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Improving lifestyle interventions for people with serious mental illnesses: Qualitative results from the STRIDE study

Bobbi Jo H. Yarborough, PsyD, **Scott P. Stumbo, M.A.**, **Micah T. Yarborough, M.A.**, **Thomas J. Young, B.S.**, and **Carla A. Green, Ph.D., MPH**

Abstract

Objective—Individuals with serious mental illnesses are disproportionately affected by overweight and obesity. Understanding the factors that facilitate or hinder lifestyle change in this population could lead to better interventions and improved health outcomes.

Methods—A subset of intervention and usual-care participants (n = 84) in the STRIDE randomized trial were interviewed at 3, 9, and 18 months, yielding 101 interviews (some were interviewed more than once). Participants had a mean age of 48.1 (SD = 10.1); 64% were female. Participants had diagnoses of schizophrenia or schizoaffective disorder (41%), bipolar disorder (20%), affective psychoses (37%) or PTSD (2%). Interviews were transcribed verbatim, coded using Atlas.ti, and analyzed for common themes.

Results—Barriers to behavior change were similar to those described for the general population, including lack of support from significant others, the lure of unhealthy foods, and poor weather impeding exercise. Additional challenges included the effects of psychiatric symptoms, or consequences of symptoms (i.e., social isolation), on ability to make and sustain lifestyle changes. We found a strong preference for ongoing, group-based support to foster a sense of accountability which motivated and helped to sustain behavior changes.

Conclusions and implications for practice—Individuals with serious mental illnesses encounter many of the same barriers to weight loss seen in the general population, but they may be more vulnerable to additional obstacles. Lifestyle change interventions for this population should help participants develop the ability to iteratively cope with fluctuating mood and subsequent changes in motivation to eat healthfully and exercise regularly.

Keywords

serious mental illness; lifestyle change; weight loss; exercise; barriers; facilitators

Introduction

Overweight and obesity are widespread problems (May, Freedman, Sherry, & Blanck, 2013), but are disproportionately prevalent among individuals with serious mental illnesses (Allison et al., 2009). Lifestyle change interventions effectively facilitate weight loss,

Corresponding author: Scott P. Stumbo, Kaiser Permanente Northwest, Center for Health Research, 3800 N. Interstate Ave., Portland, OR 97227, scott.p.stumbo@kpchr.org, (503) 528-3934.

including among this group (Bartels et al., 2013; Daumit et al., 2013; Green et al., 2015; Hjorth, Davidsen, Kilian, & Skrubbeltrang, 2014). Such interventions are helpful because they address access to and affordability of healthy foods, safe places to exercise, and education and skills that support attempts to lose weight and improve and maintain health. This type of approach may be particularly important for individuals with serious mental illnesses who are more likely to have less access to healthy foods (Drewnowski, 2012), limited autonomy over food choices when living in controlled environments (Lowndes, Angus, & Peter, 2013), poorer nutrition and sedentary lifestyles (Casagrande et al., 2011; Janney et al., 2013; Kilbourne et al., 2009), unhealthy social environments (Aschbrenner et al., 2013), psychiatric medications that cause weight gain (Chaggar, Shaw, & Williams, 2011; Newcomer, 2005, 2007), and mental health symptoms (Aschbrenner, Mueser, Bartels, & Pratt, 2013; Pearsall, Hughes, Geddes, & Pelosi, 2014) and associated cognitive impairments (Vohringer et al., 2013) that may affect lifestyle change efforts.

Because lifestyle modification interventions have only recently been adapted for overweight people with mental illnesses, we have little information on the experiences of those participating in these interventions, including what motivates them to change their lifestyles, what enables adoption of healthier habits, which components of interventions are most valued, and what additional resources and supports are needed to further maximize benefit. Better understanding the factors that facilitate or hinder lifestyle change among individuals with serious mental illnesses could lead to improvements in these programs and to better health outcomes.

As part of a 24-month study of the STRIDE weight loss and lifestyle-change program for adults taking antipsychotic medications (Yarborough, Leo, Stumbo, Perrin, & Green, 2013), we interviewed a sample of study participants at three time points to assess lifestyle change barriers and facilitators across the first 18 months of study participation. Our objective was to identify modifiable factors associated with making and maintaining healthy lifestyle changes in order to inform clinicians and improve the development of future interventions for individuals with serious mental illnesses.

