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A Pilot Study of a Peer-Group Lifestyle Intervention Enhanced with mHealth Technology and Social Media for Adults with Serious Mental Illness

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Abstract

This pilot study examined the preliminary effectiveness of a peer-group lifestyle intervention enhanced with mHealth technology and social media for obese individuals with serious mental illness. Thirty-two participants with BMI ≥ 30 received the 24-week intervention designed to facilitate peer support for lifestyle change through experiential learning and use of wearable activity tracking devices, smartphone applications, and Facebook to reinforce physical activity, healthy eating, and group participation between sessions. The primary outcome was weight loss. Secondary measures included fitness and participants' perceptions of peer group support. Most participants (72%) lost weight, including 28% achieving clinically significant weight loss, and 17% of participants showed clinically significant improvements in cardiovascular fitness. Weight loss was associated with perceived peer group support. This evaluation demonstrated the preliminary effectiveness of a potentially scalable peer-group lifestyle intervention delivered in community mental health settings for obese individuals with serious mental illness.

Keywords

Lifestyle intervention; serious mental illness; peer-to-peer support; mobile technology; social media

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Introduction

Obesity is nearly twice as prevalent in people with serious mental illness compared with the general population (Scott et al, 2011) and contributes to reduced life expectancy of 8 to 32 years in this population (Colton et al, 2006; Druss et al, 2011). Even modest amounts of weight loss can significantly reduce cardiovascular disease risk in obese individuals (Wing et al, 2011). A series of first generation randomized trials of lifestyle interventions for people with serious mental illness have demonstrated clinically significant weight loss through behavioral changes in diet and exercise (Bartels et al, 2013; Bartels et al, 2015; Daumit et al, 2013; Green et al, 2015). Though effective, there are inherent limitations in scaling and sustaining these intensive lifestyle interventions in mental health settings. Facilitating peer support networks among people with serious mental illness who share common challenges and experiences with obesity and weight loss has the potential to increase the generalizability and scalability of lifestyle interventions targeting this high risk group. In particular, interventions that capitalize on the natural strengths of consumers wanting to lose weight and leverage popular technologies to support program delivery, supplement professional services, and facilitate peer-to-peer support is the next step forward in advancing the emerging science of lifestyle change for adults with serious mental illness.

Peer-group lifestyle interventions are gaining traction as potentially scalable solutions to curbing the obesity epidemic in the general population (Leahey et al, 2012), and there is an increasing demand for health-related peer support groups in mental health settings (SAMHSA, 2015). There is untapped potential for mobile health (mHealth) technologies to enhance self-monitoring and promote peer support for weight loss. The potential for mHealth is especially relevant in mental health settings, where use of emerging technologies is rapidly increasing (Firth et al, 2016), but access to providers is often limited. Novel intervention approaches combining peer support and widely available technologies have the potential to produce effective and scalable solutions to addressing obesity in mental health settings.

In a prior proof of concept study we demonstrated the initial feasibility of a group lifestyle intervention for individuals with serious mental illness designed to facilitate peer-to-peer support for health behavior change through experiential and collaborative learning and the use of smartphones, wearable activity tracking devices, and Facebook to reinforce physical activity, healthy eating, and group participation between sessions (citation, 2015). Peer-to-peer support was operationalized as non-hierarchical, mutually beneficial relationships where participants with the same health goals share personal successes and challenges and support one another with health behavior change. The purpose of the present study was to evaluate the preliminary effectiveness of the peer-group lifestyle intervention on weight and fitness outcomes. A secondary focus was to explore the association between weight loss and peer-group social support.

Methods

This study was conducted in collaboration with an urban community mental health center in southern New Hampshire. The research was approved by the Committees for the Protection

of Human Subjects at Dartmouth College and the New Hampshire Department of Health and Human Services. Participants were age 21 or older; had a chart diagnosis of schizophrenia, schizoaffective disorder, major depressive disorder, or bipolar disorder; on stable pharmacological treatment defined as receiving the same psychiatric medications over the prior 2 months; and had obesity defined as body mass index (BMI) ≥ 30 . Excluded persons had medical contraindication to weight loss; pregnant or planning to becoming pregnant within the next 6 months; prior or planned bariatric surgery; primary diagnosis of dementia or significant cognitive impairment defined as a Mini Mental Status Exam score < 24 (Folstein et al, 1975); current participation in another weight loss or fitness program; or current diagnosis of an active alcohol-use or substance-use disorder. Participants received medical clearance from a primary care provider to participate in the exercise component of the program.

