


Engaging primary care patients with existing online tools for weight loss: A pilot trial

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Abstract

Objective: Free online tools show potential for promoting weight loss at a low cost, but there is limited evidence about how to effectively engage patients with them. To address this, a low-dose, flexible intervention was developed that aims to enhance weight-related discussions with primary care providers (PCPs) and engage patients with an organic (i.e., not researcher-created) weight loss-focused social media community and online self-monitoring tool. Feasibility and acceptability of the intervention was evaluated in a single-arm, 12-week pilot.

Methods: PCPs were recruited at two clinics, then PCP's patients with upcoming appointments were identified and recruited. Patients received an interactive online kickoff before their scheduled primary care appointment, then 8 follow-up messages over 12 weeks via email or their electronic health record patient portal. Patients completed assessments at baseline, post-appointment, and week 12. Primary care providers and patients completed semi-structured interviews.

Results: All PCPs approached enrolled ($n = 6$); patient recruitment was on track to meet the study goal prior to COVID-19 restrictions, and $n = 27$ patients enrolled. Patient satisfaction with the pre-appointment kickoff was high. Twenty-four patients reported discussing weight-related topics at their primary care appointment and all were satisfied with the discussion. Twenty-two patients completed 12-week assessments. Of these, 15 reported engaging with the self-monitoring tool and 9 with the social media community. Patient interviews revealed reasons for low social media community engagement, including perceived lack of fit. On average, patients with available data ($n = 21$) lost $2.4 \pm 4.1\%$ of baseline weight, and 28.6% of these patients lost $\geq 3\%$ of baseline weight. Primary care providers reported high intervention satisfaction.

Conclusions: The intervention and trial design show potential, although additional strategies are needed to promote tool engagement.

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KEYWORDS

Internet-based interventions, obesity, primary care, social media, weight loss

1 | INTRODUCTION

Adults with obesity have achieved clinically significant weight loss through engagement with comprehensive behavioral weight loss programs.¹ However, these programs reach only a small portion of the eligible population.¹⁻⁴ One reason for low program reach is costs of these programs, to both individuals and to institutions that may want to offer programs (e.g., insurers, workplaces). Individuals also face practical challenges to joining programs, such as scheduling incompatibility, time commitment required, and transportation barriers (when delivered in-person). Further, some individuals report concerns about the extent of dietary and physical activity change expected in programs.^{5,6}

Freely available online weight loss tools offer a potential solution to some of these barriers. One online tool that may be particularly valuable is social media communities that focus on healthy weight loss. Social media communities for weight loss include subforums of popular, broadly focused social media sites, such as the Reddit subforum "Lose It" (R\loseit) and certain Facebook private groups, as well as other websites that are affiliated with companies or are independent, such as MyFitnessPal Community Board. Such communities have potential to powerfully influence health behaviors.

Social media communities that have developed organically (i.e., not part of a research program) have been shown to be facilitators of behavior change,^{7,8} including for weight loss.^{7,9} Interactions with other community members may help support increased self-efficacy through social modeling^{10,11} and provide opportunities for observational learning as well as reinforcement of weight-control behaviors.^{12,13} Indeed, participants in social media communities report receiving support, information, and accountability that aid their weight loss efforts.^{14,15} The potential value of social media communities for weight loss has also been supported by research trials. However, such trials usually begin with the development of a new social media community (new site or part of a larger site e.g., a Facebook group) and includes ongoing efforts and activities by study staff to increase participant engagement in the community.⁷ Even with this support, trials report variable engagement and weight loss.¹⁶⁻²⁰ Organic communities may offer several advantages over researcher-developed communities for long-term impact including lower cost, greater potential for sustainability (i.e., because they are available after the trial ends), and potentially greater effectiveness (e.g., because natural interactions may deliver a more potent dose of mechanisms of action, like reinforcement, observational learning).

Another set of online tools that may support weight loss are freely available platforms for self-monitoring dietary intake and physical activity. The benefits of self-monitoring are supported by behavioral theory²¹ and strong empirical evidence.²²⁻²⁵ Online self-monitoring tools offer a way to integrate self-monitoring of dietary

intake and physical activity with goal setting and progress self-monitoring. Use of self-monitoring tools also supports self-efficacy by providing mastery experiences²⁶ through setting and achieving small, attainable goals (e.g., daily calories target).

Despite the potential of weight loss-focused social media communities and self-monitoring tools, their use is low.²⁷⁻²⁹ Further, use of health focused apps in general is lower among individuals who have obesity and weight-related comorbidities, and who have lower income and education.^{30,31} Thus, the people who have the most potential to benefit from these tools are least likely to be using them. Potential reasons for low use of these tools include limited awareness of and difficulty finding tools, low perceived benefits of use, lack of social support for self-monitoring, and boredom after initial use.³²⁻³⁴

Given low use of these online tools, an important question is how to reach individuals with obesity and encourage them to engage with these tools effectively. The primary care setting is potentially useful for reaching a diverse cross-section of Americans at high risk for weight-related health problems, as over 75% of US adults have a usual primary care provider (PCP).³⁵⁻³⁷ Importantly, most patients view health care providers as credible, authoritative figures.³⁸⁻⁴⁰ In a 2015 survey of health care patients with body mass index (BMI) greater than 25 kg/m², the majority of patients (62.4%) reported a desire to discuss weight loss strategies with their doctors, although interest in this conversation was substantially greater among individuals of race/ethnicity other than white.⁴¹

While a few past studies have used the health care setting to attempt to engage individuals in comprehensive weight loss programs,^{42,43} comprehensive programs may not be of interest to all patients due to costs or the intensity of the programs. Few studies have aimed to promote use of freely available online tools or resources, and none, to our knowledge, have aimed to promote use of existing social media communities for weight loss. Thus, the goal of the current study was to evaluate the acceptability and proof-of-concept of a primary care-based, flexible intervention designed to effectively engage patients with freely available online tools for weight loss, as well as to evaluate feasibility of a trial design to evaluate this intervention.

This intervention and trial design featured four characteristics that have not been well-studied, warranting pilot testing. First, the main intervention component (the "Kickoff") is delivered in the days prior to a previously scheduled primary care appointment. The goal of this approach was to prepare the patient and the PCP to have a productive and satisfying weight loss conversation, and to ensure that patients receive PCP-endorsed intervention material even if there is not time to discuss it at the appointment. This study sought to evaluate how PCPs and patients felt about this approach, and how it affected their interaction at the appointment. Second, the intervention was described to patients as a self-directed program with a

toolbox of options, and that it was their choice if, how, and to what extent to use the tools presented to them. To evaluate this approach, the proportion of patients who choose to engage in each tool was observed. Third, the intervention aimed to engage patients in an existing social media community for weight loss which, to our knowledge, has not been attempted (for weight loss or other health behaviors). Further, enrollment was not limited to patients who were committed to trying the tools, or who were regular social media users at baseline. Thus, this pilot sought to describe to what extent patients with varying motivation and social media experience will engage in the online weight loss tools, and to obtain qualitative data on their reasons for engaging or not. Fourth, to evaluate this intervention's potential for primary care implementation, this study evaluated PCP and patient recruitment yields and retention outcomes, PCP and patient intervention acceptability, extent of and satisfaction with patient-PCP discussions about weight management at PCP appointments, extent of engagement with the intervention components, and 12-week weight change.

2 | MATERIALS AND METHODS

2.1 | Study design

The single-arm pilot trial was registered at ClinicalTrials.gov with identifier NCT04121312. CONSORT guideline for reporting pilot trials were followed. All analysis code and research materials are available at <https://osf.io/bxsj9/>.

