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BRIEF REPORT

Losing to Gain: The Effects of a Healthy Lifestyle Intervention on the Physical and Psychosocial Well-being of Clients in a Community-based Mental Health Setting

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Abstract
Individuals with severe and persistent mental illness (SPMI) encounter both poorer physical health and psychosocial well-being in comparison to the general population. Obesity, hypertension, heart disease, and diabetes can result from the symptoms of mental illness, the side effects from psychotropic medications, as well as disparities associated with being mentally ill. Mental health nurses are in a prime position to implement healthy lifestyle interventions (HLIs). This study tested a HLI (physical exercise and nutrition) and examined the effects on physical and psychosocial outcomes in clients obtaining mental health services at a community-based facility. Key findings included a decrease in anxiety and depressive symptoms at 3 months and consistent improvement in self-efficacy for exercise in the intervention group. Bridges and barriers to achieving optimal results in physical and psychosocial well-being were identified. Findings from this study offer insight into designing and executing more effective HLIs with individuals who have SPMI.

Introduction

Health care is shifting focus from symptom management to health promotion in terms of both physical and psychosocial well-being. The center for disease control (CDC 2013) has made "the quality of the physical, mental, and social domains of life" the theme for *Healthy People 2020* (p. 1). In 2012, the National Institute of Mental Health (NIMH) (2012) estimated that 9.6 million U.S. adults have severe and persistent mental illness (SPMI) (e.g. mood, anxiety, and psychotic disorders). This population faces poorer physical and psychosocial well-being, higher co-morbidity, and increased mortality rates compared to the general population (NIMH 2012).

Healthy lifestyle interventions (HLIs) are client-focused programs of healthy diet and increased exercise and socialization and include components such as: nutrition planning, regular exercise, weight management, body mass index (BMI), and waist circumference monitoring, and group support, which together can amplify physical and psychosocial wellness and improve overall functioning (World Health Organization (WHO) 2007). Issues with such HLIs include: being conducted by non-health professionals, small samples, samples of primarily young adults, inclusion of some without a mental illness diagnosis (Wolff et al. 2011), and lack of theory to guide the work (Galletly and Murray 2009). Most studies have focused on weight loss or reduction of mental illness symptoms rather than physical and psychosocial well-being.

Mental health services have been criticized for excluding HLIs from care. Mental health professionals (MHPs), including nurses and counselors, are equipped to execute HLIs as they have expertise in psychotherapeutic approaches related to behavior change (e.g. cognitive behavioral therapy, motivational interviewing) (Soundy et al. 2007). MHPs are usually more present in the milieu and likely have even more time with clients in community settings. Clients with SPMI in community-based programs tend to stay longer where trust and rapport can flourish; both precursors to best results of HLIs (Roberts and Bailey 2011).

Individuals with SPMI are considered a vulnerable population. Socioeconomic disparities often occur, such as low-income and inadequate housing (McKibbin et al. 2014). Poor nutrition, inactivity, and side effects of psychotropic medications often contribute to being overweight (NIMH

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2012). This increases the risk for other conditions such as hypertension, hyperlipidemia, and hyperglycemia; precursors to heart disease and type II diabetes (CDC 2013). Metabolic syndrome, a combination of such symptoms and subsequent illnesses occur in 51–68% of individuals with SPMI (Park et al. 2011). Some symptoms associated with being overweight are similar to SPMI; lack of energy, diminished self-care, low self-worth and social withdrawal. Taking medications such as atypical antipsychotics, mood stabilizers, and anti-depressants, needed for symptom management, can also prompt side effects like increased appetite, slowed metabolism, and weight gain (Scheewe et al. 2013). Individuals with SPMI are stigmatized, face fragmented care, have difficulty accessing care, may lack abilities to process health information (Daumit et al. 2013; McKibbin et al. 2014) and are prone to social isolation (NIMH 2012).