Recruitment occurred between October 2014 and June 2015. Research staff described the study to referred individuals and invited them to attend a screening appointment at the mental health center to verify that they understood the study and procedures. Interested individuals provided written informed consent and were paid \$20 for completing baseline and post-intervention assessments, but not for participating in the intervention.

The 24-week peer-group lifestyle intervention consisted of: (a) once weekly one-hour group weight management sessions facilitated by two lifestyle coaches; (b) twice weekly (optional) one-hour group exercise sessions led by a certified fitness trainer; and (c) mHealth technology and social media to increase motivation and facilitate self-monitoring and peer support outside of treatment sessions. Ten to 12 participants were enrolled in each of three groups.

The peer-group weight management component was modeled on the evidence-based Diabetes Prevention Program (Kramer et al, 2009). The goals were to achieve 5% weight reduction and to increase physical activity gradually to 150 minutes per week over a 6-month period. Two lifestyle coaches taught principles of healthy eating and exercise using an experiential and collaborative learning process that, in contrast to didactic lectures, was facilitated through group discussion, team building activities, and hands-on participation in group problem solving activities tied to real world challenges with health behavior change. Learning experiences were structured to empower participants to take initiative, make decisions, and to be accountable to the group for results. Participants worked together to develop plans to apply new information about healthy eating and exercise in their daily lives. Session activities were designed to facilitate peer-to-peer cooperation and create a supportive network for weight loss. For example, to help address concerns about the high costs of healthy foods participants used weekly circulars from local grocery stores to plan shopping lists that incorporated sale items on fruits and vegetables, lean protein, and other healthy items. In another session (“Making Friends with Food”) participants worked in pairs using easel pads and markers to create presentations to the entire group on how food can be a positive (rather than a negative) force in overcoming obesity by supporting healthy choices and bringing together friends and families. Lifestyle coaches attended an initial 2-day training, weekly supervision sessions, and twice-monthly follow-up training on the mobile technologies used in the intervention.

Twice-weekly optional group exercise sessions were led by a personal fitness trainer who was hired from a local fitness facility (i.e., YMCA) to teach the classes to participants at the community mental health center. Exercise sessions started at a level appropriate for sedentary persons, with gradual increases in duration and intensity. The sessions focused on combining strength and cardio training using resistance bands, body weight, and intervals (e.g., jumping jacks). Brisk walking on a nearby bike path was incorporated into exercise sessions as often as possible. The group exercise sessions gave participants an opportunity to reach their weekly physical activity goals by working out together in a fun and supportive environment.

The mHealth technology component was designed to facilitate and reinforce self-monitoring and to allow participants to virtually connect and support each other as peers towards achieving healthy lifestyle goals outside of group sessions. Participants were provided smartphones to access a “private” Facebook group, use Fitbit wearable activity tracking devices, and receive text messages reminders about program activities. The “private” Facebook group supported an online peer network where participants could interact and share personal successes and challenges with meeting weight loss and physical activity goals. Participants were provided Fitbit Zip wearable accelerometers to track steps walked each day and track progress over time and set daily step goals using the companion smartphone application. Participants also received 2–3 text messages per week from the lifestyle coach, which included reminders about weight management and exercise sessions and encouraging messages to help motivate participants to engage in healthy behaviors throughout the week.

Participant outcomes included weight loss, BMI, and cardiorespiratory fitness. Weight was measured in pounds (lbs.) on a flat, even surface using a calibrated digital scale. Change in weight (lbs.) was calculated as the proportion of participants who achieved clinically significant 5% decrease from baseline weight. BMI was calculated by the formula: Weight (kg)/Height(m)². Cardiorespiratory fitness was assessed with the 6-Minute Walk Test (6-MWT), which measures the distance (feet) an individual can walk in six minutes (Larsson et al, 2008). In obese adults, the 6-MWT is a reliable and valid measure of cardiovascular fitness with favorable test-retest and discriminant validity (Beriault et al, 2009; Larsson et al, 2008). An increase in distance of >50 meters on the 6MWT is associated with clinically significant reduction in risk for cardiovascular disease (Rasekaba et al, 2009). Therefore the proportion of participants who achieved >50 meter increase on the 6-MWT over the study period is reported.