2.2 | Setting and PCP recruitment and enrollment

This pilot trial was conducted within Family Health Clinics at UF Health and aimed to enroll 6 PCPs at two unique clinics across two UF Health campuses (Gainesville and Jacksonville). One clinic at each campus was selected based on patient diversity, patient enrollment in the electronic health record (EHR) patient portal, and the Department of Family Health Chair's perception of PCPs likely willingness to participate. By selecting clinics with diverse patient populations, the study aimed to recruit a population that was representative of primary care patients in the north central Florida region. The study was presented to PCPs at in-person clinic team meetings, where consent was also obtained from PCPs. PCP eligibility criteria included: age 22–90 years, practiced at current clinic for ≥ 1 year, employed ≥ 0.5 FTE, and had a patient panel that was majority adults. PCPs planning to move out of the area in the next 12 months were excluded.

2.3 | Patient recruitment and enrollment

The study aimed to enroll 35 patients who had a visit scheduled with an enrolled PCP. Patients were identified with a weekly

query through UF's clinical and administrative database, conducted November 2019 to March 2020. The query identified patients 18–75 years old, with a BMI of ≥ 30 kg/m², who had an appointment with an enrolled PCP in the next 21–30 days. Identified patients were emailed a signed letter from their PCP along with a link to a secure electronic screening form. Inclusion criteria included: self-reported BMI ≥ 29 kg/m², responded “yes” to “Would you be interested in learning strategies to help you lose weight?”, ability to read and understand English without assistance, had either (a) a phone or tablet with a data plan or (b) reliable access to Wi-Fi in their home, and had a previous appointment with the enrolled provider. Exclusion criteria involved: currently enrolled in formal weight program or a research study focused on changing diet, physical activity, or weight; has tracked the majority of their food intake an average of 3 or more days per week in the past month; pregnant, breastfeeding, or planning to become pregnant in next 6 months; currently undergoing radiation or chemotherapy for cancer; reported a cardiac event in past 6 months; reported heart failure; or planning to move out of the area in the next 6 months. The target sample size ($n = 35$) was selected to be suitable to obtain information on feasibility goals and to see if the intervention shows potential for engaging patients with online tools. This sample size is consistent with published guidance for pilot trials.^{44–46} Participants were paid \$20 for the baseline assessment, \$60 for the 12-week assessment, and \$15 if they completed a qualitative interview.

2.4 | Intervention

2.4.1 | Intervention development and testing process

In developing and testing the intervention, the Obesity-Related Behavioral Intervention Trials (ORBIT) treatment testing model⁴⁷ and published guidance from experts⁴⁸ was considered. The goal of the intervention was to help patients effectively use freely available online tools, including a social media community and a self-monitoring tool. A prototype of key intervention components was first developed, as well as a clinical implementation strategy to integrate the intervention into the primary care setting. Semi-structured interviews were then conducted with the target patient population and PCPs to gather feedback,⁴⁹ and used to modify the intervention and implementation strategy. The resulting intervention, called Weight Loss Your Way, featured an interactive Kickoff that introduces and aims to motivate engagement with a social media community and a self-monitoring tool. The intervention also included 8 booster messages sent via email or EHR messaging system over 12 weeks to further motivate use. The intervention was informed by a framework of engagement in digital health interventions, presented in 2017 by Perski, Blandford, West and Michie,⁵⁰ which posits that engagement in a digital health intervention is influenced by intervention characteristics, including delivery characteristics and content, and by the context of delivery, including population and setting characteristics. Weight Loss Your Way aimed to maximize

engagement by considering the factors identified in this framework. e.g., the freely available online tools leveraged in the intervention have delivery characteristics that are empirically associated with engagement, including ease of use, personalization, interactivity, and control features (i.e., features that promote user choice).⁵⁰

2.4.2 | Interactive kickoff

Enrolled patients received a link to an interactive Kickoff through the EHR patient portal (if an enrolled user) or by email 2–10 days prior to their PCP appointment. The message stated that their PCP would like them to complete the Kickoff prior to their upcoming appointment. The Kickoff was a series of webpages hosted on Qualtrics that includes four short videos and two interactive sections and takes approximately 15 min to complete. The Kickoff introduced patients to the social media community and self-monitoring tool, while also targeting psychosocial constructs that were anticipated to motivate tool engagement, including limited awareness of tools, burden of use (specifically self-monitoring), and low perceived benefits, while also supporting patient autonomy.

The Kickoff videos, produced by UF Media Center, were narrated by two diverse staff people and were closed captioned. The videos included (1) an intervention introduction emphasizing PCPs support of patient's participation, (2) an introduction to self-monitoring, including benefits of self-monitoring, brief instructions on using MyFitnessPal, and time-saving tips; (3) an introduction to the social media community, including potential benefits of the MyFitnessPal community and demonstration of ways to use the community; and (4) an introduction to setting calorie and physical activity goals. The interactive sections provided patients with personalized feedback based on their responses to a few questions, with an overall goal of showing how the social media community could be useful to them. e.g., patients ranked commonly reported barriers to weight loss success,^{6,51} then the Kickoff displayed suggestions for resources available in the social media community that address those barriers. The Kickoff ended with instructions for how to sign up for a MyFitnessPal account. PCPs received an EHR message 1–2 days prior to patient's appointment to alert them to patient's participation so they would know to potentially expect questions about weight loss at the upcoming visit.

2.4.3 | Online self-monitoring tool

Enrolled patients were guided to engage in goal setting and self-monitoring of food intake, physical activity, and weight via MyFitnessPal, a commercial platform with a mobile app and website for self-monitoring. MyFitnessPal has high usability and acceptability, and core functionality is free to users.⁵² Weight Loss Your Way encouraged patients to set a calorie goal through the MyFitnessPal app, which guided patients to enter their current weight, gender, and weight loss goals to provide a custom calorie goal. During the Kickoff,

patients were guided to never consume fewer than calories 1200/day and to focus on weight loss of between 1/2 and 2 pounds/week. Patients were also guided to gradually increase their moderate-to vigorous-intensity aerobic physical activity, aiming for the US guidelines for adults (i.e., 150–300 min moderate-intensity physical activity/week).⁵³ During the Kickoff videos, patients were encouraged to not enter their physical activity when setting their weight goal with MyFitnessPal so as to not receive a calorie goal that accounts for physical activity. They were also encouraged to avoid compensating for calories burned during exercise with increased food intake.

2.4.4 | Social media community

Patients enrolled in Weight Loss Your Way were guided and encouraged to use MyFitnessPal Community Boards, a social media community focused on weight loss. This community has a large, diverse user base; hosts highly active discussions (i.e., >50 posts/day) about weight loss goals, struggles, and successes; has active moderators to monitor content and remove off-topic or offensive posts; and is freely available to the public (i.e., not tied to a product with a fee). This community is connected to the MyFitnessPal self-monitoring tool, which may help reinforce use of both online resources.

2.4.5 | Messages

Patients received eight intervention messages weekly from weeks 1–4 and bi-weekly from weeks 6 to 12 via the EHR patient portal if they were enrolled in it, or via email if they were not enrolled in the patient portal. Messages were framed as coming from the study team. Messages encouraged engagement with the social media community and self-monitoring tools. Content included links to resources such as strategies to reduce burden of self-monitoring; information about different dietary approaches and links to learn more; and suggestions for use of community board, such as encouragement to join a “challenge” along with links to challenges on the MyFitnessPal community board. Messages ranged from 388 words to 916 words each. Message content is provided in the Supplemental Material.

2.5 | Measures

2.5.1 | PCP measures

At baseline, PCPs self-reported demographic and professional characteristics. They reported how often they encouraged their patients to engage with weight loss focused social media communities or to self-monitor food intake or physical activity using study-specific items with response options of never, infrequently, sometimes, or

very often. After each clinic appointment with a study patient, PCPs were sent a brief questionnaire to assess whether they discussed weight-related topics, how many minutes the intervention added, and how they felt about any added time. At baseline and end of study, PCPs answered five questions related to future implementation potential, informed by the Practical, Robust Implementation and Sustainability (PRISM) model.⁵⁴

2.5.2 | Patient baseline characteristics

Patients self-reported demographic characteristics, technology and social media use for general and health specific purposes, and weight loss history and motivation.