Methods

As part of a process evaluation of the STRIDE mixed-methods randomized control trial (Yarborough et al., 2013), we conducted qualitative interviews with intervention and control group participants at 3, 9, and 18 months (mid-way through the intensive phase of the intervention; mid-way through the maintenance phase; 6 months after the intervention ended). The STRIDE intervention was an adaptation of the PREMIER comprehensive lifestyle intervention (Appel et al., 2003; Funk et al., 2006) that promoted the DASH dietary eating pattern (Ard et al., 2004) and was tailored for individuals taking antipsychotic medications.

STRIDE participants were at least 18 years of age, stable on antipsychotic medications for at least 30 days, and had a BMI≥27. An initial mailing to 1,866 potential participants yielded 739 refusals, 511 who screened ineligible, and 208 who we could not reach. Those interested in the study (n=408) participated in a screening visit. We excluded anyone who was

pregnant or planning a pregnancy during the study period, enrolled or planned to enroll in a weight-reduction program, planning or had completed bariatric surgery, or had cognitive impairment that prevented informed consent. Participants were recruited from Kaiser Permanente Northwest, an integrated health plan providing comprehensive medical and behavioral health care for nearly 500,000 members, and from three large, publicly funded community mental health clinics providing outpatient behavioral health services to more than 28,000 low income individuals in the Portland, Oregon metropolitan area.

Two hundred participants were randomized to intervention or control conditions. The intervention consisted of 24 weekly meetings that targeted readiness to change; included interactive, participant-centered delivery of lifestyle education information along with a 20-minute walk; encouraged skills practice, self-monitoring and feedback; and facilitated group interactions and support. Intervention participants could consult with interventionists by telephone as needed. Participants were encouraged to keep detailed weekly logs of calories consumed, exercise, and sleep (materials available at: http://www.kpchr.org/research/public/stride/stride.htm). These were similar to food logs used in PREMIER (Appel et al., 2003; Funk et al., 2006). Interventionists reviewed logs with participants weekly and gave feedback. Six monthly group maintenance sessions followed the weekly meetings. All sessions were co-led by a mental health counselor and another interventionist familiar with nutrition interventions. All participants completed questionnaires, laboratory and anthropometric measures, and were weighed at baseline, 6, 12, and 24 months. The protocol (Yarborough et al., 2013) and main outcomes (Green et al., 2015) are described elsewhere. The study was approved by the Kaiser Permanente Northwest Institutional Review Board. All authors certify responsibility for the content of this article and declare that they have no known conflicts of interest.

Interviews addressed efforts to change eating habits, increase exercise, and lose weight, and explored barriers to and facilitators of those changes. Intervention arm participants were also asked specifically about engagement with the intervention. Control participants were interviewed to understand general (non-intervention related) lifestyle change barriers and facilitators.

The intervention was delivered in eight cohorts and we attempted to select ten intervention participants and three control participants from each cohort for interviews. We also oversampled minority group members at each time point and balanced the 3-month interview sample on BMI category (27–34.9, ≥35), the stratification criteria used for randomization. For the 9-month interviews, we calculated weight change from baseline to 6 months; at the 18-month interviews we calculated 12-month weight change, sampling from those who had lost or gained weight in order to gather information from people with differential experiences. We attempted to contact 91 participants and were unable to reach three, three more agreed to the interview but did not complete the interview despite efforts to reschedule. Table 1 summarizes the number of participants interviewed at each time point as well as the phase of the intervention during which the interview took place. We interviewed participants in the control arm once; 17 intervention participants were interviewed more than once to ensure that all cohorts were represented in each interview wave (some cohorts were small).

Master's- and doctoral-level research staff conducted the interviews, which were 30–60 minutes long and were audio-recorded and transcribed verbatim. Participants received $35 gift cards for completing interviews.

