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Feasibility of the Walk, Address, Learn and Cue (WALC) Intervention for Schizophrenia Spectrum Disorders

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Schizophrenia spectrum disorders (SSDs) include schizophrenia, schizoaffective disorder and schizophreniform disorder. The diagnostic overlap between the three is well known; all include positive symptoms such as hallucinations and delusions (American Psychiatric Association, 2000). Further, recent research indicates that persons with these disorders do not differ significantly on symptom categories as identified by the Brief Psychiatric Rating Scale (Kopelowicz, Ventura, Liberman & Mintz, 2008), nor on basic cognitive measures such as executive functioning (Premkumar et al, 2008) and associative learning (Sacchetti, Galluzzo, Panariello, Parrinello & Cappa, 2008). Another commonality is the increased risk for adverse physical health outcomes that is shared across these diagnoses.

Persons with SSDs are not only at risk because of the disabling symptoms of their diseases but because the medications needed to manage these illnesses increase their risk for adverse events, which in turn creates other serious health risks. Death rates from diabetes, respiratory/ cardiovascular, and other obesity-related illnesses are significantly higher among the over 2 million Americans with these disorders than in the general population (Fleischhacker et al, 2008). In the United States, the cost for persons with obesity and related diseases such as coronary heart disease, type 2 diabetes mellitus and hypertension was estimated to be over \$90 billion in 2002; in that year over 50% of total medical spending was attributable to obesity (Finkelstein, Fiebelkorn & Wang, 2003). The most effective medications for managing SSDs (atypicals such as clozapine and olanzapine) are associated with weight gain, glucose dysregulation and diabetes (Ananth, Venkatesh, Burgoyne, Gadasalli, Binford & Gunatilake, 2004; Jin, Meyer & Jeste, 2004; Newcomer, 2004). Yet, despite the well-known benefits of exercise and the health dangers associated with obesity, persons with SSDs rarely adhere to exercise regimens and few interventions to promote better adherence have been tested.

Exercise, defined as planned, structured, repetitive body movement performed to improve or maintain physical fitness (Centers for Disease Control and Prevention, 2008), has many advantages as a treatment adjunct. Benefits include low cost and the reduction of obesity, cardiovascular disease (Blaha et al, 2008), diabetes (Lumini, Magalhaes, Oliveira & Ascensao, 2008), hypertension (Halm & Amoako, 2008), and anxiety/depression (Smits et al, 2008). Unfortunately, it has long been established that those with SSDs seldom exercise and are less physically active and fit than people with no mental illness or with other mental illnesses

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(Beebe, 2005; Chamove; 1986; Hogdon & Reimer, 1960; Morgan, 1974). Exercise barriers in this group include apathy, poor concentration, sedative effects of medication, poverty, and lack of access to exercise education and programs. Because benefits accrue only for those who consistently exercise, increasing exercise behavior is critical to improving the health of this group. The first step in examining interventions designed to increase exercise behavior, is to determine whether such interventions are feasible in terms of their acceptability to persons with SSDs. *In this report* we describe our adaptation of the **W**alk, **A**ddress sensations, **L**earn about exercise, **C**ue exercise behavior (WALC) intervention and report feasibility data from a pilot study of the adapted intervention in 17 persons with SSDs.

Literature Review

Only two published studies have examined exercise motivation in persons with SSDs. Archie et al. (2003) provided free access to a fitness facility to 20 outpatients with schizophrenia for 6 months and monitored exercise behavior at the facility. Dropout rates were 40% after 4 months, 70% after 5 months and 90% after 6 months. These rates compare unfavorably with exercise cessation in the general population, which is approximately 50% after 6 months. The main reason given by persons with schizophrenia for poor attendance at the exercise facility was lack of motivation. Menza, et al (2004) tested a one-year weight control program in 31 outpatients with schizophrenia or schizoaffective disorder. The program incorporated exercise as well as behavioral interventions, and compared BMI and weight with a control group of 20 nonintervention patients. Weight and Body Mass Index (BMI) decreased significantly in the intervention group, with 20 of 31 experimental participants completing the study, for a one-year retention rate of 66% (an average of 69% of sessions were attended). The study intervention consisted of nutritional counseling, exercise, and motivational counseling including professional support, encouragement, and strategies to improve exercise habits. This study shows that interventions can increase exercise behavior and reduce weight and BMI in persons with SSDs. However, because the intervention included several components, it is not possible to draw conclusions as to the effects of any single component. To address this limitation, we piloted a theory-based motivational intervention that we adapted from the WALC intervention.

