane to ambulate, 7 already met the recommended guidelines for PA, 5 were aged < 60 years, and 1 did not have a smartphone. Once participants were entered into the study, informed consent was obtained at a local university. Figure 1 provides the study details.

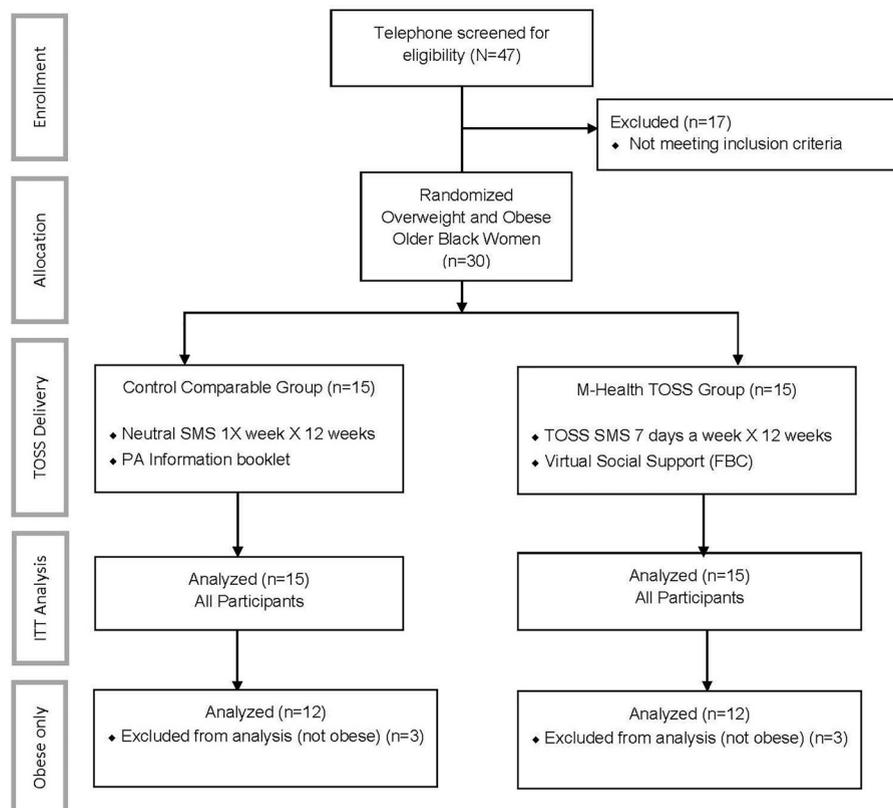


Figure 1. CONSORT flow diagram.

FBC, Fitbit community; ITT, intent to treat; PA, physical activity; SMS, short message service; TOSS, Texting Older Sisters to Step.

This study utilized a 2-group randomized control prospective study design with quantitative and qualitative data collection. The 30 women were randomly assigned to either the intervention or the control condition (15 each) using a block randomization schedule generated in SAS. This sample size falls within the guidelines proposed by Hertzog in her “Research in Nursing and Health” publication when pilot testing intervention studies.³⁹ For practical manageability, 3 waves of 10 participants randomized to either the intervention or control group were deployed between August 2020 and December 2020. Participants were followed for 12 weeks to assess acceptability and to detect intervention effects. Participants were asked not to discuss any components of the study outside of their assigned cohort. Both groups (intervention and control) received a Fitbit Inspire³⁶ and an instruction booklet with healthy lifestyle information such as the national PA guidelines, strategies to increase PA, how to eat healthily, and visual aids for PA exercises.

All participants in both groups were provided a Fitbit Inspire device, in-person instructions on how to use and maintain the device, and were instructed to wear it continuously on their nondominant wrist except for when bathing. Fitbit Inspire is a slim easy-to-use fitness tracker with 24/7 heart rate, active zone minutes, activity, and sleeping tracking. It offers 10 days of battery life and pairs with other fitness and nutrition applications and programs. In addition to the Fitbit usage for self-monitoring and tracking, the Fitbit device allows the creation of private online groups or communities. TOSS intervention group received text messages previously validated¹⁷ to promote PA every day for 12 weeks and were placed into Fitbit communities. The control group received a general health or nutrition-related text message on the basis of CDC general health information weekly on Sundays.⁴⁰ Fitbit Inspire provided the number of steps per day and minutes of daily PA of the participants. At their convenience, participants could view their PA behaviors in real time either on the Fitbit Inspire device or on the Fitbit application on their mobile phones.