2.5.3 | Patient health behaviors and motivation

A series of validated brief dietary intake items were used to measure health behaviors, including one for cups of fruit/day, vegetables/day, usual servings of sugar-sweetened beverages/week, and number of times eating out in sit-down or fast-food restaurants/week.^{55,56} Physical activity was measured with the Stanford Leisure-Time Activity Categorical Item (L-Cat), a validated 1-item questionnaire with good psychometric properties that asks respondents to select from 6 different categories to describe their usual leisure time physical activity over the past month.⁵⁷ Single items developed for this study were used to measure patient motivation separately for improving diet, increasing physical activity, and losing weight on a 1 to 10 scale (e.g., "On a scale of 1-10, how motivated are you to make improvements in your diet, where 1 is not at all motivated and 10 is extremely motivated.").

2.5.4 | Patient perceptions of PCP appointment

Immediately following their clinic appointment, patients were sent a questionnaire asking if they discussed weight or intervention topics with their PCP, and how satisfied they were with the conversation. They also completed the 6-item Health Care Climate Questionnaire (HCCQ), a measure of perceived provider support for autonomy with good psychometric properties,⁵⁸ which was adapted to ask specifically about the weight-related conversation from the appointment. Scores on this measure can range from 1 to 7, with 7 reflecting the highest possible support.

2.5.5 | Body weight

Baseline anthropometric assessments (height, weight) were initially conducted in-person at the primary care clinics at the start or end of the patients' scheduled PCP appointments, or, for follow-up, at an on-campus laboratory. A mobile stadiometer (SECA 213) and calibrated

digital scale (SECA 869) were used, and patients were double measured while wearing light clothing and no shoes. In March 2020, the spread of COVID-19 led to institutional limitations on in-person contact, and the study shifted to new data collection procedures. Patients were asked to obtain and report their height and weight themselves using a scale at their own home or at a clinic or public location (e.g., scales regularly available at some grocery store chains). They were asked to weigh themselves two times (and a third if the first two weights were more than 0.2 pounds apart) and report it on a REDCap questionnaire sent at the time of their 12-week assessment.

2.5.6 | Intervention engagement

At 12-week follow-up, patients self-reported if they completed the Kickoff and how many of the intervention messages they read. They also reported the frequency of their engagement with the social media community and self-monitoring tool. A code was obtained from patients that allowed downloading of their self-monitoring data directly from MyFitnessPal. From food records, the number of days with ≥ 800 calories logged (shown to represent a complete day where most food/drinks have been tracked) was identified.⁵⁹⁻⁶¹ From physical activity records, the number of days where >100 or more calories burned (representing intentional self-monitoring and not an artifact of a linked wearable device) was identified.

2.5.7 | Intervention satisfaction

Patients reported on their satisfaction with the Kickoff in the immediate post-appointment assessment and their satisfaction with the intervention messages at the 12 weeks assessment.

2.5.8 | Qualitative interviews

All PCP and patient interviews were conducted 1:1 with a member of the research team through audio-only Zoom, and were recorded and transcribed verbatim. All six PCPs were sent an email invitation to participate in a 20-min phone interview. The moderator guide for PCPs was based on PRISM,⁵⁴ and PCPs were asked about the intervention's fit with their workflow, alignment with their priorities, perception of benefits to their patients, and their recommendations for additional resources or components of the intervention. This study aimed to interview 8-12 patients with a goal of recruiting individuals with a range of experiences, with recruitment ceasing when thematic saturation was achieved. Patients who expressed willingness to participate in the interview in their 12-week survey completed interviews. In interviews lasting 45-60 min, interviewers used a moderator guide to ask patients about their experience with the intervention, including what they liked and did not like about each intervention component. Interviews were recorded and transcribed by study staff.

2.6 | Analyses

Demographic characteristics are summarized using means and standard deviation or frequencies. Frequencies of endorsement of engagement with intervention components and of engagement with online tools based on objective data from the tools are presented. Dietary and physical activity variables and body weight are presented with means and standard deviations or frequencies at baseline and 12 weeks. To report change in body weight, all available weight data from those with both baseline and follow-up weights ($n = 21$) are used; there were 4 patients who had study-measured weights at both baseline and follow-up, 6 patients with both self-reported weights, and 11 patients with a baseline study-measured weight and follow-up self-reported weight.

Qualitative data from the semi-structured interviews were content analyzed using rapid analysis.^{62,63} A structured interview coding template was drafted by the study Co-Principal Investigators (MAM and DJS) to capture a priori key themes; MAM and DJS independently coded two interviews, then added emergent themes to the code sheet. A single coder (KBC) then used the refined template to code the remaining transcripts. A matrix table was created to summarize all patient responses; a summary of the themes and responses is presented here. This study was approved by the UF Institutional Review Board.

3 | RESULTS

3.1 | PCP recruitment and baseline characteristics

Each PCP who was presented with the option chose to enroll, and the goal of 6 enrolled PCPs was achieved. Primary care providers had a mean age of 39.6 ± 7.2 years ($n = 5$; one PCP did not provide age), 4

identified as female and 2 as male; 5 identified as White and 1 as Asian American. Three had Medical Doctorates, 2 were Nurse Practitioners, and 1 was a Doctor of Osteopathic Medicine. At baseline, 3 PCPs reported that they “sometimes” encourage their patients to use weight loss-focused social media communities and 3 reported infrequently or never doing this. Three PCPs reported that they “often” encouraged their patients to use apps for self-monitoring food or physical activity, 2 reported “sometimes,” and one reported “infrequently” doing this.

3.2 | Patient recruitment and baseline characteristics

A recruitment email was sent to 583 patients, and 42 consented to complete the eligibility questionnaire. Thirty-three patients were eligible after screening, and 27 went on to enroll in the intervention. Enrollment was stopped at 27 patients (8 fewer than the study goal) due to restrictions from the COVID-19 pandemic (see Figure 1).

Patient baseline characteristics are shown in Table 1. Patients were predominantly women (66.7%), identified as white race (66.7%), had a mean BMI of 39.7 ± 8.1 kg/m² and the majority did not have a bachelor's degree (55.5%). Most patients regularly used Facebook (85.2%), though 40.7% of the total sample reported use of social media less often than daily. Most patients (59.3%) had never been in a formal weight loss program and 48.1% had never self-monitored their dietary intake.

3.3 | Study retention

Immediate post-PCP appointment assessment was completed by 26 patients (96.3%) and 12-week follow-up assessment was completed

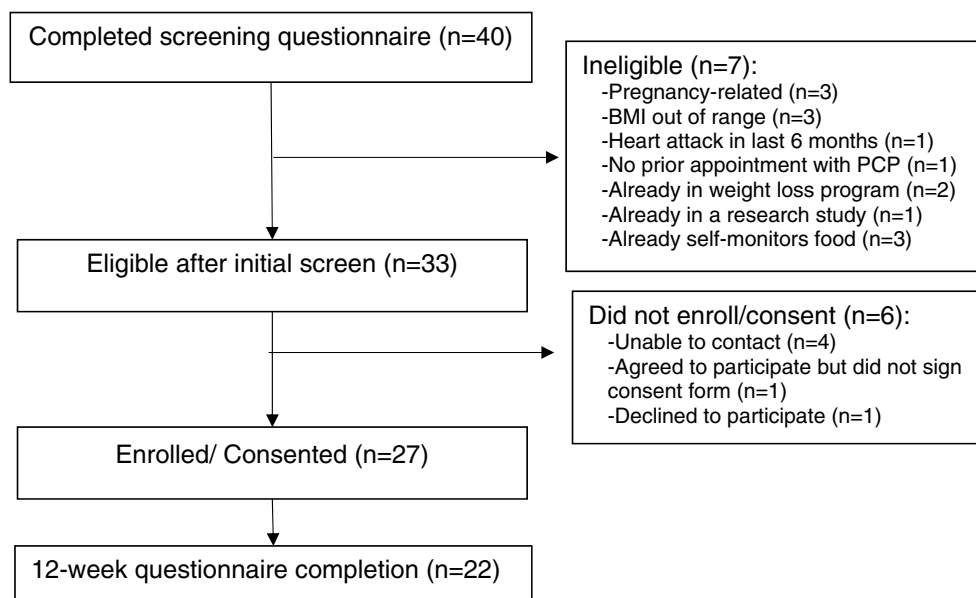


FIGURE 1 Flow of patients through the study

TABLE 1 Baseline characteristics of primary care patients ($n = 27$)