The purpose of this pilot study was to examine the effects of a multi-target, multi-disciplinary executed HLI in a group of clients with SPMI who attend a community-based mental health facility. The general research questions are: (1) Does a HLI improve clients' with SPMI psychosocial well-being (symptoms of anxiety and depression, feelings of self-efficacy)? and (2) Does a HLI improve general physical well-being and within what parameters (weight, BMI, waist circumference, blood pressure)? In this study, HLI is defined as, "promotion of healthy diet, increased exercise and socialization with access to community fitness resources, and improved psychological functioning, while considering both group and individual health needs and goals." Physical exercise is defined as "a form of physical activity with distinct direction toward improving aspects of health or a skill" which entails intentional, structured or semi-structures activities (walking group, dance group, staff supervised use of exercise equipment) (Happell et al. 2011).

This study used social cognitive theory (SCT) (Bandura 1997) as a theoretical framework; a theory highly applicable to populations receiving HLIs (Baranowski and Parcel 2002) and who have SPMI with physical inactivity (Daumit et al. 2013; McDevitt et al. 2006). SCT addresses how the characteristics of an individual, behavior, and the environment interact on a continuum to facilitate change (McDevitt et al. 2006). The primary construct is self-efficacy, or "the confidence in which an individual has to accomplish a behavior; and overcoming barriers to achieving that behavior" (p. 159). Self-efficacy influences what activities an individual chooses for promoting change, the perceived benefits to changing, the degree of investment and effort towards change, and how well he/she will cope with barriers in reaching a goal (Bandura 1997).

Literature Review

In 2010, the Center for Disease Control (CDC) made physical, mental, and social quality of life the focus for *Healthy People 2020* and began to longitudinally measure these domains in individuals (via the Health-Related Quality of Life and Well-being or HRQoL). In addition to weight loss and reduced health risks, HLI results also include diminished symptoms of SPMI (Scheewe et al. 2013; Van Citters et al. 2010), increased perceived social support (Hoffmann et al. 2015), and enhanced social skills (McDevitt et al. 2006; Perham and Accordino 2007). Studies have shown that physical exercise is a moderately effective treatment for anxiety and depression (Hoffmann et al. 2015; Saxena et al. 2005), can help minimize psychotic symptoms (Scheewe et al. 2013), and can be an adjunct treatment for SPMI, (Sylvia et al. 2013). HLIs may have similar impacts as psychotherapy and psychotropic medications. Clients often report using exercise as a coping skill (Soundy et al. 2007) and some experts suggest that adherence to HLIs is congruent with adherence to psychotherapy and psychopharmacology (Happell et al. 2011; McKibbin et al. 2014).

Attaining proficiency in types of exercise as well as reaching small, achievable goals promotes self-efficacy (Bandura 1997) and HLI participation lessens isolation (Soundy et al. 2007). Improved mental health (including positive social interaction) is likely associated with positive health behaviors and fosters self-efficacy (Van Citters et al. 2010). Subsequently, all of these effects could lead to less reoccurring or long-term psychiatric hospitalizations (Saxena et al. 2005). HLIs for individuals with mental illness can be classified as a mental health promotion activity or an attempt to maximize overall functioning and wellness, which exceeds mere symptom reduction (WHO 2007).

Most HLIs in the literature ranged in duration from 3 to 12 months, with a few lasting 18 months and one lasting 5 years. Intensity of exercise varied from low (stretching, walking, swimming) to high (cardiovascular, aerobic exercise). It seems that the longer in duration, the better the client outcomes from the HLI (Daumit et al. 2013; Katekaru et al. 2015; McKibbin et al. 2014; Roberts and Bailey 2011; Van Citters et al. 2010). Studies conducted with individuals with SPMI have shown improvements in physical well-being, especially HLIs with both physical exercise and nutrition education (Daumit et al. 2013; McKibbin et al. 2014). Findings indicate that more simplistic HLIs are more effective than complex, multi-faceted HLIs. Rationales for simplicity fostering more success include that clients with SPMI tend to lack the motivational, cognitive, memory, concentration and reading comprehension abilities to follow large, complex HLIs as part

of their illness trajectory (Galletly and Murray 2009; Park et al. 2011). Many investigators discussed the need for variety in the types physical exercise offered and tailoring the HLI to meet individual needs to achieve best outcomes (McDevitt et al. 2006; Hoffmann et al. 2015; Park et al. 2011). Roberts and Bailey (2011) suggested that best outcomes occur when researchers use flexibility in exercise programs. Some researchers argued the importance of smaller groups (Park et al. 2011). These approaches likely help to prevent boredom, offer more personalized support, and foster continued interest of clients.