Within the Fitbit Inspire application, only the intervention groups were provided written and verbal instructions on the FBC function as a means of virtual peer support to increase PA self-efficacy among this population.⁴¹ Intervention participants were allowed time to ask questions about the FBC function, and they were not prescribed a frequency to use this function. FBCs were a novel addition to the TOSS text messages because they provided a virtual environment for the women to discuss PA facilitators and barriers and to potentially develop partnerships as a means of encouragement and to maintain a sense of accountability for PA to other women in the digital community.³⁶

Text messages were delivered to both the control and the intervention groups between 8:00AM and 10:00AM through an automated system called Remind.com, which is a private mobile messaging platform. Remind.com allowed the research team to send text messages to each participant group simultaneously and evaluate whether text messages were received and read by each participant and allow the participants an opportunity to react to messages with an emoji.⁴² The control group received a weekly neutral text message related to CDC’s general health information such as the need to obtain adequate sleep and hydration, to read nutrition labels, or to watch sugar and salt content.⁴⁰ In contrast, the intervention group received daily TOSS text messages on the

basis of preliminary work that used focus groups of older Black women to develop a PA text message library to promote an increase in PA behavior.¹⁷ TOSS messages included topics such as benefits of regular PA, strategies to increase PA or encourage peer support, inspirational Bible verses to encourage PA, and graphics of Black women engaging in PA. Moreover, these focus groups stated that text messages should be humorous, factual, and sent out in the morning. Through this platform, researchers assessed intervention treatment fidelity by reviewing the text message summaries, the number of messages sent, the percentage of messages received and read, the proportion of women who experienced errors, and the number of undelivered text messages.

Measures

At baseline and postintervention in-person sessions, researchers obtained participants’ sociodemographic information (baseline only) using a paper-and-pencil questionnaire with the following demographic questions and response options to characterize the sample. *What is your age?* What is your marital status? Single, married, widowed, divorced, other. *What is the highest grade in school that you completed?* 8th grade or less, attended high school, high school graduate (Diploma or GED), some college or post high school training, Associate degree, bachelor’s degree, master’s degree, or Doctorate degree. *What is your employment status?* work full time, work part time; retired but work part time; fully retired; homemaker; and unemployed; other. *Which of these categories is closest to your total annual income?* under \$8,000; \$8,000–\$11,999; \$12,000–\$14,999; \$15,000–\$19,999; \$20,000–\$29,999; and \$30,000 and over. In addition, researchers obtained a nonfasting, fingerstick blood HbA1c (using an A1C NOW PLUS point-of-care device). To obtain the participant’s height and weight, a Health O Meter 450KL Mechanical Beam Scale with Height Rod scales was used. The waist circumference (WC) was obtained using a soft retractable tape measure (placed measuring tape horizontally around the abdomen at the level of the iliac crest).^{43,44} Participants were instructed to wear Fitbits continuously for 12 weeks except for charging the device and showering to assess the number of steps and daily activity minutes. Participants in the intervention groups (5 per group) were instructed on how to use the FBC within the Fitbit application as a strategy for peer social support, and no other instructions on FBC were provided after the baseline session. Remind.com was used to send TOSS messages daily for 12 weeks to the intervention group and neutral messages to the control group once a week for 12 weeks. Using Fitabase,⁴⁵ steps and daily PA activity were obtained from the Fitbit Inspire. Fitabase is a web-based platform that is stored and allowed for the export of data from individual participants in a downloadable comma-separated values file for daily, hourly, and minute-level data. A 1-year subscription for access to Fitabase was purchased for this study. Fitabase connects with each study participant’s device, generating custom tags to securely track deidentified information by group. Participants were monitored in real time weekly, which provided study staff the ability to observe any data or device issues; however, Fitbit data were successfully collected daily and only exported for analysis at the conclusion of the intervention for all the 3 waves.