Variable	M(SD) or n(%)
Age, years	47.1 (13.7)
Weight, kg, self report*	115.8 (30.5)
BMI, kg/m ² *	39.6 (8.2)
BMI category, self report*	
29.0–30.0	4 (15.4)
30.1–35.0	4 (15.4)
35.1–40.0	6 (2)
40.1+	12 (46.2)
Sex, N(%)	
Women	18 (66.7)
Men	9 (33.3)
Education, N(%)	
High school diploma or some college	11 (40.7)
Associate's degree	4 (14.8)
Bachelor's degree	6 (22.2)
Post-graduate or graduate degree	5 (18.5)
Race, N(%)	
Black	7 (25.9)
White	18 (66.7)
Other	2 (7.4)
Ethnicity, N(%)	
Hispanic/Latino	1 (3.7)
Non-Hispanic	25 (92.6)
Marital status, N(%)	
Married or living with partner	19 (70.4)
Number of children living in the household, N(%)	
None	16 (59.3)
Work status, N(%)	
Employed full-time	19 (70.4)
Not employed full-time	8 (29.6)
Household financial security, N(%)	
After paying the bills, you still have enough money for special things that you want	12 (44.4)
You have enough money to pay the bills, but little spare money to buy extra or special things	9 (33.3)
You have money to pay the bills, but only because you have to cut back on things, OR you have difficulty paying the bills	4 (14.8)
I prefer not to answer	2 (7.4)
Health insurance, N(%)	
Private	22 (81.5)
Medicare	2 (7.4)
Other	3 (11.1)

(Continues)

TABLE 1 (Continued)

Variable	M(SD) or n(%)
Amount of weight desired to lose, in pounds	62.3 (32.9) range 15–115
Currently trying to lose weight, N(%)	
Yes	25 (92.6)
Tried to lose weight in the past year, N(%)	
Yes	23 (85.2)
Has ever self-monitored dietary intake, N(%)	
Yes	14 (51.9)
Number of times lost 10 pounds or more in lifetime, N(%)	
0–2 times	6 (22.2)
3–5 times	7 (25.9)
6–10 times	5 (18.5)
More than 10 times	9 (33.3)
Number of times joined a formal weight loss program in past, N(%)	
0 times	15 (59.3)
1–2 times	3 (11.1)
3–5 times	5 (18.5)
6–10 times	3 (11.1)
Frequency of self-weighing in the past 3 months, N(%)	
0 times	2 (7.4)
1 time	3 (11.1)
Once a month	3 (11.1)
Once a week	12 (44.4)
2–7 times a week	7 (25.9)
Regular social media use, N(%)	
Facebook	23 (85.2)
YouTube	16 (59.3)
Twitter	5 (18.5)
Instagram	12 (44.4)
Snapchat	6 (22.2)
None	2 (3.7)
Frequency of social media use in the past month among regular users, N(%) ^a	
1–4 times/week	6 (24.0)
Almost every day (5–6 times/week)	3 (12.0)
Once a day	4 (16.0)
More than 1 time every day	12 (48.0)
Interest in engaging with community board focused on weight loss, N(%)	
Interested	17 (63.0)
Not interested	10 (37.0)

Note: *n = 26.

Abbreviations: BMI, body mass index; M, mean; SD, standard deviation.

^aAmong the n = 25 patients with any social media activity.

by 22 (81.5%). Weight data were available for 21 patients. Qualitative interviews were completed with all PCPs ($n = 6$) and with 11 patients; additional patient interviews were unable to be scheduled. One PCP stayed enrolled in the study but requested to no longer enroll patients after a patient expressed concerns that they were sent a recruitment email.

3.4 | Patient perceptions of PCP appointment

Of the 26 patients who responded to the post-PCP appointment survey, 24 (92.3%) reported discussing nutrition/diet with their PCP, while 21 (80.8%) reported discussing exercise, and 22 (84.6%) reported discussing weight. Of the 24 patients who reported discussing one of these topics, all 24 (100%) reported being satisfied with the discussion. Sixteen patients (61.5%) reported that their PCP specifically mentioned the Weight Loss Your Way intervention, and 16 (61.5%) reported scheduling a follow-up appointment with their PCP in the next 6 months to discuss weight-related topics. The mean score on the HCCQ was 6.3 ± 0.8 , indicating that patients perceived a high level of autonomous support from their PCP.

3.5 | Intervention engagement

The Kickoff was reported to be completed by 25 patients (96.1% out of 26 completing the post-appointment survey). Out of 22 patients completing the 12 weeks survey, 13 (59.1%) reported reading all 8 intervention messages, while 19 patients (86.3%) reported reading at least 3 of the messages (see Table 2).

Among patients who completed the 12-week assessment ($n = 22$), 16 (72.7%) reported using either the social media community or online self-monitoring at some point during the intervention. In total, 9 patients (40.9%) reported using the social media community for weight loss. Two of these 9 patients reported writing something in the community at least once, and 3 reported visiting the community ≥ 3 times per week. Patients who did and did not use the social media community in this study had similar baseline levels of social media use (66.7% and 63.6%, respectively).

Self-reported data showed that 15 patients (68.1%) reported engaging in some self-monitoring of diet during the study (see Table 2). Of these, 12 patients (54.5%) reported self-monitoring ≥ 1 food or drink on ≥ 3 days a week, and 8 (36.4%) reported self-monitoring every food and drink consumed on ≥ 3 days a week. Fourteen patients (63.6%) reported self-monitoring their physical activity, and 7 (31.8%) reported self-monitoring on ≥ 3 days per week.

Objective data collected from MyFitnessPal were available for 15 patients, of which 14 had with some evidence of dietary self-monitoring. Among these patients, the mean days of logging ≥ 1 food/drink was 43.6 ± 26.2 days (out of 98 days considered). Patients logged ≥ 800 calories on a mean of 30.0 ± 26.5 days. Data from MyFitnessPal also showed that 11 people tracked physical activity,

and there was a mean of 41.3 ± 33.2 days where 100 or more calories burned were reported.

3.6 | PCP perceptions

At baseline, all 6 PCPs agreed the intervention would fit into their workflow (1 strongly agreed); at follow-up, all 6 still agreed, but 4 now strongly agreed. All other baseline perceptions remained the same at follow-up; all PCPs agreed that the intervention aligned with their priorities (3 strongly agreed), that it was easy to try (2 strongly agreed), and that patients would likely benefit (3 strongly agree). In addition, all 6 disagreed that the intervention takes a great deal of time to implement.

Primary care providers completed the brief post-appointment survey after 70.0% of enrolled patient appointments, for a total of 18 surveys. They reported that weight-related topics were discussed in 16 (88.9%) of these appointments. Primary care providers estimated that the time added to the appointment was "none" for 9 patients, 3–5 min for 7 patients, and 11–12 min for 3 patients—the latter all seen by the same PCP. In each of the situations where time was added, the PCP described the additional time as being acceptable to them.

In qualitative interviews, PCPs described that the Weight Loss Your Way intervention had little impact on their discussions with patients, although a few PCPs noted that it led to more detailed discussion and conversation about calorie and activity self-monitoring. Primary care providers described that they liked the goals of the intervention and felt it was well-aligned with their clinic goals, explaining that they particularly liked that the intervention allowed them to provide their patients with additional weight management resources that could be tailored to patient's needs and extend support beyond what is offered during a rushed clinic appointment. In terms of feedback for improvement, PCPs noted that they would like more communication about the patient enrollment and progress in the intervention, such as a brief note with points for them to emphasize in the clinic visit, and to make it very clear that the invitation to join was originating from the PCP to avoid patients being offended. Additionally, a few PCPs explained that they would like to see more long-term weight loss outcomes from the intervention.