An adapted version of the 10-item Social Provisions Scale was used to measure perceived peer group support (Caron, 2013). Participants responded to each of 10 statements (1=Agree to 4=Strongly Agree) as it pertained to current relationships with group members. An example item included: “There are people in the group I can depend on to help me if I really needed it.” Paired sample t-tests were used to test differences between baseline and post-treatment scores for primary outcome measures. Pearson product-moment correlation coefficient was calculated to examine the association between peer support and weight loss.

Results

Of 100 clients approached for this study, 34 declined and 29 were excluded because they did not meet eligibility requirements for the following reasons: (n=7) medical contraindications to weight loss (e.g., heart conditions, bariatric surgery, medical instability); (n=6) lack of transportation to program; (n=5) active substance abuse; (n=5) BMI < 30; (n=4) did not meet serious mental illness diagnostic criteria; (n=1) did not meet the Mini Mental Status Exam criteria; (n=1) currently enrolled in another weight loss or fitness program. Thirty-seven participants completed a baseline assessment. A secondary review of eligibility requirements indicated that five participants had medical contraindications to weight loss (e.g., heart conditions, bariatric surgery, medical instability). Baseline demographic data is reported for 32 participants who were allocated to the intervention (Table 1). Seven participants did not complete follow-up assessments for the following reasons: (n=1) pregnancy; (n=1) active substance use; (n=1) hospitalization; (n=2) lost to follow-up; and (n=2) not interested. Post-intervention data was collected for 25 participants. Among the 25 participants who completed the study the average number of weight management sessions attended was 16 out of 24 possible sessions (median = 18 sessions) over the study duration. Participants attended an average of 11.2 (SD=12.8) of the optional group exercise sessions, resulting in a 28% attendance rate at the optional group exercise sessions over the study duration. All (100%) of the participants used the Fitbit and 76% used the private Facebook group.

Most (72%) participants lost weight, including 28% achieving clinically significant weight loss. Weight loss was significant (mean±SD weight loss of 7.76±12.4 pounds)($t=3.12$, $df=24$, $p=.005$). BMI decreased significantly (mean±SD BMI decrease of 1.25±1.99 kg/m²) ($t=3.13$, $df=24$, $p=.005$). Seventeen-percent of participants showed clinically significant improvements in cardiovascular fitness defined as >50 meter increase on the 6-MWT, however, overall change in fitness was not significant (mean±SD 6-MWT increase of 74.78 ±205.1 feet ($t=-1.74$, $df=22$, $p=.09$)). Finally, weight loss was significantly associated with perceived peer-group support ($r(24) = .59$, $p = .002$).

Discussion

To our knowledge, this is the first evaluation of the preliminary effectiveness of a lifestyle intervention that uses experiential and collaborative learning techniques and popular technologies to create and facilitate a peer support network to promote weight loss in obese adults with serious mental illness. Most participants lost weight, including 28% achieving clinically significant weight loss, and weight loss was significantly associated with perceived peer support. A subgroup of participants showed clinically significant improvements in cardiorespiratory fitness; however, there were no significant changes in fitness.

A series of randomized trials of lifestyle interventions have shown that people with serious mental illness can achieve clinically significant weight loss through behavioral changes in diet and exercise (Bartels et al, 2015; Daumit et al, 2013; Green et al, 2015). This study builds on prior research by demonstrating the potential effectiveness of a novel intervention approach to facilitating a peer support network for health behavior change with weight loss results that are consistent with earlier studies with similar populations. For example, in a

large randomized trial of a behavioral weight loss intervention for adults with serious mental illness, Daumit and colleagues reported that 63.9% of participants had a weight at 18 months that was at or lower than their baseline weight (Daumit et al, 2013). In the present pilot study, 72% of participants lost weight during the six-month study period. With respect to clinically significant weight loss, a prior pilot study of the Diabetes Prevention Program for adults at community mental health centers reported that 22% of participants in the intervention group lost at least 5% of their initial body weight after the 16 week program (Srebnik et al, 2015). In the present study, 28% of participants achieved a clinically significant weight loss after 24 weeks of program participation.

The intervention was delivered entirely in a group format without access to one-on-one weight management counseling or guidance from dietitians. The weight management sessions were structured to empower participants to take initiative, make decisions, and to be accountable to the group for results. Lifestyle coaches provided basic information about healthy eating and exercise, and encouraged participants to turn to each other for social support for health behavior change. Engaging and dynamic group exercise sessions were designed to promote teamwork, and social media was used to encourage peer interactions and support outside of treatment sessions.