Strong staff involvement was also found to promote success of HLIs. In their literature review on HLI incentives and barriers, Roberts and Bailey (2011) found that clients viewed staff who joined in and encouraged them as incentives to participation. In another study, staff served as "health mentors" and clients who attended more individual meetings with their assigned staff exhibited increased mental health function over those who met less with their assigned staff ($F(2,75.634) = 9.466$, $p = .001$) (Van Citters et al. 2010). Daumit et al. (2013) attributed the 7 lb. ($p = .002$) average weight loss between their intervention and control group to the presence of weight management counselors working with clients. Park et al. (2011) concluded that client involvement and significant outcomes in their *Passport 4 Life* HLI were related to the mental health nurse participating in activities with clients.

While there are factors that promote a healthy lifestyle in this population, there are also barriers to consider. Besides symptoms of mental illness (e.g. lack of energy, social anxiety, anhedonia) and side effects of psychotropic medication (e.g. sedation, dizziness, unsteady gait), most barriers also occur in the general population. Ambivalence and adherence to lifestyle change occur for people with SPMI and those without SPMI (Park et al. 2011). Soundy et al. (2007) explained how a new exercise technique can be worrisome for clients feeling insecure about their bodies. Participants in their study discussed how entering the pool at the Young Men's Club of America (YMCA) made them feel self-conscious. This too can be true of all individuals, including those without SPMI.

While staff investment in HLIs has been determined as a bridge to success, a potential barrier can occur when not all have taken a role in developing and maintaining the HLI with clients. Most investigators commented on the enthusiasm shown by MHPs regarding facilitating HLIs with individuals with SPMI. Still, the development and execution can add extra work to an already overwhelming case load for providers and staff (Hoffmann et al. 2015). McKibbin and colleagues (2014) found that providers (N = 36) supported HLIs, but viewed the planning and delivery as staff's responsibility. The providers asked to be informed of nutrition and exercise content taught and client progress to incorporate these components into the client treatment plan (McKibbin et al. 2014).

With regards to incorporating HLIs such as physical activity and nutrition education into the care of clients with SPMI, studies show that nursing school curriculum lacks emphasis on health-promotion, especially the connection between physical and psychosocial well-being (Happell et al. 2011). Meanwhile, mental health nurses have a major role in client health promotion (Roberts and Bailey 2011). Happell et al. (2011) attributed lack of education, low confidence, and overall understaffing of nurses as obstacles to engaging clients in HLIs.

Methods

Context, Participants, Recruitment, and Eligibility Criteria

IRB approval by the university Office of Human Research Ethics was granted prior to beginning this study. The leadership team from the community mental health agency in which samples were derived reviewed materials and gave their consent to begin the study. Seventy-two clients consented to participate. There were $n = 47$ from the psychosocial rehabilitation (PSR) program, who enrolled in the intervention group. A PSR is a clubhouse setting where those with SPMI go during the day to access mental health services with the goal of leading a productive life with optimal independence (Pelletier et al. 2005). Inclusion criteria for the intervention group included: being over age 18, having a diagnosis of SPMI (e.g. mood, anxiety, and psychotic disorders), a PSR program member, and being physically able to perform various degrees of physical exercise. Each client's primary care provider provided medical clearance for their participation in different levels of exercise either at the YMCA or PSR. For further safety, a CPR trained PSR staff remained at each exercise site. The control group initially included $n = 25$ clients from the outpatient program of the same community mental health agency. These clients obtained psychotherapy and medication management at the main office or other services such as assertive community treatment in the home. The clients in the control group had similar diagnoses to the clients in the intervention group, but had consistently declined diet and exercise changes recommended by their providers.

Participation was voluntary and informed consent was obtained following the explanation of the study. The principal investigators (PIs), research assistants (RAs) or director from the respective program assessed all clients for the ability to cognitively understand consent material. All participants received a Walmart Gift Card for $10 upon signing up and then another $10 Walmart gift card at the end of

the study. Clients in the intervention group also received a blue t-shirt, the color of the PSR program, to promote group membership when exercising.