To assess the feasibility and acceptability of the TOSS intervention, a project satisfaction questionnaire was constructed. This

questionnaire assessed what participants liked most and least about the text messages, the Fitbit devices, and their overall participation and what they would modify to improve the intervention. Specifically, all participants were asked, *What did you enjoy most about the overall study? What did you enjoy most about the Fitbit? What did you enjoy least about the overall study? What did you enjoy least about the Fitbit? To what degree did wanting to be more physically active motivate you to be involved with the study? Please feel free to tell us anything else about participating in this study that may help us improve.* Participants in the intervention group were also asked, *What did you enjoy most about the Fitbit Community? and What did you enjoy least about the Fitbit Community?*

Statistical Analysis

All analyses were performed using Stata, version 16 (StataCorp LP, 2020), and SAS (version 9.4). Means and SDs were used for continuous measures, whereas frequencies and percentages were

used for categorical variables of interest. Difference scores were created for continuous outcome measures (pre–post). For the 1 participant who did not complete the study, an intent-to-treat approach was used where the baseline values were carried forward for the outcome measures of interest. Another participant had a missing HbA1c value at baseline, so a conservative approach was used, and the post-test value was imputed. Therefore, the difference score on HbA1c for that person was 0. Paired samples *t*-tests were used to determine whether there were reductions in WC, weight, and HbA1c regardless of a group membership. Independent sample *t*-tests were used to compare the treatment and control groups on changes in steps, WC, weight, and HbA1c. Owing to the small sample size of this feasibility study, Cohen *d* was calculated to measure the magnitude of the intervention effect on the outcome measures. In this case, this measure of effect size is more appropriate than statistical significance to assess the potential impact of the intervention and estimate the number of participants needed for adequate power in a larger study.

Table 1. TOSS Study Baseline Sample Characteristics (N=30)

Variables	Intervention group (n=15)	Control group (n=15)	t statistic (χ^2)	p-value
Age, mean (SD)	64.67 (2.87)	65.33 (3.48)	–0.57	0.5715
Marital status, n (%)			(0.21)	0.9760
Single	4 (26.67)	3 (20.00)		
Married	7 (46.67)	8 (53.33)		
Widowed	1 (6.67)	1 (6.67)		
Divorced	3 (20.00)	3 (20.00)		
Education level, n (%)			(4.04)	0.6707
Attended high school	1 (6.67)	0 (0.00)		
High school graduate	1 (6.67)	1 (6.67)		
Some college	3 (20.00)	7 (46.67)		
Associate's degree	2 (13.33)	1 (6.67)		
Bachelor's degree	5 (33.33)	4 (26.67)		
Master's degree	2 (13.33)	2 (13.33)		
Doctoral degree	1 (6.67)	0 (0.00)		
Employment, n (%)			(8.89)	0.1799
Full time	2 (13.33)	2 (13.33)		
Part time	0 (0.00)	1 (6.67)		
Retired but part time	3 (20.00)	0 (0.00)		
Fully retired	7 (46.67)	11 (73.33)		
Homemaker	1 (6.67)	0 (0.00)		
Unemployed	0 (0.00)	1 (6.67)		
Other	2 (13.33)	0 (0.00)		
Income, n (%)			(2.25)	0.5226
\$12,000–\$14,999	0 (0.00)	2 (13.33)		
\$15,000–\$19,999	1 (6.67)	1 (6.67)		
\$20,000–\$29,999	3 (20.00)	2 (13.33)		
≥\$30,000	11 (73.33)	10 (66.67)		
Waist circumference, mean (SD)	42.73 (4.90)	43.20 (5.82)	–0.24	0.8114
Weight, mean (SD)	209.7 (32.76)	212.3 (41.22)	–0.19	0.8516
BMI, mean (SD)	34.52 (4.20)	35.33 (5.96)	–0.43	0.6683
A1c, mean (SD)	6.18 (2.18)	6.39 (0.58)	–0.37	0.7175
Steps, mean (SD)	6,207.85 (4,315.71)	6,506.85 (3,480.18)	0.15	0.8363

TOSS, Texting Older Sisters to Step.