Participants may have been compelled to pursue weight loss goals in part because they felt connected to and supported by similar others who were making the same behavior changes to lose weight. A prior study of social influence on weight loss among adults in the general population has shown that individual weight-losses in a team-based weight loss program were influenced by the weight losses of others on the team (Leahey et al, 2012), which the authors speculated could be a result of the development of shared norms (i.e., shared beliefs about what is socially acceptable) or social modeling of healthy eating, physical activity, and weight loss intentions. However, the link between perceived peer support and health behaviors necessary for weight loss in people with serious mental illness is not fully understood. Future qualitative research could play an essential role in exploring the impact of peer support on health behavior change among individuals with serious mental illness enrolled in lifestyle interventions.

Empowering participants to create a peer network where they can learn from and support one another in the weight loss process through a brief period of professionally facilitated group sessions combined with popular technologies they can access 24-hours a day has the potential to produce an effective and scalable solution for lifestyle interventions in mental health settings. Helping individuals with serious mental illness transition from intensive lifestyle coaching to ongoing support from peers for health behavior change could allow greater reach of health promotion services targeting this high-risk group. Future research planned for a larger trial will examine long-term follow-up after the six-month lifestyle intervention when participants must rely on one another for ongoing informational, appraisal, and emotional support for healthy eating and exercise behaviors necessary for weight loss and maintenance of weight loss.

In the current pilot study we provided participants with smartphones to ensure that all participants had access to the mobile technologies and social media that were core

components of the intervention. A meta-analysis of recent studies of cell phone ownership among people with psychosis reported an overall rate of 81.4% among people surveyed since 2012, with rates of smartphone ownership averaging 49% across studies (Firth et al, 2016). In a recent survey of individuals with schizophrenia, 56% reported using a privately owned cell phone to send and receive text messages and 48% had access to the Internet (Miller et al, 2015). These studies indicate that many people with serious mental illness are using mobile phone technologies in their daily lives, and this is expected to increase in the near future as devices and plans become more affordable and widely available (Firth et al, 2016). The lifestyle intervention model evaluated in this study has the potential for future scalability given the trend toward increasing use of emerging technologies in high-risk populations.

Limitations include generalizability and inadequate statistical power. Our self-selected sample was small and racially and ethnically homogeneous, thus limiting generalizability of the findings. How differences in variables related to culture, race, and ethnicity might have an impact on the intervention in a more diverse sample of people with serious mental illness is unknown. Furthermore, due to the small sample size we were unable to conduct subgroup analysis examining factors such as psychiatric diagnosis and medication use. Future research should consider whether these variables are associated with clinically meaningful outcomes such as weight loss or improved fitness. The pilot study was designed to evaluate preliminary effectiveness of the intervention, thus results should be interpreted with caution. We were not able to determine whether and to what extent any of the specific intervention components (e.g., exercise groups, mHealth technology, or social media) had an impact on health outcomes. Future studies with larger sample sizes and randomized designs are needed to evaluate the effectiveness of peer-group lifestyle interventions and their specific components in improving health outcomes for individuals with serious mental illness affected by obesity.

Conclusions

Obesity is highly prevalent among people with serious mental illness. The next generation of lifestyle interventions designed for mental health settings must be scalable and time-limited to curb the obesity epidemic in this population. Capitalizing on the potential of peer-to-peer support and leveraging existing popular technologies to promote health behavior change is a promising approach to lifestyle interventions for persons with serious mental illness. Future randomized trials are needed to determine the effectiveness of peer-group lifestyle interventions enhanced with smartphone technology, wearable devices, and social media to reduce obesity-related cardiovascular risk in mental health settings.

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Table 1

Demographic, Clinical, and Background Characteristics of Participants

Characteristics	% or M±SD	N
Age (M±SD)	48.8 ± 11.9	32
Weight (M±SD lbs.)	228.9 ± 41.9	32
Body mass index (M±SD)	37.7 ± 7.9	32
Gender (female)	56%	18
Race (white)	97%	31
Psychiatric Diagnosis		
Schizophrenia spectrum	22%	7
Major depression	44%	14
Bipolar disorder	34%	11
Educational level		
Completed High School or GED	47%	15
Some College or Technical School	38%	12
Completed College Degree	16%	5
Marital status		
Never married	41%	13
Currently Married	9%	3
Separated or Divorced	47%	15
Widowed	3%	1
Current living status		
Independent	81%	26
Living with family	16%	5
Assisted Living	3%	1