Measures

The *Psychological General Well-being Index (PGWBI)* (Dupuy 1984) is a self-rated, 22 question measure of affective states over the past month. It consists of a total scale (general psychological well-being) and six sub-scales (Anxiety, Depressed mood, positive well-being, self-control, general health, and vitality). Items are scored on a likert scale with varied descriptors attached to values 1 through 6 (e.g., 1 = *extremely so*, 2 = *very much so*, 3 = *quite a bit*, 4 = *some-enough to bother me*, 5 = *a little*, or 6 = *not at all*). There is no reverse scoring. The direction of the scoring is constant and is one-directional or the higher the score, the higher the positive number. The PGWBI has shown good reliability (Cronbach's coefficient α of .93) (Chassany et al. 2004).

The Exercise Self-efficacy Scale (SEE) (Resnick and Jenkins 2000) is a self-rated measure with 8 questions. The participant circles a percentage as to how confident he or she is of exercising 20 min (altered from 40 min on the original scale) three times each week. Answer choices range from 0 to 100% confidence, in increments of 10. Items summed and divided by 8 so that a higher score reflects higher self-efficacy. A score of 0–100 is possible. The SEE has shown good reliability (Cronbach's coefficient α. of .92) (Resnick and Jenkins 2000).

Weight was recorded monthly in pounds and ounces using a calibrated, medical scale. *Body mass index or BMI* was calculated monthly using the participant's initial height measurement and their weight at the end of that month. For consistency, a BMI calculator was utilized from the National Institute of Health. *Waist Circumference* was measured monthly using the guidelines published on my healthywaist.org (International Chair on Cardiac Risk 2011). *Blood Pressure* (BP) was obtained monthly. (However, for those in the intervention group, weekly blood pressures and weekly weights were taken by clients' request). The Joint National Committee (JNC) 7 guidelines (Chobanian et al. 2003; James et al. 2014), endorsed by the National Institute of Health, were used to define the BP parameters in this present study. BPs were categorized according to the stages of the JNC 7 guidelines as follows: normal (< 120 and < 80), prehypertension (120–139 or 80–89), Hypertension, stage I (140–159 or 90–99) and Hypertension, stage II (≥ 160 or ≥ 100). A decrease in BP was defined as going from stage II to stage I or from Stage I to prehypertension according to JNC 7 guidelines (Chobanian et al. 2003).

Dependent variables included physical well-being (changes in weight, BMI, waist circumference, and BP) and psychosocial well-being (changes in the PGWS scale and subscales for depression and anxiety symptoms (Dupuy 1984) and self-efficacy via the SEE (Resnick and Jenkins 2000)). To combat threats of regression or maturation, data were collected at multiple time points (baseline (beginning of June), 3 months (end of August), and 6 months (end of November)). During the summer, a senior level nursing student assisted the PIs in data collection. During the academic year, ten junior level nursing students assisted in data collection. All students were shown data collection procedures by a PI. PIs, PSR staff and nursing students conducted exercise groups at the PSR and accompanied those clients who exercised at the YMCA. Each week, a nutrition group was held for clients using educational resources from the U.S. Department of Agriculture (USDA) (2011) to build a weekly curriculum.

Data Analysis

A quasi-experimental between subject group research design with repeated measures (over a 6 month period was used in this pilot study. SPSS for Windows statistical software, v21 (Corp 2012) was used to analyze data. Statistical tests included: multiple comparison independent *t*-tests with eta squared values. An alpha level of .01 was used for statistical tests. Demographics included: age, race, primary mental health diagnoses, main medical diagnoses, psychotropic medications prescribed and individual client participant health goals.