The WALC intervention was originally designed to motivate community-dwelling older adults to exercise, and is based upon self-efficacy theory. Self-efficacy theory was developed from Social Cognitive Theory (Bandura, 1977, 1986, 1995 and 1997) and incorporates (a) self-efficacy expectations, which are the participants' beliefs in their ability to perform the behavior, and (b) outcome expectations, which are the beliefs that the behavior will produce positive consequences. Hence, the theory of self-efficacy states that the more strongly individuals believe in their ability to perform a course of action and in the positive outcomes of those actions, the more likely they will be to initiate and persist in the activity. A larger study (in progress) will measure self efficacy, outcome expectations and exercise behavior as identified in this theoretical model. This manuscript reports attendance at WALC-S intervention groups because the purpose of this project is to examine feasibility.

Bandura (1977;1995) identified four sources of information that influence self-efficacy expectations: 1) performance of the activity, 2) verbal encouragement, 3) exposure to role models, and 4) physiological feedback (physical sensations experienced while performing the activity). We incorporated these components as we adapted the WALC for persons with SSDs with the ultimate goal of increasing exercise behavior in this group. This manuscript, however, is limited to a report of attendance at WALC-S groups as a first step in demonstrating the feasibility of this intervention in outpatients with SSDs. Table 1 lists the intervention activities and how they addressed each of the four theoretical components.

The WALC Intervention has been empirically validated in a series of studies with elderly persons. Early studies identified physical health, self-efficacy expectations and outcome expectations as significantly correlated with exercise behavior in this group (Resnick, 2001a; Resnick 2001b). The WALC intervention is based upon self-efficacy theory. The WALC intervention was piloted in 17 sedentary older women and found to be acceptable to participants and easily implemented by nurses (Resnick, 2002). Finally, Resnick, Magaziner, Orwig & Zimmerman (2002) reported the effectiveness of the WALC intervention in a sample of 25 older adults. In the single group, repeated measures design, the WALC was provided prior to a group exercise program, and attendance at the group program was monitored. Participants attended 58% of all exercise classes, reflecting the presence of a number of exercise barriers.

Persons with SSDs face similar exercise barriers as elderly persons. Research has shown that both elderly persons and those with SSDs lack exercise motivation (Archie et al 2003; Resnick & Spellbring, 2000). Further, elderly persons perceive the following barriers to exercise: fear of pain, fear of falling, problems with goal setting (Resnick, 2005), and lack of knowledge regarding the positive benefits of exercise (Resnick, 2005; Vreeland et al 2003). Published studies support the presence of similar exercise barriers among persons with SSDs. Persons with SSDs have documented cognitive deficits that lead to difficulties setting goals and carrying out goal directed plans (Velligan, Kern & Gold, 2006). In another study, over 33% of persons with SSDs cited fear of pain as a barrier to exercise participation (Beebe, 2005). During exit interviews, Beebe's (2005) participants reported that health benefits experienced were unexpected, highlighting the similarities with elderly persons who lack knowledge as to the strong relationship of health benefits and exercise (Resnick, 2005). While no study directly compares reasons older adults and those with SSDs fail to exercise, we believe these similarities make the adaptation of the WALC a reasonable starting point in our quest for interventions to motivate exercise in this group. This manuscript reports feasibility data from a pilot study of the WALC-S intervention.