Table 2. TOSS Intervention Participant Reduction in Body Measures and Increase in Steps

Variable	All participants			Participants with obesity		
	Intervention group (n=15)	Control group (n=15)	Cohen's d (p-value)	Intervention group (n=12)	Control group (n=12)	Cohen's d (p-value)
Waist circumference, mean (SD)	1.79 (2.45)	0.96 (1.83)	0.38 (0.3010)	2.16 (2.59)	0.91 (2.04)	0.54 (0.2030)
Weight, mean (SD)	1.80 (3.90)	1.43 (5.69)	0.08 (0.8384)	2.50 (3.93)	1.33 (6.04)	0.23 (0.5802)
HbA1c, mean (SD)	0.11 (0.73)	0.10 (0.39)	0.01 (0.9679)	0.01 (0.75)	0.15 (0.37)	0.24 (0.5702)
Steps, mean (SD)	−736.71 (4,315.71)	218.79 (3,480.18)	−0.24 (0.3581)	1,556.89 (4,705.93)	857.709 (1,932.19)	0.19 (0.0431)

TOSS, Texting Older Sisters to Step.

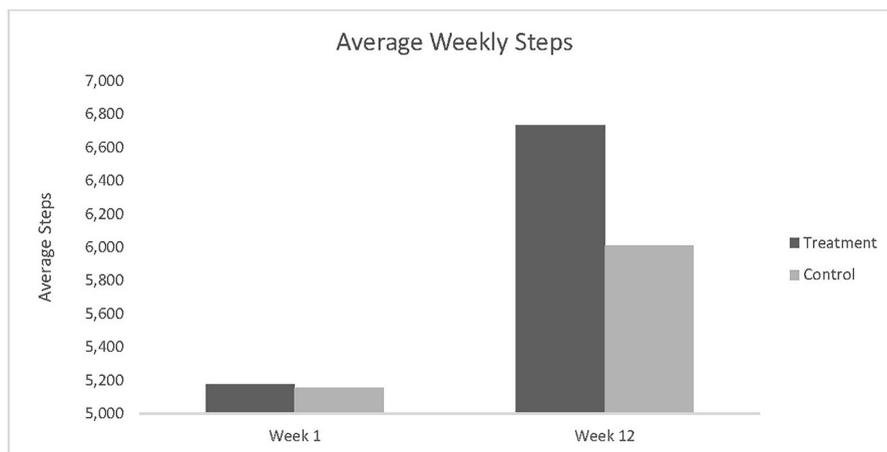
RESULTS

The descriptive characteristics of the sample of 30 Black women (15 per group) who participated in this study are presented in Table 1. Participants' ages ranged from 60 to 70 (mean=65.00 [SD=3.15]) years, and 90% had at least some college education. At baseline, among the treatment and control groups, the overall average WC (mean=42.97, SD=5.29 inches), weight (mean=211.02, SD=36.61 lbs), BMI (mean=34.93, SD=5.08 kg/m²), and HbA1c (mean=6.29, SD=1.57%) were computed, and there were no group differences between the treatment and control group at baseline ($p>0.05$).

Ad hoc comparisons of the participants with overweight ($n=6$) and obesity ($n=24$) revealed that on average at baseline, the participants with overweight had 1,964.33 more steps, were approximately 3 years older, and had a 5.5-inch smaller WC than the participants

with obesity ($p<0.05$). Therefore, analyses of intervention results are presented with and without these 6 women (3 from the intervention group and 3 from the control group) to better inform a large-scale, fully powered TOSS intervention study (Table 2). When the intervention's effect on steps per day at post-test was examined for all participants (30 of 30), there were no group differences present. When the comparison was made for the participants with obesity (24 of 30) (Figure 2), there was a greater number of steps per day among the intervention group than among the controls (group mean difference=699.11, 95% CI=466.85, 846.19) ($p<0.05$, Cohen's $d=0.19$).

Across both groups ($n=30$), there was a statistically significant reduction of 1.37 inches in WC from baseline ($p<0.01$, Cohen's $d=0.63$, a medium effect size). When the groups were compared, the treatment group showed a 1.79-inch reduction compared with a

**Figure 2.** Changes in steps per day among Black women with obesity ($n=24$).

0.96-inch reduction in the control group (mean group difference=0.83, 95% CI= -0.79, -2.45) ($p>0.10$, Cohen's $d=0.38$). Across both groups for the participants with obesity only ($n=24$), there was a statistically significant reduction of 1.53 inches in WC from baseline ($p<0.01$, Cohen's $d=0.65$). When the groups were compared, the treatment group showed a 2.16-inch reduction compared with a 0.91-inch reduction in the control group (mean group difference=1.25, 95% CI= -0.73, -3.23) ($p>0.10$, Cohen's $d=0.54$, a medium effect size).