The research team read transcripts throughout data collection to ensure accuracy, then developed a general descriptive coding scheme. Code definitions included examples of text generated after careful reading of a subset of transcripts. Analyses for this report were based on text coded, using Atlas.ti (Friese, 2011), with the broad descriptor "barriers and facilitators." Coded text was further reviewed for subthemes and explanations of: 1) how and why specific barriers and facilitators affected participants, and 2) circumstances under which barriers and facilitators were encountered. To ensure rigor, we completed check coding on 15% of the transcripts, achieving 79% agreement between primary and secondary coders. We also reviewed discrepancies, sought disconfirming cases, and involved investigators with different academic backgrounds in analyses and interpretation (Creswell, 1998).

Results

Participants

Table 2 describes characteristics of the 84 study participants we interviewed. Interviewees averaged 48 years old; 36% were men, and 21% were members of racial or ethnic minorities. Participants had diagnoses of schizophrenia or schizoaffective disorder (41%), bipolar disorder (20%), affective psychosis (37%) or PTSD (2%). Forty-six (55%) were from Kaiser Permanente cohorts and 38 (45%) were from community mental health centers. BASIS-24 depression subscale scores averaged 1.7 (SD=1.0) and psychosis subscale scores averaged 0.84 (SD=1.0). The demographics of the qualitative sample roughly matched the full sample (Yarborough et al., 2013) with the exception of having more males and non-whites, both as a result of purposeful oversampling.

Thematic Analyses

We identified 12 themes in our analyses of lifestyle change barriers and facilitators, described below. Barriers tended to be consistent across intervention and control arms, and stable across time. Facilitators related to participation in the intervention diminished over time as the intensity of the intervention waned.

Motivation for joining the study and making lifestyle changes

Theme 1: People with serious mental illnesses are concerned about physical health, especially obesity-related adverse effects of psychiatric medications: Reasons for wanting to enroll and participate in STRIDE did not differ by study arm. The most commonly mentioned reasons for wanting to lose weight were current health (or perceived future health risk status) and perceived potential for weight gain, particularly as a result of taking psychiatric medications.

On the topic of health and health risks, one participant who was worried about her family history of diabetes, said "*One of the reasons why I wanted to be part of this study was to be*

healthier… My dad was a big guy and he developed diabetes, and he had to have surgeries and all kinds of stuff. I don't want to do that later in life. You know, I'm trying to avoid getting diabetes. I don't want to have to go through any weight loss surgery and stuff like that. That's stuff I worry about"; (intervention arm, 9 months). Recently receiving health news was also a motivator for another participant: "*Finding out that I'm a borderline diabetic…about six months ago…was also a push too";* (control arm, 3 months).

Some STRIDE participants felt that the intensity or rapidity of their weight gain on psychiatric medications necessitated action. *"When I went on Zyprexa I gained a hundred pounds, very quickly. And that was really frustrating for me, because I had worked really hard to get me down to where I was";* (control arm, 3 months). Another participant noted that she was *"hoping to get some kind of control over my weight. I have been on medications that have severely increased my weight…And just hoping and praying that this will…work. Even if I don't necessarily lose so much weight, but just living healthier, eating healthier, being healthier is enough";* (intervention arm, 3 months).

Themes in common with those who do not have mental health problems—

Early in analyses, we noted that many participants' experiences with lifestyle change barriers and facilitators were similar to those reported in lifestyle change studies in other populations. We detail these common themes here:

Theme 2: Living with family members who did not support healthy lifestyle change was a significant barrier: Family members who did not support improved lifestyle were particularly problematic when it came to making dietary changes or managing tempting foods. Temptation to eat junk food and exposure to unhealthy eating among family members were commonly noted: "*My husband verbally supports me but he eats whatever he wants to eat and has it in the house*"; (intervention arm, 9 months). Social gatherings also presented barriers: *"If I'm at my mom's place then she usually has some food out there…[and] my wife likes to go out to McDonald's quite a bit. Social situations where I'm encouraged to eat… restaurants often offer huge portions. Gatherings with relatives on any kind of holiday…It's easier for me not to eat at all than to eat moderately;"* (intervention arm, 9 months).