Design of the WALC-S

The WALC-S was designed to address cognitive deficits common to persons with SSDs. From its earliest descriptions, schizophrenia has been characterized as a disorder of neurocognition (Bleuler, 1911; Kraepelin, 1919). While variability exists between individuals, cognitive impairments are present to some degree in virtually every SSD (Bowie & Jaga, 2007). Specific deficits include mild-to-moderate impairment in attention and memory and severe impairment in executive functioning (Bilder, Reiter, Bates et al, 2006; Siedman, Buka, Goldstein & Tsuang, 2006). Executive functioning deficits involve frontal lobe dysfunction in the areas of planning, organization, and mental flexibility (Bowie & Jaga, 2007) with resultant difficulties in problem solving and decision making (Vaskinn et al, 2008). We used a number of strategies to offset these difficulties. For example, we addressed memory deficits (Bacon, Izaute, & Danion, 2007) through repetition of information during WALC-S sessions, and by providing written and verbal reminders of WALC-S groups. To assist participants to sustain attention during WALC-S groups, information was presented in a variety of formats; first verbally, then pictorially with visual aids, and finally demonstrated in person. Research staff assisted with goal setting and identifying ways to overcome exercise barriers in order to offset difficulties with problem solving and decision making (Kim, Lee, Shin, & Chey, 2007). Finally, because participants in prior studies cited the importance of the social aspects of exercise (Beebe, 2005), we designed the WALC-S as a one-hour group intervention (8-9 participants per group) that met weekly for four weeks.

Specific Components of the WALC-S

W (walk)

The WALC-S intervention was *not* a walking group; rather, it was a forum for discussion of the basics of walking for exercise designed to provide information, support and motivation to undertake walking independently and safely. Content in this area included information on appropriate attire (layers during cooler months or light colored clothing during warmer months). Closed tennis shoes and socks were recommended for comfort and safety. The importance of starting slowly and gradually increasing walking time, warming up and cooling down the muscles by stretching, and maintaining adequate hydration were reviewed. The group practiced a series of basic stretches at each meeting. First, study personnel verbally explained the importance of stretching before and after walking to reduce muscular soreness and minimize injury. Next, a poster of basic stretches was reviewed. Finally, project staff demonstrated each stretch with return demonstration by participants. The following exercises were performed twice for 10 seconds each: neck rotation, trunk rotation, front bends, hamstring and lateral stretches. Study personnel assisted with goal setting, a process that is difficult for persons with schizophrenia due to limitations in executive functioning (Kim, Lee, Shin & Cheng, 2007; Velligan, Kern & Gold, 2006). Goals were individualized and included independent walking increasing days and/or minutes walked each week, along with improvements in flexibility, energy level or psychiatric symptoms.

A (address sensations)

Study personnel discussed common exercise discomforts experienced by previously sedentary persons and provided suggestions on reducing exercise discomforts, such as using heat or massage for muscular soreness. This discussion was supplemented by a booklet provided to each participant. Common complaints of previously sedentary persons initiating exercise programs include fatigue, as well as joint pain and stiffness in the lower extremities (Ohta, Okufuji, Matsushima & Ikeda, 2004). Participants were instructed to notify project staff and follow up with primary care provider if discomforts occurred. Since studies show persons with SSDs may have increased pain thresholds (Potvin & Marchand, 2007), research staff carefully monitored affect, facial expressions and behavior for signs of discomfort during the basic stretching exercises, rather than relying solely on participant report.

L (learn about exercise)

Study personnel provided verbal, group instruction on exercise benefits and overcoming barriers to exercise. A booklet containing written material was used to reinforce this content. The booklet listed exercise benefits for persons with SSDs including physical and mental health benefits such as weight loss, increased flexibility and endurance along with reductions in anxiety, depression and psychotic symptoms (Beebe, et al., 2005). In addition, the booklet enumerated suggestions for overcoming common exercise barriers. Common barriers addressed included fatigue, muscular soreness, finding the time to exercise, loneliness while exercising and boredom while exercising. Study personnel assisted participants to generate solutions to identified difficulties if needed.