Similarly, there was a trend for an overall reduction in weight for all the 30 participants (1.62 pounds lost on average, $p=0.08$, Cohen's $d=0.34$). The treatment group lost 1.80 lbs. on average compared with 1.43 in the control group (mean group difference=0.37, 95% CI= -3.28, -4.02, $p>0.10$, Cohen's $d=0.08$). For the participants with obesity, there was also a trend toward statistical significance for an overall reduction in weight for all participants (1.92 pounds lost on average, $p<0.0739$, Cohen's $d=0.38$). The treatment group lost 2.50 pounds on average compared with 1.33 in the control group (mean group difference=1.17, 95% CI= -3.14, -5.48, $p>0.10$, Cohen's $d=0.23$).

For all participants, when the groups were compared on HbA1c, no group differences emerged, with the treatment group showing a 0.11-unit decrease, and the control group reduction was 0.10 units (mean group difference=0.01, 95% CI= -0.43, -0.45, $p>0.10$, Cohen's $d=0.01$). In an analysis of just the participants with obesity for HbA1c, the group difference was not statistically significant but stronger in magnitude, with the treatment group remaining relatively stable with a reduction of

0.01 units, whereas the control group reduction was 0.15 units (mean group difference= -0.14, 95% CI= -0.64, -0.36, $p>0.10$, Cohen's $d=0.24$). Participants with obesity changes in WC, weight, and HbA1c are presented in Figure 3.

Approximately 90% of the 30 participants were recruited into the study by word of mouth, and the other 10% were recruited by an emailed flyer. A total of 29 participants completed the study protocol, with 1 woman unable to complete it owing to an unscheduled surgery 6 weeks into the intervention. Evaluation of intervention acceptability revealed that 100% of participants enjoyed the study when asked about the overall study enjoyment; open responses from both groups included, *I enjoyed everything, increased awareness about what to do [PA], increased motivation and awareness (to engage in PA), and the study was easy to do*. When asked about the Fitbit, open responses included that they enjoyed the convenient accountability of the device and the ability to measure steps, heart rate, and sleep. However, when asked about the least enjoyment of the overall study, most responses were *nothing, N/A, there wasn't anything, no complaints*; however, 2 women stated that they would have liked more social support from peers (1 control and 1 intervention participant). When asked about the least enjoyment of the Fitbit, 6 women stated that they did not like wearing the device 24/7, 5 stated that they did not like sleeping on the device, and 3 stated that they had some skin irritation. When participants were asked about the motivation to be involved with the study, the response options were *Not at all, A Little, Moderately, Very Much, or Extremely*. A total of 95% of both groups reported that the study was motivational. In