Theme 3: Unhealthy foods have enticing, pleasing flavors, even if healthy foods taste good too: Participants reported various ways that the pleasant flavors of unhealthy foods presented barriers to healthier eating choices. It is noteworthy that the desire for pleasant-tasting but unhealthy foods was distinct from the *dislike* of healthy foods. In fact, some participants said they enjoyed eating healthy foods as a result of their participation in the intervention: *"I'm finding out that I like some things that I didn't think I'd like. You know, like....more vegetables, more fruit. Ever since the program, I think I've ate a lot more of that kind of stuff than I have in years"*; (intervention arm, 18 months). Nevertheless, many more interviewees mentioned the lure of unhealthy foods: *"I'm not using anything [learned in the program] now...I decided I like eating badly"*; (intervention arm, 18 months).

Theme 4. Bad weather interferes with the best-laid plans for exercise: The most commonly named barrier to physical exercise was bad weather, mentioned by many participants, across all interview time points. "*I'm kind of an all or nothing person. And the*

weather holds me back. I count on walking outside a lot…in the spring it was so beautiful that I was out walking and focusing on my diet. And then I got sloppy with that. I don't like to walk in the mall, and I don't like to walk in the cold, the rain"; (intervention arm, 3 months).

Theme 5. Positive attention related to weight loss reinforces lifestyle changes: Receiving positive attention for weight loss was a common facilitator that fortified change efforts. One woman said "*My family is starting to notice that I'm losing weight. I like the positive comments…I feel like I've got more energy and more motivation to do stuff*"; (intervention arm, 3 months). For another participant, continued weight loss or maintaining weight during the less intensive phase of the intervention helped keep up momentum: "*The reinforcement of coming in and having [group leader] weigh me, write it down. Once in a while we would get graphs of how much weight we lost, and mine was always going down";* (intervention arm, 9 months).

Barriers that may carry more significance among people with serious mental illnesses than among others

Theme 6: Depressive symptoms interfere with lifestyle change efforts: Certain barriers, while also commonly observed in the general population, appeared to be more detrimental to behavior change efforts in our sample of individuals with serious mental illnesses. In our sample, mental health symptoms were mentioned as barriers to both healthy eating and regular exercise. A link between depression and poor eating choices was typical: *"I was just feeling really horrible. And I make bad food choices when I'm feeling really horrible, which gets me more depressed, you know? And it's kind of a cycle";* (intervention arm, 3 months). Another said, *"The more symptomatic I get, the harder it is to get myself out of the house to do stuff…And I'm trying to exercise because it helps clear my head of stuff";* (intervention arm, 9 months). Still another noted the difficulty of enacting lifestyle changes when depressed: *"It's hard to make changes in your diet and follow the routine…when you're at a point where you just don't care"*; (intervention arm, 3 months).

Theme 7: Lack of motivation or weariness interferes with ability to consistently adhere to behavior change plans: Another common response across participants was what they called "laziness," generally described as a lack of motivation or a weariness that came with having to maintain the effort that dietary changes and regular exercise require. *"Yeah, laziness. [Chuckles] You know what I mean? Sometimes I just don't feel like making something nutritional. So I'll have a bowl of cereal with sugar on it";* (intervention arm, 3 months). Another participant said: *"I just get lazy sometimes. I just don't want to do it, so I sit on the couch and watch TV"*; (intervention arm, 9 months). This feeling is not uncommon among those attempting to lose weight generally, nor is it unique to our sample. However, among people managing serious mental illnesses, this weariness might represent, be the result of, or be worsened by anhedonia, avolition, fatigue, or general emotional resource drain that can accompany chronic or recurrent mental illness.

Theme 8: Friends help facilitate exercise but loss of exercise buddies can inhibit exercise motivation: Several participants described how exercise motivation interacted with

social support, and it was common for participants to mention loss of external exercise motivation when exercise partners were not available: *"…having a buddy to walk with helps a lot. You can talk while you're walking and it doesn't seem like it is taking so long to do the walk. So that helps. That's one of the reasons why I do it with my friend. When I'm at home I don't have anybody to walk with. So there's not so much of a reason to do it";* (intervention arm, 9 months). To the extent that one's mental illness has resulted in social skills deficits or social isolation, accountability to a group and social support that make it easier to receive encouragement and reinforcement for healthy behavior may be particularly important. Another participant said, *"I used to exercise with a group of people, and we just always met at the gym all the time. We gave each other a lot of support and stuff, and had a really good time. That was when I lost quite a bit of weight during the time. [Now] I don't have a friend that I like [to] exercise with"*; (control arm, 3 months).