Results

The final sample of participants who completed the study was $n = 54$; intervention $n = 33$; control $n = 21$. (Of the initial participants in the intervention group: seven did not continue (PSR) services, two participants moved out of town, and one participant was admitted to an inpatient facility. Mid-study, two participants moved out of town, one showed sporadic attendance, and one changed services. For the control group, after the first 2 months, one participant transferred to an inpatient psychiatric facility, two participants changed services, and another became transient). Demographic characteristics for participants between groups did not differ in terms of age (intervention group $M = 47$ years; control group $M = 43$ years), race (intervention group $n = 17$ (52%) caucasian and $n = 16$ (48%) black in intervention group); (control group $n = 12$ (57%) caucasian and $n = 9$ (43%) black) and physical illnesses affiliated with metabolic syndrome. However, there were differences in gender and mental health diagnoses between groups. Due to attrition, the intervention group had significantly less participants diagnosed with a schizophrenia spectrum disorder (64%) than in the

control group (81%) and significantly more participants with a depressive disorder (52% vs. 19%) and anxiety disorder (30% vs. 10%). The intervention group included $n = 14$ (40%) males and $n = 19$ (60%) females and in the control group $n = 14$ (67%) males and $n = 7$ (33%) females.

At baseline (the beginning of June), there were no statistically significant differences found between the two groups for the independent variables (measures used), excluding the SEE. The intervention group had a mean weight of 208 lbs., while the control group had a mean weight of 211 lbs. BMI means were 32.46 and 36.77, respectively. Waist circumference means were 43.99 and 42.28, respectively. The range of blood pressures at baseline was as follows: for the intervention group $M = 120/77$, control group $M = 126/84$. Total scores at baseline included the PGWBI M intervention = 64.36 and M control = 67.88 and the subscales for Anxiety (13.8 and 14.96) and Depression (11.00 and 10.80). For self-efficacy of exercise, there was a significant difference in means between the two groups at baseline; ($M = 64.34$ and 44.20). The independent t-test scores showed a significant difference in self-efficacy scores for participants in the intervention group $M = 65.87$, $SD = 29.85$ and the control group ($M = 33.72$, $SD = 31.35$; $t(56) = 3.79$, $p = .000$) at 3 months. The magnitude of the difference was very large (eta squared = .21). This pattern continued at 6 months in which participants in the intervention group scores were $M = 72.39$, $SD = 25.07$ and the control group ($M = 27.86$, $SD = 36.59$; $t(55) = 5.36$, $p = .000$). Again, the magnitude of the difference was very large and showed a substantial increase from baseline to 3 months (eta squared = .35).

Significant differences were found for both anxiety and depressive symptom scores between the two groups. For participants in the intervention group anxiety symptoms were lower $M = 14.42$, $SD = 5.34$ than in the control group ($M = 18.42$, $SD = 5.00$; $t(55) = -2.70$, $p = .009$) at 3 months. The magnitude of the difference was very large (eta squared = .12). For participants in the intervention group depressive symptoms were also lower $M = 10.03$, $SD = 3.61$ than in the control group ($M = 12.50$, $SD = 2.16$; $t(56) = -2.79$, $p = .007$) at 3 months. The magnitude of the difference was large (eta squared = .13). This pattern did not continue for anxiety and depression symptoms at 6 months. However, participants in the control group had higher psychological well-being $M = 77.84$, $SD = 15.15$ than those in the intervention group ($M = 63.79$, $SD = 19.54$; $t(53) = 2.71$, $p = .009$) at 3 months. The magnitude of the difference was large (eta squared = .12), but with no significant variances at 6 months.

Finally, blood pressure measurements showed some differences, although non-significant between groups, across the study from baseline to 6 months. In the intervention group, 24 of 32 (75%) participants showed either a consistent stage (O, I or II) or a decrease in blood pressure stage over time, while in the control group, 17 of 21 (81%) participants showed either a consistent stage (O, I or II) or a decrease in blood pressure stage over time. Regardless of group, this finding can be interpreted as positive.

Discussion

Improvement in anxiety and depressive symptoms were found in the intervention group over the control group at 3 months, but no differences were seen at 6 months. An explanation could be that the 3-month mark was measured at the end of August, while the 6-month mark was measured at the end of November. It is documented that seasonal changes often yield increased depressive symptoms and that increased stress occurs closer to the holidays. In addition, many of these measurements occurred right after Thanksgiving. Meanwhile, the control group had higher scores for overall psychological well-being at 3 months over the intervention group, but not ongoing or at the 6-month mark. It is difficult to say what might explain this finding. It could be that clients in the control group had begun the study with higher self-esteem than clients in the intervention group. Perhaps as clients in the intervention group became more comfortable with exercise and began changing nutrition, their psychosocial well-being improved to match the control group. There is also a chance that differences between mental health services (e.g., medication management, psychotherapy, group therapy) affected this finding.