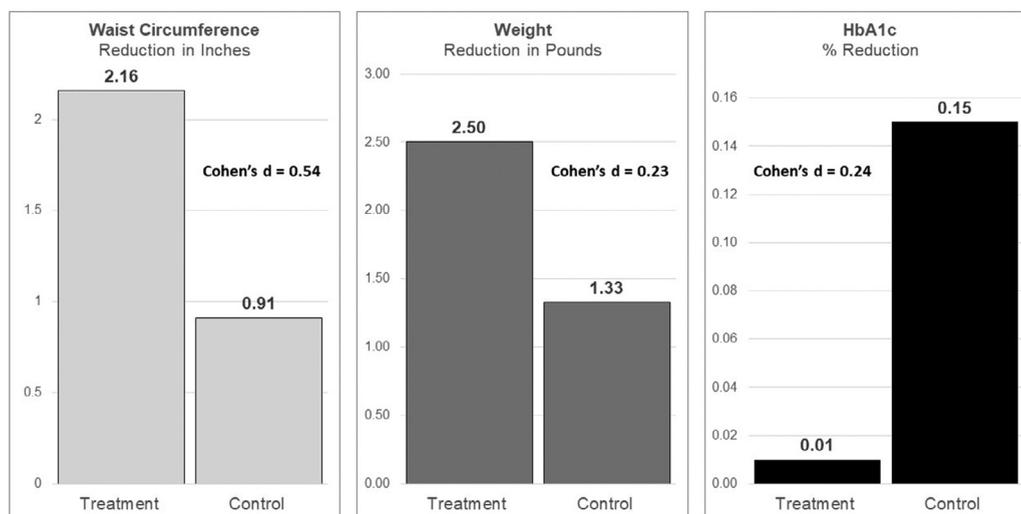


Figure 3. Changes in waist circumference, weight, and HbA1c in women with obesity ($n=24$).

addition, postintervention survey data revealed that 7.1% of the intervention group reported that the daily prompts were too frequent, and 14% of the control group suggested the desire for more social support and opportunities to meet in person when asked how to improve this study in the future. When intervention participants were asked about the FBC enjoyment, the majority did not respond to the question or stated that they did not use this feature, whereas 2 participants stated that they liked to see other participants' steps. Furthermore, when intervention participants were asked about their least enjoyment of the FBC, the majority did not write a response, 1 woman wrote "nothing, I enjoyed everything," and another wrote, "too much time to use." The women were more likely to respond and react to text messages on the Remind.com platform. Fitbit data were successfully collected on 98% of the 85 study days.

DISCUSSION

This 2-arm RCT aimed to assess the feasibility and acceptability of the mobile health TOSS intervention in a sample of community-dwelling, older Black women with overweight and obesity. Despite the coronavirus disease 2019 (COVID-19) pandemic, the recruitment goal of enrolling 30 older Black women was found to be feasible and completed over the course of 3 months primarily through word of mouth, and all participants completed the study protocol except 1 who underwent surgery. Overall, the ability to recruit and retain study participants should not be a barrier to testing the effectiveness of the TOSS intervention in a larger RCT.

Most of the women in the intervention and control groups used 1 or a combination of the terms—encouraging, motivational, or information that they needed to change PA behaviors—to describe the overall study. The participants also used the Remind.com platform to react to TOSS messages and to communicate with study staff and other participants within a virtual format. Although several studies have used Remind.com to deliver instructional and motivational messages to study participants,^{46,47} the research team is not aware of any study that has tested Remind.com as a channel to motivate PA in older Black women with overweight and obesity. In contrast, the project satisfaction questionnaire revealed that few participants in the intervention group utilized the FBC feature for peer support owing in part to not knowing the other participants personally as well as difficulty in using this feature within the Fitbit application. This finding suggests that study-moderated introductions or a buddy system among intervention group participants may be needed for older Black women to fully utilize virtual social support, particularly

given that a few women indicated on the project satisfaction questionnaire that they did not participate in the FBC because they did not know anyone.^{48,49}

The finding of a statistically significant increase in steps per day among the intervention group compared with that among the control group in this feasibility study suggests that the TOSS intervention may be effective for improving PA behaviors of older Black women with overweight and obesity in the hypothesized direction. However, the short duration and limited intensity of this pilot intervention may have decreased the impact of the study to produce clinically significant improvements in the health-related outcomes that may be associated with 7,000–7,500 steps per day.^{10,50–52} Although it did not reach statistical significance, the control group had a greater reduction in HbA1c levels than the intervention group for participants with obesity. This finding was not in the expected direction given that the intervention group received daily TOSS messages that were factual, inspirational, and motivational to encourage PA behaviors compared with the control group who received weekly neutral messages on general health information, such as, "try to get 6–8 hours of sleep this week," "try to drink 6–8 glasses of water this week," or "read nutritional labels this week." Group differences in HbA1c may be related to the control participants potentially making other health behaviors changes (e.g., diet and sleep), which may have impacted their glycemic control.^{53–56} Additional work with a larger sample is needed to provide more insight into these findings. Overall, this pilot intervention produced promising results in the hypothesized direction that signals the need to pursue a larger, long-term trial that includes other health behaviors such as healthy eating and adequate sleep.^{53–56}