Primary facilitators of lifestyle changes—As with many other themes found in these analyses, we found facilitators of lifestyle change in our sample that are also reported by individuals without mental health problems.

Theme 9: Active engagement in the intervention and accountability to the group are key facilitators of lifestyle change: The most important facilitator of dietary changes and increased exercise was active engagement in the intervention. Attendance at the weekly group sessions, along with turning in a weekly food and exercise log and being weighed, were important motivators for the majority of intervention participants. Several people noted that accountability to self, to other group members, and to group leaders is what led to behavior changes. For example, one participant reported: "*Well, just knowing that I want to be accountable, because I don't want to disappoint the group or…myself, I guess*"; (intervention arm, 3 months). Another participant noted: "*The accountability of being part of the group is very important…I had pretty much given up on trying to get to a reasonable weight. And I looked at this as one last shot at trying to do that…The group has been very supportive, and I appreciate that… meeting once a week and comparing notes with people, and knowing that I'm not alone with all these obstacles, and that there are people that care*"; (intervention arm, 3 months).

Theme 10: Group walks support exercise motivation: Group facilitation of exercise was also important; participants liked the 20-minute walk that was part of each intervention session. Several participants noted feeling accountable to exercising with the group: "*[T]he walking [is helpful]. The exercise portion of the group, that can get set on the back burner. And I don't think it should be. It's enjoyable just to get to talk to people and get the support of exercise";* (intervention arm, 3 months).

Theme 11: Learning about nutrition and calories fills knowledge gaps; logging food, exercise, and sleep is instructive: Finally, the nutritional education and behavioral monitoring components of the intervention facilitated changes in eating habits for some participants. "*It was the food section [of the intervention], teaching me how to cook healthier. That helped. The rainbow helped. Shopping the perimeter helped. You learned different tricks of the trade to eat healthier. And what was helpful was label reading too, as*

far as eating healthier goes." From another participant, "*I think the greatest help has just been the repetition and just kind of instilling that in my mind. Because before, I was raised where it was like meat and potatoes and chocolate cake for dessert. Vegetables were on the table at Thanksgiving and Christmas. So…I learned that when it's like that, it's really hard, at the store, to consciously say 'I need fruits and vegetables' because I'm not used to eating them. So it actually takes a big, conscious decision for me to go in to that area.*" Though food logs were unpopular with some individuals, the participants who found them helpful described how the logs helped them to count calories and track their eating. "*As much as I do not like saying this, the weekly records really, really help...it's quick, it's easy…I think a lot of problems that I had before with portion control and serving size [are] not happening now. And I really like that the weekly records are not just about food. I've got, on the same page, my sleep and my exercise. I think that really balances it. Instead of just being about food";* (intervention arm, 3 months). Another participant said, "*The food logs were helpful to me… When you have to write it down on paper and you can see that one item has eight hundred or a thousand calories on it, and that is almost all of your calories in one meal, it kind of surprises you*"; (intervention arm, 3 months).

Theme 12: Without the facilitators of accountability, camaraderie, and structured support, maintaining healthy behavior is difficult: The waning intensity of the intervention itself—from weekly to monthly meetings to no meetings—commonly triggered backslides in eating and exercise habits. At 9 months, one participant noted "*It's not the same as when we were meeting weekly…You know, after about two weeks I sort of fall off the horse and start going back to my old habits. And then a week later [as the monthly meeting approaches] I'll try to improve on it*"; (intervention arm). Another, looking ahead to when even the monthly meetings would cease, said "*I'm a little leery about this next year where there's basically nothing…It's kind of scary. It's kind of a big jump-off place, even though when we went to once a month it felt uncomfortable from every week*" (intervention arm, 9 months). Several participants noted at the 9-month interview that meeting only once a month made it very difficult to keep up with changes they had made during the first six months of weekly meetings such as keeping up with food logs and recommended dietary changes. In particular, participants felt less accountable: "*You know, when you're here every week you're more accountable. Once a month, it's tough*"; (intervention arm). By 18 months, accountability was even harder to maintain: "*It's challenging. It was helpful when I had the group, especially when we met every week. It was good to get that interaction and reinforcement from the group. So now…it's a little difficult*" (intervention arm).