C (cue exercise)

Participants were provided with calendars to track WALC-S attendance and any other exercises performed independently. Participants were instructed to place the calendars in a prominent location at home (i.e. refrigerator) and to record their personal goals, WALC-S attendance and any other exercises performed. Activities for each weekly group are listed in Table 2.

Procedure

A feasibility study of the WALC-S intervention was conducted with a convenience sample of 17 outpatients with SSDs. Participants were recruited from outpatients receiving care at a Community Mental Health Center (CMHC) located in the Southeast. The CMHC is a regional, not for profit integrated system providing mental health services in 19 counties. Teams of psychiatrists, master's prepared clinicians, nurses and bachelor's prepared professionals provide comprehensive, individualized treatment to every client and family. The CMHC offers case management, outpatient, psychosocial rehabilitation, prevention, residential treatment and employment services to over 350 persons with SSDs.

Prior to data collection, University IRB approval as well as the approval of the research committee at the CMHC, were obtained. Inclusion criteria were: 1) a chart diagnosis of schizoaffective disorder or schizophrenia, any subtype, according to the criteria described in the Diagnostic and Statistical Manual for Mental Disorders (DSM-IV, American Psychiatric Association, 2000), 2) English speaking, and 3) medical clearance for moderate exercise in writing from primary care provider. Exclusion criteria were: 1) mental retardation, 2) developmental delay, 3) uncorrected visual or hearing impairments, 4) hospitalization within the past 12 months for angina pectoris, myocardial infarction, or cardiac surgery of any kind, 5) congestive heart failure, 6) cardiac pacemaker, 7) heart rate > 100 or < 50 at rest, 8) uncontrolled hypertension defined as a blood pressure exceeding 140/90 on 3 consecutive readings despite adequate treatment, 9) history of spinal or hip fractures or hip or knee arthroplasty, and 10) neuromuscular or orthopedic limitations to normal, unassisted ambulation. The CMHC's Notice of Privacy Practices, (signed by all patients), allows disclosure of protected health information for research, authorizing the initial case reviews and communications required to identify potential participants. After potential participants were identified, researchers verified inclusion criteria, then approached potential participants regarding study participation while they were at the CMHC for regularly scheduled treatment appointments. The Evaluation to Sign Consent (ESC; DeRenzo, Conley & Love, 1998) Form was used to document the participant's ability to provide informed consent, and was completed prior to signing consent forms.

Demographic data were collected immediately after informed consent was obtained. Each participant who had a home telephone was notified of groups by reminder call the evening prior; those who missed received a follow up call. The WALC-S was provided by a doctorally prepared psychiatric nurse following training by the first author. Two groups were provided sequentially to 8 and 9 participants, respectively. In order to provide adequate time to obtain medical clearance, groups began approximately 6 weeks after informed consent.

Measures

Demographic data were collected at study entry and included: age, race, gender, living arrangement, chart diagnosis and self-reported educational level. Attendance at WALC-S groups was defined as the percentage of sessions attended out of the total sessions offered. Reasons for nonattendance were obtained during follow up telephone calls after each WALC-S group.

Results

The sample consisted of 17 persons with SSDs receiving care at an outpatient treatment facility located in the Southeastern United States. Most of the participants were male Caucasians with schizoaffective disorder; they ranged in age from 24-54 years with an average age of 43.2 years. The most commonly prescribed psychiatric medications were antipsychotics and

antiparkinsonian agents. The most commonly prescribed nonpsychiatric medications were proton pump inhibitors. See Table 3.

The WALC-S was well accepted by our participants. Overall attendance for the 4 week intervention was 63.2% and attendance increased over time. Groups one and two were attended by 52.9% of participants (n = 9), group 3 attendance was 70.5% (n = 12) and attendance at the fourth and final group was 76.5% (n = 13).