3.7 | Weight, dietary, and physical activity changes

Baseline and 12 weeks summaries of patients' dietary intake and physical activity variables are presented in Table 3. All variables changed in the direction of improved health behaviors, though statistical significance was not examined. Among those for whom data were available ($n = 21$), mean weight loss was $2.4 \pm 4.1\%$ of baseline body weight, and 6 patients (28.6%) lost $\geq 3\%$ of their baseline body weight.

TABLE 2 Engagement with intervention components, for patients with follow-up data (n = 22)

	Baseline
	Mean(SD) or N(%)
Intervention messages	
Number of intervention emails read, of a total of 8 sent, N(%)	
None	1 (4.6)
1 or 2	2 (9.1)
3–5	5 (22.7)
5–7	1 (4.5)
All 8	13 (59.1)
How helpful were the emails to motivate changes to diet and physical activity, N(%)	
Not at all	1 (4.5)
Slightly	6 (27.3)
Moderately	11 (50.5)
Very	4 (18.2)
How helpful were the emails to motivate engagement with the social community, N(%)	
Not at all	13 (59.1)
Slightly	5 (22.7)
Moderately	3 (13.6)
Very	1 (4.5)
Social community use	
Self-reported user of the MyFitnessPal online social community, N(%)	
	9 (40.9)
Self-reported frequency of using the social community in a typical week of the intervention	
Never	1 (4.8)
1 or 2 times	5 (55.6)
3–4 times	3 (33.3)
Wrote a post or comment in the social community	2 (22.2)
How helpful was the social community for weight loss ^b , N(%)	
Not at all	11 (50.0)
Slightly	6 (27.3)
Moderately	3 (13.6)
Very	2 (9.1)
Food self-monitoring	
Self-reported frequency of self-monitoring in MyFitnessPal or another app/website, during a typical week of the intervention, N(%)	
Never tracked	7 (31.8)
1–2 days	3 (13.6)
3–4 days	6 (27.3)
5–6 days	3 (13.6)
7 days	3 (13.6)
Self-reported tracked every food and drink item consumed ^a , N(%)	
Never	2 (13.3)
1–2 days	5 (33.3)

TABLE 2 (Continued)

	Baseline
3+ days	8 (36.4)
Self-reported amount of food and drinks tracked, ^a N(%)	
0%–50% of intake	3 (20.0)
50%–100% of intake	12 (80.0)
How helpful was self-monitoring food and drinks for weight loss, N(%)	
Not at all	1 (4.5)
Slightly	4 (18.2)
Moderately	8 (36.4)
Very	9 (40.9)
Set a calorie goal ^b , N(%)	12 (54.5)
Average number of days tracked any food or drinks out of 98 days, objective data ^b	43.6 (26.2)
Average number of days tracked at least 800 calories of food or drinks out of 98 days, objective data ^b	30.0 (26.5)
Physical Activity Self-monitoring	
Self reported tracking exercise in MyFitnessPal or another app/website, N(%)	14 (63.6)
Linked a physical activity device to MyFitnessPal, N(%)	13 (59.1)
How helpful was self-monitoring food and drinks for weight loss ^b , N(%)	
Not at all	2 (9.1)
Slightly	5 (22.7)
Moderately	10 (45.5)
Very	5 (22.7)
Set a physical activity goal ^b , N(%)	9 (40.9)
Average days tracking physical activity, objective data ^c	41.3 (33.2)
Self-Weighing Self-monitoring	
Frequency of self-weighing during the intervention, N(%)	
Never	2 (9.1)
Once a month	4 (18.2)
Once a week	9 (40.9)
A few times a week	4 (18.2)
Daily	3 (13.6)
Recorded weight on MyFitnessPal ^b , N(%)	13 (59.1)
Set a weight loss goal ^b , N(%)	17 (77.3)

^aOf the n = 15 people who tracked 1+ days.

^bn = 14.

^cn = 11.

3.8 | Patient intervention satisfaction

Out of the 26 patients who completed the post-appointment survey, 24 (92.3%) agreed that they enjoyed completing the Kickoff; that they learned new things from it; that they trusted that the information was secure and would stay private; and that they thought it was interesting. Twenty-five patients (96.2%) reported that the Kickoff was

easy to use. All patients reported that the Kickoff was trustworthy, easy to navigate, and that the instructions were easy to understand. Twenty-three patients (88.5%) reported that they had enough time to complete it prior to their PCP appointment and most (n = 19, 73.1%) disagreed that the Kickoff “took too long.” 23 patients (88.5%) reported that they were given enough information to make a decision about using the social media communities and self-monitoring tool.

	Baseline	12 Weeks
Measures	Mean(SD) or N(%)	Mean(SD) or N(%)
<i>Dietary Intake</i>		
Cups of fruit/day, M(SD)	1.0 (1.2)	1.8 (1.2)
Cups of vegetables/day, M(SD)	2.0 (1.5)	2.5 (1.1)
Sugar-sweetened beverages, past 7 days, N(%)		
No servings	7 (31.8)	9 (40.9)
1–6 servings/week	10 (45.5)	11 (50.0)
≤1 serving/day	5 (22.7)	2 (9.1)
Eat at fast food restaurants, times per week, M(SD)	2.9 (3.0)	2.7 (3.2)
Eat at sit-down restaurants, times per week, M(SD)	3.4 (4.5)	2.4 (2.7)
<i>Physical Activity</i>		
L-CAT, N(%)		
No activity	4 (18.2)	3 (13.6)
1 day/week	11 (50.0)	7 (31.8)
2 days/week	4 (18.2)	7 (31.8)
3+ days/week (meeting physical activity recommendations)	3 (13.6)	5 (22.7)
<i>Weight</i>		
Body weight, kg	115.9 (31.6) ^a	114.4 (31.7)
Percent change in weight, baseline to 12 weeks		–2.4 (4.1)
<i>Motivation</i>		
Motivation to improve eating habits ^b	7.9 (1.8)	8.2 (1.9)
Motivation to increase exercise ^b	8.0 (1.9)	8.1 (2.0)
Motivation to lose weight ^b	8.5 (1.6)	8.2 (1.8)

^a(n = 21) Baseline data not available for one patient.

^bOn a scale of 1–10 where 1 is not at all motivated and 10 is extremely motivated.

TABLE 3 Behavioral and weight outcomes from baseline and 12-week for patients with follow-up data (n = 22)

Overall, the intervention messages were described as at least moderately helpful for motivating diet and physical activity by most patients (n = 15, 68.2% of 22 respondents), whereas most patients described these messages as being only slightly or not at all helpful (n = 17, 77.3%) for motivating engagement with the social media communities (see Table 2).

3.9 | Patient qualitative interviews

In semi-structured qualitative interviews, patients reported that they found the Kickoff materials motivating, that it helped them to set and meet their goals, and that they liked the format and that they could revisit the materials. However, some patients also explained that it was difficult to access, they didn't have enough time to complete it before their PCP appointment, they would have preferred that it was all in a written format, and they desired to ask questions or talk to other people while completing it.

Overall, patients had mixed feedback about the intervention messages. They explained that they were helpful and motivating, provided good reminders and accountability, were well-timed at the beginning of the week, and helped them think about things they wouldn't have otherwise. However, other patients noted that the messages were too long and dense, that the topics were too general and not personalized enough, and that they wanted more cutting-edge research on weight loss and information for specific sub-groups like certain age groups.

In terms of discussing weight with their PCP, most patients reported that participation in the study did not impact their conversations due to the regular discussion of weight with their PCP. However, many patients reported specifically discussing their participation in the Weight Loss Your Way intervention and that their PCP was very encouraging of their use of the tools recommended. One patient reported that they did not discuss the intervention with their PCP, but that it would likely have increased their accountability if the PCP had discussed it.