For many, exercise decreased over time without the facilitation of group support. A participant, frustrated by gaining much of her weight back by 18 months, said "*Less exercise. I don't know...I never really exercised an awful lot. I rode my bicycle and tried walking a little bit, but that was always my weakest part of the program. And now it's virtually nonexistent";* (intervention arm). One participant noted that he had not kept up with the exercise regimen established during the group sessions: "*I could be exercising. But it's hard to do by myself…I really liked the walks…when I attended group. Walks by yourself can kind of get…boring*"; (intervention arm, 18 months).

Participants reported more consistency in keeping food logs early in the study period and significantly less at 18 months. The perceived importance of the food logs to future weight loss remained for some participants, however, even if their actual use had declined precipitously. At 9 months one man noted: *"Well, it wasn't until I started writing things down that I realized my intake was terrible. It was like two, three or four thousand [calories] every day. And, I haven't been journaling. I haven't written stuff down in the last few months. But, I know I'm eating too much still. And I know if I get back into writing everything down, it's going to help...the first thing on my list was keeping your food record, [it's] the biggest part of the whole thing. For me, that was very helpful"*; (intervention arm).

Discussion

Among individuals with serious mental illnesses enrolled in a study testing a comprehensive lifestyle change program, we found that lifestyle change efforts were motivated by current or future perceived health risks, often related to antipsychotic medication-induced weight gain. Our participants experienced many of the same barriers and facilitators of behavioral change as those identified by members of the general population (Hammarstrom, Wiklund, Lindahl, Larsson, & Ahlgren, 2014; Ruelaz et al., 2007; Shuval et al., 2013; Toscos, Consolvo, & McDonald, 2011), though we also identified barriers that appear more significant for individuals with serious mental illnesses or that may interact with psychiatric symptoms to make lifestyle changes more difficult to adopt or sustain.

STRIDE group facilitators reported that mental illnesses episodes disrupted engagement and participation in the study but few participants described specific psychotic symptoms that interfered with behavior change efforts despite reporting psychotic symptoms typical of individuals with serious mental illnesses in other day treatment and outpatient settings (Dickerson et al., 2013; Eisen, Normand, Belanger, Spiro, & Esch, 2004). In contrast, many described depression symptoms as important barriers to lifestyle improvements, consistent with a recent research report (Klingaman, Viverito, Medoff, Hoffmann, & Goldberg, 2014) indicating depression and stress were greater barriers to weight loss among those with schizophrenia than for those in the general population. Our participants commonly described how depressive symptoms negatively influenced their ability, motivation, and willingness to control eating choices and portions, and their ability to motivate themselves to exercise. Moreover, participants described how depressed mood co-occurred with disinhibited eating (i.e., the tendency to overeat without restraint, sometimes considered "opportunistic" eating) perpetuating a cycle of unhealthy behavior.

In addition, lack of desire to continue eating vegetables, easy availability of cheap fast food, and disinhibition (i.e., lack of control), combined with enjoyment of high fat, unhealthy foods known from previous research to correlate with stress, depression, and anxiety (Bryant, King, & Blundell, 2008), while barriers also experienced in the general population (Klingaman et al., 2014; Lundgren, Rempfer, Lent, & Foster, 2014), were particularly prevalent in our interview sample.

Cognitive impairments in this population may also limit opportunities for successful lifestyle changes. These include limited ability to think flexibly; estimate perceived effort and