We gathered information about missed groups using follow up telephone calls. Seventeen individuals were offered four WALC-S groups each for a total of 68 WALC-S groups offered. Of the total 68 groups offered, 25 groups were missed. Of the 25 missed sessions, we were unable to make telephone contact on 13 occasions. Of the 12 persons we contacted, two could not identify a reason for missing group. Of the 10 giving a reason, transportation problems were cited 6 times, physical illness twice, conflict with work activities once, and psychiatric hospitalization once.

A subset of participants attended every WALC-S group. They were mostly Caucasian males whose average age was 32 years. Most were living with family or caregivers (as opposed to alone), their average education was 11.2 years. This small group was younger and better educated by self-report than those who missed at least one session.

We compared participants who attended more than half of groups (high attenders) with those attending less than half of groups (low attenders). There were no appreciable differences between high and low attenders based upon age, gender or race. Chi square analysis of attendance (high or low) and living arrangement (alone or with others) revealed a significant association of high attendance and living with others ($p = 0.032$). Mean attendance was 65.9% in those living with others versus 54.1% for those living alone.

Discussion

This report describes our adaptation of the WALC intervention and its use in persons with SSDs. We found the intervention to be feasible and acceptable in this group. Nearly half of participants attended at least 75% of the groups. No participant experienced an adverse event of sufficient severity to require a visit to their primary care provider. Two participants (both female) complained of back and leg muscle tightness during the stretches. They were instructed to modify the exercises by performing them in a seated position, limiting range of motion and not stretching to the point of pain. Their complaints resolved without further intervention after the first two weeks.

Our attendance rates for this four week intervention are higher than those reported by Menza et al (2004), probably due to differences in length of the two studies. Unfortunately, Menza et al (2004) did not report reasons for nonattendance during their one-year study. Archie et al (2003) reported the main reason for nonattendance at the exercise facility was lack of motivation, but gave no information on how these data were collected. We were unable to contact over half of nonattenders after missed sessions. It is possible although not certain, that nonresponsiveness to the outreach calls following missed groups may itself be reflective of low motivation or nonengagement. A small percentage (16.6%) of those we reached failed to identify a reason for nonattendance, again a possible but not verifiable reflection of amotivation. Our participants specifically reported considerable and ongoing transportation problems interfering with WALC-S attendance. Although the state provides bus service to the CMHC free of charge, transportation problems (not being picked up or missing the bus) were the single most often cited reason for missing a WALC-S group (60%), highlighting potential system related barriers to exercise offerings.

Our finding of an association between living with others and high attendance may be related to housing stability, socioeconomic status, or the presence of a support system. For instance, family members in the home may have played a part in reminding participants of groups, encouraging attendance or providing transportation. In contrast to Archie et al (2003) our attendance increased over time, but it is important to bear in mind that our actual exercise activities were limited to basic stretches whereas participants in the Archie et al study (2003) were expected to perform exercises in a swimming pool, aerobics class or by walking on treadmills. Nevertheless, our increasing attendance may also be attributable to the motivational techniques used. This study is a first step in establishing that persons with SSDs are interested and willing to participate in interventions designed to enhance their exercise motivation.

Limitations

This pilot study is subject to the limitations inherent in such a project. The small convenience sample and lack of a control condition limit generalizability. It is possible that those agreeing to participate already possessed some inherent motivation for exercise that threatens external validity. There is thus a need to replicate the intervention using a larger sample.