There were differences in both gender and mental health diagnoses between groups. While the intervention group had more females than males, the control group had more males than females. This might have affected both physical and mental health outcomes of the study. For instance, it has been well documented that females and males have different body compositions and lose weight differently. Symptoms of the mental illnesses can overlap and can be experienced differently between individuals; affecting health management ability in different ways.

Finally, the study spanned over 6-month timeframe, including holidays in which individuals with SPMI likely experience an increase in symptoms of depression and anxiety as well as increased intake of calorie-laden foods. This might also explain the findings for physical parameters: weight, BMI, waist circumference, and blood pressure measurements did not indicate significant differences across the study from baseline to 6 months. It has been suggested that clients with SPMI take longer making behavior changes (Daumit et al. 2013; .Katekaru et al. 2015). Six months may not be an adequate length of time for clients to adopt and sustain a HLI long-term.

Analyses of change in measure scores from baseline to 3–6 months showed that participants in the intervention

group had ongoing improvement in their exercise self-efficacy over the control group. This finding is logical as those participants in the intervention group voluntarily joined the HLI and were motivated to exercise. Other studies have reported social benefits, especially HLIs that placed clients in the community, mingling with others inside and outside of their peer group (Perham and Accordino 2007; Happell et al. 2011). The researchers also wanted to promote a community partnership between nursing students at the local university, with a local mental health community-based agency, as well as other community-based facilities (e.g. the YMCA), which was achieved.

There were limitations to this study. The sample derived was a convenience sample and not randomly assigned. Attrition likely impacted statistical power and generalizability of findings. There could have been some measurement error as nursing students involved in the data collection differed each seven and one-half weeks, as well as different nursing staff monitoring variables at the two different settings. The undergraduate nursing students could have differed on skill level in data collection. While the two PIs used standardized tools and trained the RA and students, internal validity was not measured amongst different data collectors. In addition, findings from studies utilizing a quasi-experimental design must be interpreted with some degree of caution when considering causality.

Implications for Research and Practice

Findings from this study can help MHPs in refining HLIs to improve outcomes for those with SPMI. Given the multifaceted health issues for those with SPMI, this could be a prime population for making HLIs a standard of care. MHPs such as nurses and counselors likely have better opportunity to promote HLIs in comparison to those health professionals working in hospital or office settings. MHPs have more time to spend with clients in a community-based mental health setting and have experience with psychotherapeutic approaches intended to assist clients with behavior change (e.g. cognitive behavioral therapy and motivational interviewing) (Saxena et al. 2005; Soundy et al. 2007). MHPs in a community setting such as a PSR interact with clients on a regular basis and over a longer period of time to continue engaging these clients in the components of a HLI. Clients likely feel more comfortable with the continuity of staff. Client engagement in both regular exercise and nutrition teaching would likely help clients sustain their improved physical and psychosocial well-being. It should be noted that given the common diagnosis of schizophrenia and psychotic disorders for this population, this study did not examine differences in psychotic symptoms such as hallucinations over time. There is further research needed in this area.

Distinct parallels existed between the service definition goals of PSR programs delivered in community mental health settings, the objectives set forth by the CDC for Healthy People 2020, and this study. The promotion of both physical and psychosocial well-being can be cultivated through HLIs (e.g. nutritional planning, regularly scheduled physical activity, frequent monitoring of weight, BMI, and waist circumference tracking, and group support). Few studies have examined HLIs through a multi-disciplinary lens or have exemplified a coordinated effort between a university, a mental health agency, and a community center to serve clients with SPMI. Involving nursing students in the development and delivery of HLIs with clients who have SPMI can enhance student learning and promotes their involvement as a nurse working with this population. In addition, the clients have additional individuals encouraging and monitoring their success with the HLI.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflicts of interest.

Ethical Approval All procedures performed in this study involving human participants were in accordance with the ethical standards of the institution at which the study was conducted.

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