compare effort with its potential benefits (Gold et al., 2013); predict cues that lead to rewarding outcomes (Strauss, Waltz, & Gold, 2013); and make adaptive and goal-directed decisions (Brown et al., 2013; Heerey, Robinson, McMahon, & Gold, 2007; Mason, O'Sullivan, Montaldi, Bentall, & El-Deredy, 2014; Waltz, Frank, Wiecki, & Gold, 2011; Waltz & Gold, 2007). We did not measure cognitive impairment directly, nor ask specifically about it in the interviews but were struck by the frequency with which participants spontaneously mentioned these kinds of difficulties in their discussions of lifestyle change barriers. All-or-nothing thinking (a maladaptive thinking style, typically associated with depression, but not uncommon in schizophrenia) (Grant & Beck, 2009) was common among interview participants, negatively influencing dietary changes and exercise. Moreover, flexible cognitive restraint (having a less rigid and more relative approach to dietary self-regulation) was rare, limiting participants' ability to recover from dietary setbacks and maintain weight loss (Teixeira et al., 2010). Participants described how all-or-nothing thinking interacted with cost-effort analyses, leading many to avoid the perceived effort of adapting their exercise routine to accommodate bad weather or lack of exercise companions. Similarly, participants perceived that healthy eating was more costly and required more effort and cooking skills than unhealthy eating. Such assessments are not uncommon in socioeconomically disadvantaged groups, who are more likely than advantaged groups to believe that losing weight is expensive, not of high priority, and requires a lot of cooking skills (Siu, Giskes, & Turrell, 2011). These types of cognitive limitations may be important to address in future lifestyle interventions.

Limitations

Our sample was relatively small, though larger than similar qualitative studies (Jimenez et al., 2015). We purposely chose to look only at barriers and facilitators among people with serious mental illnesses enrolled in a lifestyle intervention, so results may not represent those who refused participation. Our study also only included individuals with mental illnesses, so we are unable to make direct comparisons to the general population. Finally, we did not directly measure behaviors like rigid thinking, or skills like cost-effort analysis, so our interpretations regarding the influence of these factors are based on our observations of study participants and analyses of interview text. They therefore suggest avenues for future research.

Conclusions and Implications for Practice

Our study revealed several areas where the effectiveness of lifestyle change programs tailored for individuals with serious mental illnesses may be improved. These include:

1. Assisting people to develop the ability to iteratively adapt to changes in mental health symptoms, particularly mood changes, and subsequent changes in motivation to eat healthfully and exercise regularly.
2. Enhancing estimation of effort and prediction of future health benefits. Participants described "laziness," as a lack of motivation resulting from the overwhelming effort required to make and then keep up with changes in eating and exercise habits. These issues may be a key factor in the limited success in producing long-

term sustainable weight loss (Ramage, Farmer, Apps, & McCargar, 2014). Future research should focus on the best ways to assist people with accurate cost/effort/benefit analyses and help them connect effort with immediate and long-term rewards.

3. Amplifying skills training related to developing flexible thinking, perhaps with a greater focus on the coping and planning necessary for successful health behavior change (Schwarzer, 2008). Other areas to explore include a heavier emphasis on cognitive restructuring focused on overcoming defeatist beliefs and negative expectancies (Couture, Blanchard, & Bennett, 2011) and reframing lapses as opportunities for improvement.

4. Developing meal preparation skills to enhance the palatability of healthy foods, particularly vegetables. As income and educational levels are relatively low in this population, low-cost cooking demonstrations may be particularly useful (Yarborough, Janoff, Stevens, Kohler, & Green, 2011).

5. Facilitating exercise to promote the social nature of activity. Exercise partners were important facilitators of exercise, while, conversely, not having an exercise partner was seen as a barrier by many. Other studies of the general population (Kruger, Blanck, & Gillespie, 2006) have shown the value of exercise partners, bolstering the idea that concurrent family or friend involvement in healthy lifestyle interventions would be beneficial to making changes in exercise and diet. In addition, peer health coaches have been shown to be effective in improving diabetes (Moskowitz, Thom, Hessler, Ghorob, & Bodenheimer, 2013; Thom et al., 2013) and other health outcomes (Druss et al., 2010), and could prove useful in this population where peer mentors and support are particularly valued.

6. Increasing options for exercise to accommodate variable weather. Because many people with serious mental illnesses have limited incomes, facilitating or supplying fitness-club memberships and training may be a cost-effective indoor alternative; results from the In Shape program support this approach (Bartels et al., 2013).