Patients reported appreciation for several aspects of the MyFitnessPal self-monitoring tool, including that it was simple to use, gave reminders to log food intake, established reasonable calorie goals, made them more conscious of their food intake, and had helpful features such as scanning of bar codes. Patients also shared aspects of self-monitoring that were less desirable, including that it was time consuming, that the app had too many options for the same food, and that they did not find self-monitoring helpful overall.

Positive aspects of the social media community noted were that it provided encouragement for weight loss goals, helped them find recipes and cooking ideas, and that some of the information was trustworthy and relevant to them. However, patients also shared concerns about the community, including that some content was not trustworthy, some of the community had a negative tone, they were unsure what to post, and they did not find the content relevant to them. Reasons described for not engaging with the community were a lack of comfort sharing on social media generally, disliking discussing weight with others, concern about judgment from others, and finding the community overall uninspiring. Some patients reported that they would have liked more contact from an intervention staff member to provide additional guidance, individualized feedback, and accountability.

4 | DISCUSSION

The current study describes the feasibility, acceptability, and proof of concept of a novel weight loss intervention designed to engage primary care patients with an existing social media community and self-monitoring tools to support weight loss. This intervention and trial design used had several uncommon features that may be applicable beyond this project, including delivering intervention materials in the days prior to a PCP appointment, enrolling patients across a range of motivational levels and past experiences with social media, and using a flexible, toolbox approach. Overall, the intervention showed promise, with nearly all patients reporting a satisfying weight management discussion at their primary care appointment, and PCPs and patients reporting high satisfaction with many components of the intervention. Additionally, there was strong evidence for the feasibility of the trial design, including adequate recruitment and retention of PCPs and patients. Areas of weakness in the intervention and trial design were also identified, including relatively low engagement with the social media community. Because this is the first intervention presented in the literature, to our knowledge, that aims to engage individuals in an existing social media community for health behavior change, the data herein provide guidance beyond the current intervention for improving efforts to engage individuals in health-focused social media communities.

In this study, patient-PCP interactions around weight-related topics occurred frequently and were described as satisfying to patients, with minimal to no disruptions reported to the clinical workflow. This contrasts with national data showing the low frequency of weight management counseling reported by primary care

patients⁶⁴⁻⁶⁷ and general patient dissatisfaction with these conversations when they do occur.⁶⁸ Notably, the Weight Loss Your Way intervention was novel in that it delivered automated intervention content with PCP endorsement in the days just prior to a primary care appointment. Overall, PCPs had very positive responses to this approach as reflected in their study enrollment rates, survey data, and interview responses. Interviews with enrolled PCPs suggest that success in recruiting PCPs may be attributable to the PCPs' overall interest in connecting patients to weight management resources, and perceptions that the intervention would be potentially low burden for themselves and the patients. Primary care providers also reported that the intervention easily integrated into their workflow and was aligned with their priorities, found to be important markers for implementation potential in past interventions.^{54,69,70} Combined with patients' reports of high rates of satisfaction with their weight-related discussions with their PCP, these pilot results suggest that the approach of sending content from PCPs to patients prior to an appointment may help prepare patients and PCPs to engage in effective weight-related discussions. A future fully powered trial with a control condition will be valuable for determining the effectiveness of this approach.

Mixed outcomes were found for patient engagement with the social media community and self-monitoring tool. Whereas in a traditional intervention, the goal is typically to achieve a high threshold of engagement with all intervention components, the current intervention instead used a flexible toolbox approach. The intervention aimed for all patients to learn about the tools and their potential benefits (i.e., by completing the Kickoff), to have a positive discussion with their PCP about weight loss and available tools, and to try some of the available tools. The expectation was that this would in turn translate to some patients not having sustained engagement, but that overall a meaningful proportion of the population would achieve weight loss beyond what they would achieve without the intervention. While these goals were met in terms of patients completing Kickoff and a high proportion having positive weight-related discussion with PCPs, the goal that all or nearly all patients would try the online tools was not met. Instead, 72.7% of patients reported that they tried at least one of the online tools during the intervention. Further, ongoing use of the online tools was low. This low use of online tools is consistent with past studies of digital interventions.^{71,72}

Semi-structured interviews provided useful ideas about how to increase patients' interest and willingness to use the social media communities and self-monitoring tools. Interviews revealed that some patients were unhappy with the specific social media community recommended, and some did not feel that they found content that was relevant to them. Some patients noted that they would be more likely to use a community that was embedded with their existing social media activity (e.g., Facebook). Interventions seeking to engage patients in existing social media communities may benefit from offering a choice of different types of communities to meet the diverse preferences of their patients. It may also be beneficial to give more explicit instruction on how to find relevant content within the

community. Regarding use of the self-monitoring tool, it was learned during interviews that some patients found it cumbersome, and they wanted strategies for streamlining their self-monitoring over time. With enhanced training and ongoing materials, more patients may engage with these tools. Food photography is one method that has shown potential promise to simplify dietary tracking in the context of a provider-supported weight loss intervention.⁷³

The weight change results observed in the present study support the potential of the intervention for population impact. While the weight loss is modest compared to that observed in intensive weight loss programs, even modest weight losses can have a large public health impact if the intervention is low cost and easy to implement, as Weight Loss Your Way was designed to be. The weight change observed in this pilot should also be considered in light of the difficulty in estimating what the weight trajectory would have been of patients had they not enrolled in the study, in the absence of a control group.

The feasibility of the trial approach was supported by the successful recruitment and retention of patients in this study. Additionally, data suggested that this study enrolled people who may not typically be reached by more intensive weight loss programs. Most enrolled patients had never joined a formal weight loss program in the past nor had they ever self-monitored their dietary intake, whereas in past studies most participants (~70%) have been enrolled in a commercial weight loss program or had previous professional assistance with a weight loss attempt.^{44,62} This study also included patients with diverse backgrounds for a weight loss trial, with the sample comprised of one-third men, one-third non-white, and more than half of patients with less than a Bachelor's degree. Although only a relatively small portion of total patients emailed completed the screening process (5.6%), the proportion was consistent with other studies using mass marketing approaches.^{74,75} Given the potential for emails to go to spam folders or be unread, these data are unlikely to be an indicator of interest in the program if advertised through other methods. Of note, final, 12-week data was obtained from 81% of patients, despite procedures changing from in-person to remote assessments mid-study due to the COVID pandemic.

In spite of several strengths, this study had limitations. First, due to COVID-19 restrictions, recruitment ceased before meeting the study goal of 35 patients. Nonetheless, the sample size of 27 is within the range of recommendations for a single arm pilot trial, and the data were adequate to evaluate key study questions. Second, due to COVID-19 restrictions, weight data were collected through a mix of standardized, study-measured weight, and unstandardized patient self-weighing. However, given observed weight change is likely to be unstable in a small sample and there was not a control group, this finding is not emphasized. Third, while the aim for qualitative interviews was to select patients with goal of representing a range of experiences, patient selection was ultimately based on who was willing to complete the interview. However, despite this, analyses included a wide range of negative and positive feedback about the intervention that will likely improve future iterations of the intervention.

In conclusion, this study supports the potential of a toolbox approach that encourages the use of a weight loss-focused social media community and self-monitoring tools in the primary care setting, although further refinement of the intervention is warranted. This approach was well received by PCPs and most patients, and showed potential for supporting weight loss at a low cost. These study results revealed barriers to engaging with the social media community, and to a lesser extent, the self-monitoring tools, that can be addressed prior to conducting a larger trial.

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CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

AUTHOR CONTRIBUTIONS

Megan McVay and Danielle Jake-Schoffman contributed to conceptualization, formal analysis, funding acquisition, investigation, methodology, supervision, and writing of original draft. Kellie Cooper contributed to investigation and formal analysis. Marissa Donahue contributed to investigation and project administration. Montserrat Carrera Seoane contributed to investigation. Nipa Shah, Fern Webb, and Michael Perri contributed to conceptualization. All authors contributed to writing-review & editing.