Future directions

Results of this investigation point to several fruitful areas for further inquiry. Future examinations of exercise motivation should include mechanisms for taking multiple influences into account, controlling if possible for factors such as transportation, finances, and social support along with disease-related deficits. Our next step is to examine the impact of the WALC-S upon actual exercise behavior. A larger study is now in progress to compare exercise program attendance between those receiving the WALC-S and those receiving a time and attention control group. Based on this feasibility study we incorporated the use of city bus passes to offset difficulties with the state bus system, and written mailings as reminders for participants without home telephone service. If participants cannot immediately identify a reason for a missed group, a menu of reasons is provided based upon reasons identified in this feasibility study. The menu includes the following: transportation problem, physical illness, work conflict, psychiatric illness, lack of desire and other. Nurses are well positioned to provide and examine the effects of interventions designed to enhance this important component of exercise behavior. Our ultimate goal is to increase exercise motivation for individual persons with SSDs in order to facilitate overall health and quality of life.

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Table 1

Adaptation of theoretical components of the Walk, Address sensations, Learn about exercise, Cue exercise behavior for persons with Schizophrenia spectrum disorders (WALC-S)

Theoretical Component	Adaptation of Intervention
Exposure to role models	Study personnel and other participants will serve as role models during each WALC-S group.
Verbal Encouragement	Study personnel will provide verbal encouragement during each WALC-S group Study personnel will query participants about exercise improvements experienced during each WALC-S group.
Physiological Feedback	Study personnel will survey participants for any discomforts during basic stretches at each WALC-S group. Study personnel will verbally highlight positive physiological outcomes that participants experience during each WALC-S group.
Performance of Activity	Study personnel will provide calendars to cue exercise. Study personnel will provide reminder calls before each WALC-S group. Study personnel will provide follow up calls to those who miss any WALC-S group. Participants will perform basic stretching exercises at each WALC-S group. Participants will WALC-S mark groups attended on their calendars.

Table 2

Activities and Materials for the WALC-S

Week	Activities and Materials
One	<p>Introductions of research staff and group members</p> <p>Review section of booklet on basics of exercising safely</p> <p>Perform stretches: Poster with photograph of each stretch, demonstration by research staff and return demonstration by group members</p>
Two	<p>Introductions and Check-in with each member</p> <p>Review section of booklet on basics of exercising safely</p> <p>Review section of booklet on exercise benefits</p> <p>Perform stretches: Poster with photograph of each stretch, demonstration by research staff and return demonstration by group members</p>
Three	<p>Introductions and Check-in with each member</p> <p>Review section of booklet on basics of exercising safely</p> <p>Review section of booklet on exercise benefits</p> <p>Barriers and solutions: Discuss and write suggestions for dealing with common exercise barriers on blackboard.</p> <p>Perform stretches: Poster with photograph of each stretch, demonstration by research staff and return demonstration by group members</p>
Four	<p>Introductions and Check-in with each member</p> <p>Review section of booklet on basics of exercising safely</p> <p>Review section of booklet on exercise benefits</p> <p>Barriers and solutions: Discuss and write suggestions for dealing with common exercise barriers on blackboard.</p> <p>Set individual goals</p> <p>Provide reminder calendars to cue exercise</p> <p>Perform stretches: Poster with photograph of each stretch, demonstration by research staff and return demonstration by group members</p>

Table 3

Characteristics of person with Schizophrenia Spectrum Disorders (N = 17)

Diagnosis	
Schizoaffective Disorder	12 (70.6)
Schizophrenia	5 (29.4)
Sex	
Male	10 (58.8)
Female	7 (41.2)
Race	
Caucasian	11(64.7)
African American	6 (35.3)
Living Arrangement	
Alone	6 (35.3)
With family	7 (41.2)
With paid caregiver	4 (23.5)
Educational Level *	
Below High School	10 (58.8)
High School Graduate	2 (11.8)
Beyond High School	4 (23.5)
Medication Category	
Typical Antipsychotics	7 (41.2)
Atypical Antipsychotics	6 (35.3)
Antiparkinsonian agents	6 (35.3)
Antianxiety agents	2 (11.7)
Antidepressants	2 (11.7)
Proton pump inhibitors	5 (29.4)
Lipid lowering agents	3 (17.6)
Antihypertensives	3 (17.6)