7. Establishing and maintaining active engagement in the lifestyle change program, including by the use of self-monitoring tools. As in the general population (Fitzpatrick et al., 2013), active engagement, including attending and receiving support at group intervention sessions, and keeping weekly monitoring records facilitated healthy changes. Similar to previous studies (Kruger et al., 2006), we found that keeping self-monitoring records was correlated with greater weight loss success (Green et al., 2015). Though self-monitoring tools were not universally popular, many participants endorsed their utility and linked them directly to their ability to monitor calories and lose weight.

8. Bolstering natural supports. Participants who reported that their family members were “on board” noted a significant improvement in dietary and exercise habits, demonstrating, as with other populations, that making lifestyle changes with close family involvement is helpful (Wing & Jeffery, 1999). Future research should

explore the best methods for involving supportive family and peers in lifestyle change efforts.

9. Continuing personal contact to sustain accountability for weight maintenance. For many, the accountability and support provided by the group made up for a lack of or inconsistent family or peer support, and helped overcome problems with motivation. We found a strong preference for two proven weight-maintenance components: continued personal contact in order to remain accountable to eating and exercise changes (Coughlin et al., 2013) and extending structured support during the weight-maintenance phase (Ross Middleton, Patidar, & Perri, 2012). These preferences are also supported by the newly released Guidelines for the Management of Overweight and Obesity in Adults (Jensen et al., 2014).

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Table 1

Interview time points throughout study period, topics covered and number conducted, N=101 interviews

Interview time point	Intervention arm phase	Intervention interviews		Control interviews[1]
		#	Repeat[2]	#
3 months	Midway through the intensive 6-month active phase of the intervention. Study participants were attending weekly meetings to educate and support lifestyle changes. Major goals were use of weekly food logs to track calorie intake and increased physical activity.	31	--	8
9 months	Midway through the second, less- intensive 6-month phase of the intervention. Monthly meetings to maintain lifestyle skills developed during the intensive phase and monthly telephone support.	25	4	8
18 months	6 months after active phase of intervention ended. No structured interaction with intervention participants.	21	13	8
Total		77	17	24

[1] No participants in the control arm were interviewed more than once.

[2] The number of interviewees in the intervention arm who were interviewed in a previous time point (e.g. 4 individuals were interviewed at 9 months who had been interviewed at 3 months).

Table 2

STRIDE interviewee characteristics at baseline, N=84

	Mean (SD)
Age	48.1 (10.1)
	N (%)
Male	30 (36%)
Ethnic or racial minority	18 (21%)
Recruitment site	
--Kaiser Permanente Northwest	46 (55%)
--Community mental health clinic	38 (45%)
Mental health diagnosis[1]	
--Schizophrenia	34 (41%)
--Bipolar disorder	17 (20%)
--Affective psychoses	31 (37%)
--PTSD	2 (2%)
Married or living with partner	34 (41%)
Smoked all of last year	20 (24%)
Income $0–$9,999[2]	25 (31%)
$10,000–$29,999	28 (35%
$30,000 or higher	27 (34%)
High school grad/GED or lower	29 (35%)
Some college/technical	37 (44%)
College graduate or higher	18 (21%)
Working[3]	22 (26%)
Disabled	34 (41%)
Retired, unemployed, student, homemaker, temporarily laid off, other	28 (33%)
Colorado Symptom Index (CSI)[4]	19.1 (12.6)
BASIS-24[5]	1.4 (.78)
--Depression/functioning subscale	1.72 (1.0)
--Psychosis subscale	0.84 (1.0)
SF-12 general health[6]	43.0 (10.1)

[1] Diagnoses were pulled from electronic medical records. All other items in table are based on self-report on baseline questionnaires.

[2] N=80 for income (4 declined to answer)

[3] Working, disabled and retired/others were mutually exclusive, self-reported categories in the baseline survey based on a single item “What is your current employment status?” Response options included: working, homemaker, retired, temporarily laid off, unemployed, disabled, student, other.

[4] We used the modified version of the CSI. Possible scores range from 1–56 with higher scores indicating more symptoms.

[5] BASIS-24 possible scores range from 0 to 4 with higher scores indicating more symptoms.

[6] SF-12 general health measure can have possible scores ranging from 0 to 100 and are normed to achieve means of 50 and standard deviations of 10 in the general U.S. population.