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REFERENCES

1. LeBlanc ES, Patnode CD, Webber EM, Redmond N, Rushkin M, O'Connor EA. Behavioral and pharmacotherapy weight loss interventions to prevent obesity-related morbidity and mortality in adults: updated evidence report and systematic review for the US preventive services task force. *JAMA*. 2018;320(11):1172-1191.
2. Kahwati LC, Lance TX, Jones KR, Kinsinger LS. RE-AIM evaluation of the veterans health administration's move! weight management program. *Transl Behav Med*. 2011;1(4):551-560.
3. Ackermann RT, Finch EA, Brizendine E, Zhou H, Marrero DG. Translating the diabetes prevention program into the community. The DEPLOY pilot study. *Am J Prev Med*. 2008;35(4):357-363.
4. John LK, Troxel AB, Yancy WS, et al. The effect of cost sharing on an employee weight loss program: a randomized trial. *Am J Health Promot*. 2018;32(1):170-176.

5. McVay MA, Yancy WS, Bennett GG, Jung S-H, Voils CI, et al. Perceived barriers and facilitators of initiation of behavioral weight loss interventions among adults with obesity: a qualitative study. *BMC Publ Health*. 2018;18(1):854.
6. McVay MA, Yancy WS, Scott CN, et al. Patient factors associated with initiation of behavioral weight loss treatment: a prospective observational study in an integrated care setting. *Transl Behav Med*. 2017;7(1):75-83.
7. Waring ME, Jake-Schoffman DE, Holovatska MM, Mejia C, Williams JC, Pagoto SL. Social media and obesity in adults: a review of recent research and future directions. *Curr Diab Rep*. 2018;18(6):34.
8. Johnston Allen C, Worrell JL, Di Gangi PM, Wasko M. Online health communities: an assessment of the influence of participation on patient empowerment outcomes. *Inf Technol People*. 2013;26(2):213-235.
9. Pappa GL, Cunha TO, Bicalho PV, et al. Factors associated with weight change in online weight management communities: a case study in the loseit reddit community. *J Med Internet Res*. 2017;19(1):e17.
10. Cruwys T, Bevelander KE, Hermans RCJ. Social modeling of eating: a review of when and why social influence affects food intake and choice. *Appetite*. 2015;86:3-18.
11. Trost SG, Owen N, Bauman AE, Sallis JF, Brown W. Correlates of adults' participation in physical activity: review and update. *Med Sci Sports Exerc*. 2002;34(12):1996-2001.
12. Elfhag K, Rössner S. Who succeeds in maintaining weight loss? A conceptual review of factors associated with weight loss maintenance and weight regain. *Obes Rev*. 2005;6(1):67-85.
13. Smith GL, Banting L, Eime R, O'Sullivan G, Van Uffelen JG, et al. The association between social support and physical activity in older adults: a systematic review. *Int J Behav Nutr Phys Act*. 2017;14(1):56.
14. Pagoto S, Schneider KL, Evans M, et al. Tweeting it off: characteristics of adults who tweet about a weight loss attempt. *J Am Med Inform Assoc*. 2014;21(6):1032-1037.
15. Reading JM, Buhr KJ, Stuckey HL. Social experiences of adults using online support forums to lose weight: a qualitative content analysis. *Health Educ Behav*. 2019;46(2_suppl):129S-133S.
16. Pagoto SL, Waring ME, Schneider KL, et al. Twitter-delivered behavioral weight-loss interventions: a pilot series. *JMIR Res Protoc*. 2015;4(4):e123.
17. An R, Ji M, Zhang S. Effectiveness of social media-based interventions on weight-related behaviors and body weight status: review and meta-analysis. *Am J Health Behav*. 2017;41(6):670-682.
18. Cavallo DN, Martinez R, Webb Hooper M, Flocke S. Feasibility of a social media-based weight loss intervention designed for low-SES adults. *Transl Behav Med*. 2021 Apr;11(4):981-992.
19. Pagoto S, Waring M, Olendzki E, Oleski J, May C, Evans M. The feasibility of incentivizing participation in an online social network weight loss program. *Proceedings of 50th HICSS* 2017.
20. Pagoto S, Waring M, Jake-Schoffman D, et al. What type of engagement predicts success in a Facebook weight loss group? *Proceedings of 51th HICSS* 2018.
21. Bandura A. Social cognitive theory of self-regulation. *Organ Behav Hum Decis Process*. 1991;50(2):248-287.
22. Swann C, Rosenbaum S, Lawrence A, Vella SA, McEwan D, Ekkekakis P. Updating goal-setting theory in physical activity promotion: a critical conceptual review. *Health Psychol Rev*. 2021 Jan 2;15(1):34-50.
23. Epton T, Currie S, Armitage CJ. Unique effects of setting goals on behavior change: systematic review and meta-analysis. *J Consul Clin Psych*. 2017;85(12):1182-1198.
24. Burke LE, Wang J, Sevvick MA. Self-monitoring in weight loss: a systematic review of the literature. *J Acad Nutr Diet*. 2011;11(1):92-102.
25. Goldstein SP, Goldstein CM, Bond DS, Raynor HA, Wing RR, Thomas JG. Associations between self-monitoring and weight change in behavioral weight loss interventions. *Health Psychol* 2019;38(12):1128-1136.
26. Bandura A. Regulation of cognitive processes through perceived self-efficacy. *Dev Psychol*. 1989;25(5):6.
27. Brown MM, Arigo D, Pasko K, Gupta A. Perceptions of social support for weight loss among patients in primary care. *Obes Res Clin Pract*. 2019;13(6):594-598.
28. Goldstein CM, Thomas JG, Wing RR, Bond DS. Successful weight loss maintainers use health-tracking smartphone applications more than a nationally representative sample: comparison of the National Weight Control Registry to Pew Tracking for Health. *Obes Sci Pract*. 2017;3(2):117-126.
29. Tanenbaum ML, Bhatt HB, Thomas VA, Wing RR. Use of self-monitoring tools in a clinic sample of adults with type 2 diabetes. *Transl Behav Med*. 2016;7(2):358-363.
30. Robbins R, Krebs P, Jagannathan R, Jean-Louis G, Duncan DT. Health app use among US mobile phone users: analysis of trends by chronic disease status. *JMIR Mhealth Uhealth*. 2017;5(12):e197.
31. Park KA, Eum SY, Oh H, et al. Factors affecting online health community participation behavior in patients with thyroid cancer. *PLOS ONE*. 2020;15(6):e0235056.
32. Burke LE, Swigart V, Warziski Turk M, Derro N, Ewing LJ. Experiences of self-monitoring: successes and struggles during treatment for weight loss. *Qual Health Res*. 2009;19(6):815-828.
33. Krebs P, Duncan DT. Health app use among US mobile phone owners: a national survey. *JMIR Mhealth Uhealth*. 2015;3(4):e101.
34. TechCrunch. *Nearly 1 in 4 People Abandon Mobile Apps After Only One Use*; 2016. <https://techcrunch.com/2016/05/31/nearly-1-in-4-people-abandon-mobile-apps-after-only-one-use/>
35. Office of Disease Prevention and Health Promotion. AHS-1.1 Persons with medical insurance (percent, under 65 years) by Race/Ethnicity. *Healthy People*. 2020.
36. Office of Disease Prevention and Health Promotion. AHS-3 Increase the proportion of persons with a usual primary care provider. *Healthy People*. 2020.
37. Merritt K, Jabbarpour Y, Petterson S, Westfall JM. *The State of Primary Care in the United States: A Chartbook of Facts and Statistics*; 2018.
38. Anderson LA, Dedrick RF. Development of the Trust in Physician scale: a measure to assess interpersonal trust in patient-physician relationships. *Psychol Rep*. 1990;67(3 Pt 2):1091-1100.
39. Kao AC, Green DC, Davis NA, Koplan JP, Cleary PD. Patients' trust in their physicians: effects of choice, continuity, and payment method. *J Gen Intern Med*. 1998;13(10):681-686.
40. Gallagher TH, St. Peter RF, Chesney M, Lo B. Patients' attitudes toward cost control bonuses for managed care physicians. *Health Aff (Millwood)*. 2001;20(2):186-192.
41. Lewis KH, Gudzone KA, Fischer H, Yamamoto A, Young DR. Racial and ethnic minority patients report different weight-related care experiences than non-Hispanic Whites. *Prev Med Rep*. 2016;4:296-302.
42. McVay MA, Yancy Jr WS, Bennett GG, et al. A web-based intervention to increase weight loss treatment initiation: results of a cluster randomized feasibility and acceptability trial. *Transl Behav Med*. 2019.
43. Oddone EZ, Gierisch JM, Sanders LL, et al. A coaching by telephone intervention on engaging patients to address modifiable cardiovascular risk factors: a randomized controlled trial. *J Gen Intern Med*. 2018;33(9):1487-1494.
44. Hertzog MA. Considerations in determining sample size for pilot studies. *Res Nurs Health*. 2008;31(2):180-191.
45. Leon AC, Davis LL, Kraemer HC. The role and interpretation of pilot studies in clinical research. *J Psychiatr Res*. 2011;45(5):626-629.