Current study findings are similar to those of other 2-arm pilot randomized trials using text messages to improve PA behaviors among older Black women. In a 6-week study among older Black women, medium-to-large effects were found between the intervention (text messages) and the control (no text messages) groups for steps per day (6,530.99 [2,647.97] vs 4,780.21 [1,978.1]) and MET minutes of leisure-time exercise (23.77 [6.3] vs 14.91 [3.9]), which suggests that the effect sizes for this study may have been attenuated by the public health text messages delivered to the control group.¹⁹ In an 8-week text message plus Facebook PA intervention among adult Black women (aged 18–49 years), participants in the intervention group (text message + social support through Facebook) did not have significantly more steps per day compared with control participants (print-based PA messages).²⁰ However, the intervention group reported an increase in social support from family

members, and all participants suggested that friends participate in the intervention.^{18,20} Taken together, this evidence suggests that the control condition must be carefully considered to estimate the true effects of a text-message PA promotion approach among Black women.

Limitations

Several limitations of this pilot study should be considered in the interpretation of the results. The purpose of this pilot study was to examine the feasibility and acceptability of the intervention process and components for which a small demonstration sample is appropriate and financially prudent. However, the small sample size may be insufficient to detect the true intervention effect, and therefore the results should be interpreted with caution. Moreover, the small sample size and the word-of-mouth recruitment strategy did increase the opportunity for people to know each other and potentially discuss the text messages they received. Second, the sample of older Black women enrolled in this study may not be generalizable to older Black women locally or regionally owing to the COVID-19 pandemic, which may have increased hesitancy to participate in research among older Black women at high risk of adverse outcomes from potential COVID-19 exposure. Third, the higher educational level (i.e., some college) of the study participants may limit generalizability to older Black women with lower educational attainment or SES. Fourth, some of the women commented on the project satisfaction questionnaire about the lack of social support because of COVID-19, which included an inability to engage in PA with their peers. Another limitation was the missed opportunities to assess the study processes of the Fitbit/FBC and to measure SCT impact as the theoretical basis for this intervention; however, the SCT constructs will be measured in the efficacy trial. An additional limitation is that participants were volunteers, which introduces a common selection, Healthy Volunteers, bias that indicates that participants who signed up are more likely to be motivated to participate than other Black women with similar BMI and PA status. Finally, the lack of engagement with peers through the FBC feature may have been mitigated by an ice-breaker session to allow the intervention participants to become acquainted with each other and encourage peer social support. Therefore, the FBC feature may require additional testing before concluding that this tool is not acceptable among older Black women. Despite the limitations of this study, the findings show the feasibility and acceptability of a PA intervention that uses text messages and technology to promote PA among older Black women with overweight and obesity. The preliminary results of this study may offer healthcare providers information on the use of text messaging and commercially available wearable devices among older Black

women for the promotion of PA and other health behaviors. Future research is needed to establish the efficacy of this approach for health promotion in this population.

CONCLUSIONS

The findings show that using self-monitoring techniques in combination with culturally tailored messages (cues for motivation derived from peers in the TOSS study) as the delivery channel for health promotion messages is a promising approach to increase PA behaviors among older, Black women with overweight and obesity.¹⁷ The TOSS feasibility study is appropriate for further testing because it was acceptable, practical, and low cost and has the potential to be widely disseminated to other populations.⁵⁷ The women reacted positively to the study; the intervention was practical to deliver on the basis of limited resources, time, and during a pandemic; and the intervention was relatively low cost to conduct.^{21,57} Specifically, the results of this pilot study have shown to be successful, especially among women with obesity who were in the treatment group (they had more steps and showed a 1.92-inch WC reduction and an overall weight reduction of 2.50 pounds compared with the control), and could be expanded to reach larger, eligible populations while maintaining its effectiveness.⁵⁸ Furthermore, findings provide some evidence that intervention messages to the control group regarding nutrition behaviors may need to be excluded to reveal independent effects of the TOSS intervention on PA behaviors and weight-related outcomes among Black women with overweight and obesity. Although the study advances the current literature investigating the use of mobile health and health behavior change interventions among older Black women with overweight and obesity, more research is needed to test the effectiveness of the TOSS intervention to improve PA in a large-scale randomized trial.

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SUPPLEMENT NOTE

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