46. Thabane L, Ma J, Chu R, et al. A tutorial on pilot studies: the what, why and how. *BMC Med Res Methodol.* 2010;10:1.
47. Czajkowski SM, Powell LH, Adler N, et al. From ideas to efficacy: the ORBIT model for developing behavioral treatments for chronic diseases. *Health Psychol.* 2015;34(10):971.
48. Freedland KE, Pilot trials in health-related behavioral intervention research: problems, solutions, and recommendations. *Health Psychol.* 2020;39(10):851-862.
49. Jake-Schoffman DE, McVay MA. Using the Design Sprint process to enhance and accelerate behavioral medicine progress: a case study and guidance. *Transl Behav Med.* 2020.
50. Perski O, Blandford A, West R, Michie S. Conceptualising engagement with digital behaviour change interventions: a systematic review using principles from critical interpretive synthesis. *Transl beh med.* 2017;7(2):254-267.
51. Metzgar CJ, Preston AG, Miller DL, Nickols-Richardson SM. Facilitators and barriers to weight loss and weight loss maintenance: a qualitative exploration. *J Hum Nutr Diet.* 2015;28(6):593-603.
52. Ferrara G, Kim J, Lin S, Hua J, Seto E. A focused review of smartphone diet-tracking apps: usability, functionality, coherence with behavior change theory, and comparative validity of nutrient intake and energy estimates. *JMIR Mhealth UHealth.* 2019;7(5):e9232.
53. Piercy KL, Troiano RP, Ballard RM, et al. The physical activity guidelines for Americans. *JAMA.* 2018;320(19):2020-2028.
54. Feldstein AC, Glasgow RE. A practical, robust implementation and sustainability model (PRISM) for integrating research findings into practice. *Jt Comm J Qual Patient Saf.* 2008;34(4):228-243.
55. Wilcox S, Saunders RP, Kaczynski AT, et al. Faith, activity, and nutrition randomized dissemination and implementation study: countywide adoption, reach, and effectiveness. *Am J Prev Med.* 2018.
56. Jake-Schoffman DE, Turner-McGrievy G, Wilcox S, Moore JB, Hussey JR, Kaczynski AT. The mFIT (motivating families with interactive technology) study: a randomized pilot to promote physical activity and healthy eating through mobile technology. *J Tech Behav Sci.* 2018;3(3):179-189.
57. Kiernan M, Schoffman DE, Lee K, et al. The Stanford Leisure-Time Activity Categorical Item (L-Cat): a single categorical item sensitive to physical activity changes in overweight/obese women. *Int J Obes (Lond).* 2013;37(12):1597-1602.
58. Shumway D, Griffith KA, Jagi R, Gabram SG, Williams GC, Resnicow K. Psychometric properties of a brief measure of autonomy support in breast cancer patients. *BMC Med Inform Decis Mak.* 2015;15(1):51.
59. Wharton CM, Johnston CS, Cunningham BK, Sterner D. Dietary self-monitoring, but not dietary quality, improves with use of smartphone app technology in an 8-week weight loss trial. *J Nutr Educ Behav.* 2014;46(5):440-444.
60. Patel ML, Hopkins CM, Brooks TL, Bennett GG. Comparing self-monitoring strategies for weight loss in a smartphone app: randomized controlled trial. *JMIR Mhealth Uhealth.* 2019;7(2):e12209.
61. Turner-McGrievy GM, Dunn CG, Wilcox S, et al. Defining adherence to mobile dietary self-monitoring and assessing tracking over time: tracking at least two eating occasions per day is best marker of adherence within two different mobile health randomized weight loss interventions. *J Acad Nutr Diet.* 2019;119(9):1516-1524.
62. Gale RC, Wu J, Erhardt T, et al. Comparison of rapid vs in-depth qualitative analytic methods from a process evaluation of academic detailing in the Veterans Health Administration. *Implement Sci* 2019;14(1):11.
63. Voils CI, Adler R, Strawbridge E, et al. Early-phase study of a telephone-based intervention to reduce weight regain among bariatric surgery patients. *Health Psychol* 2020;39(5):391-402.
64. Sciamanna CN, Tate DF, Lang W, Wing RR. Who reports receiving advice to lose weight? Results from a multistate survey. *Arch Intern Med.* 2000;160(15):2334-2339.
65. Dutton GR, Herman KG, Tan F, et al. Patient and physician characteristics associated with the provision of weight loss counseling in primary care. *Obes Res Clin Pract.* 2014;8(2):e123-e130.
66. Felix H, West DS, Bursac Z. Impact of USPSTF practice guidelines on clinician weight loss counseling as reported by obese patients. *Prev Med.* 2008;47(4):394-397.
67. Bleich SN, Pickett-Blakely O, Cooper LA. Physician practice patterns of obesity diagnosis and weight-related counseling. *Patient Educ Couns.* 2011;82(1):123-129.
68. Wadden TA, Anderson DA, Foster GD, Bennett A, Steinberg C, Sarwer DB. Obese women's perceptions of their physicians' weight management attitudes and practices. *Arch Fam Med.* 2000;9(9):854-860.
69. Varsi C, Ekstedt M, Gammon D, Ruland CM. Using the consolidated framework for implementation research to identify barriers and facilitators for the implementation of an internet-based patient-provider communication service in five settings: a qualitative study. *J Med Internet Res.* 2015;17(11):e262.
70. Børøsund E, Ruland CM, Moore S, Ekstedt M. Nurses' experiences of using an interactive tailored patient assessment tool one year past implementation. *Int J Med Inform.* 2014;83(7):e23-34.
71. Patel ML, Wakayama LN, Bennett GG. Self-monitoring via digital health in weight loss interventions: a systematic review among adults with overweight or obesity. *Obesity.* 2021;29(3):478-499.
72. West DS, Stansbury M, Krukowski RA, Harvey J. Enhancing group-based internet obesity treatment: a pilot RCT comparing video and text-based chat. *Obes Sci Pract.* 2019;5(6):513-520.
73. Vaz CL, Carnes N, Pousti B, Zhao H, Williams KJ. A randomized controlled trial of an innovative, user-friendly, interactive smartphone app-based lifestyle intervention for weight loss. *Obes Sci Pract.* 2021;7(5):555-568.
74. Brown SD, Lee K, Schoffman DE, King AC, Crawley LM, Kiernan M. Minority recruitment into clinical trials: experimental findings and practical implications. *Contemp Clin Trials.* 2012;33(4):620-623.
75. Tate DF, LaRose JG, Griffin LP, et al. Recruitment of young adults into a randomized controlled trial of weight gain prevention: message development, methods, and cost. *Trials.* 2014;15(1):326.

SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

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