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Safety considerations when promoting exercise in individuals with serious mental illness

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Abstract

Histories and physical exams, completed prior to starting a weight loss program, showed that 52% (N=106) had high risk for CAD, 40% had difficulty performing a tandem gait (indicator of balance) and 30% had an existing musculoskeletal disorder. These risks are realistic concerns when recommending exercise and/ or walking.

Keywords

obesity; physical activity; safety

1.Introduction

Adults, with serious mental illness (SMI), are less physically active than the general population (Daumit, et al., 2005). While exercise is a common component of weight loss interventions with this, or any other population, the fear of physical injury may be higher in this population and warrant additional consideration before any exercise component is initiated.

The fear of falling and injury is one of the barriers to exercise reported by individuals with SMI (McDevitt et al., 2006; Ussher et al., 2007). This concern may well be justified, given that balance issues were noted in the classic description of schizophrenia, (Bleuler, 1908; Kraepelin, 1919) and in more recent research (Sullivan et al., 2004) that found postural instability in individuals with schizophrenia. No studies were found that explored the implication of these findings when promoting exercise.

The present descriptive study addresses medical co-morbidity and physical findings that may jeopardize the safety of exercise in individuals with SMI. The research question is: What is the frequency of coronary artery disease (CAD), balance and foot problems that can interfere with exercise safety in individuals with serious mental illness.

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2. Methods

2.1 Participants

Individuals meeting diagnostic criteria (American Psychiatric Association, 2000) and functional impairment for SMI (National Advisory Mental Health Council, 1993), aged 18–65, BMI ≥ 25 , ambulatory and medication stable for 3 months were recruited as part of a larger weight loss study, a Psychiatric Rehabilitation Approach to Weight Loss. The study was approved by the Institutional Review Board of the University of Kansas Medical Center and complete study procedures were explained and written informed consent was obtained prior to participation. Participant's medical records were reviewed to confirm clinical diagnoses, medications, and values for lipids and glucose. Eligible participants were then scheduled for a history and physical examination. All data were collected from January 2007 through May 2008.

2.2 Measures

2.2.1. Pre-Participation History—A questionnaire based on the American College of Sports Medicine and American Heart Association guidelines was adopted to assess for risk of coronary artery disease (CAD) (American College of Sports Medicine, 2006). Being physically active was defined as continuous physical activity greater than 30 minutes at least three times per week.

2.2.2. Physical Examination—Cardiac and pulmonary systems including blood pressure, weight, height, and waist circumference were examined. In addition lower extremities and gait were assessed.

Body weight was measured using a digital scale accurate to ± 0.5 pounds (Seca Platform Scale, model 707, Seca Corp., Columbia, MD).

Participants wore regular clothing without shoes for the weight and height measurements. Height was determined using a portable stadiometer (± 0.1 cm). Height and weight were then used to determine body mass index (BMI). Waist circumference was measured by the average of three measurements using a spring loaded tape measure (Lohman et al., 1988). If no lipids or glucose values were documented within the past year, a portable CardioChek whole blood testing system (model 2.20, Polymer Technology System, Indianapolis, IN.) was performed to obtain these values.

Feet were examined for circulatory problems, deformities, infection, dry skin, fissures and ulcers. The neuromuscular system of lower extremities was assessed by having participants walk while being observed: 1) as they normally do, 2) on their tip toes, 3) on their heels, and 4) using a tandem gait (i.e. heel to toe walking). If the individual could not perform the specific activity for a distance of six feet, a score indicative of a problem was recorded. The assessment was performed by a nurse practitioner and nurse practitioner students after training for reliability.

2.2.3. CAD Score—Using the AHA/ACSM screening questionnaire, health history and physical examination, a CAD score of low, moderate or high risk was assigned based on the ACSM CAD risk factors: age, smoking status, family history, BMI, dyslipidemia, hypertension, impaired fasting glucose, and signs or symptoms of, or known cardiovascular, pulmonary, or metabolic disease.

3. Results

The study population (N=106) was predominately female (64.2%, n= 68); 58.5% (n=62) were Caucasian, 36.8% (n= 39) African American, and 4.7% (n=5) from other racial or multi-racial groups. Mean age was 44.74 ± 10.77 . Most (72.6%, n= 77) were living independently, 18 (17%) were living with relatives but largely independent and the rest (10.4%, n=11) lived in the community with support from others. Charted diagnoses based on DSM-IV (American Psychiatric Association, 2000) showed the majority had schizophrenia spectrum disorders (50%, n= 51), while 25.5 % (n= 26) had Bipolar Disorder, 21.6% (n=22) major depression and 2.9 % (n=3) had other diagnoses. Data for all variables on all participants are not available.

A total of 44 (42.7%) individuals reported breathlessness with exertion. Nearly a quarter (24.3%, n= 25) reported dizziness and 19 (18.4%) noted chest discomfort with exertion. Table 1 shows the frequency and percent of coronary artery risk factors observed within the sample population. Hypertension was the most frequent cardiovascular diagnosis, asthma and sleep apnea the most frequent pulmonary diagnoses and diabetes the most frequent metabolic diagnosis. Using CAD risk factors, 54 (52.4%) were classified as high risk, 38 (36.9%) as moderate, and 11(10.7%) as low risk.

Thirteen participants (12.2%) reported back, knee or ankle surgeries and 11 (10.3%) reported using assistive devices (e.g., cane or walker) for walking. The most frequent musculoskeletal disorder was arthritis. Assessment of feet revealed few with deformities, bunions, hammer toes (6.8%, n=7), ulcers (1.9%, n=2) and fungal infections (8.7%, n=9). Dry skin and callused feet were more prevalent (56.3%, n=58). Most participants could walk on their toes and heels; a greater number were unable to tandem gait (See Table 1).

Using the ability to perform tandem gait as an indicator of balance, there was no difference with age ($t(92) = -.236, p = 0.81$) or gender ($X^2(1, N=94) = 2.21, p = .14$). Those with higher BMI had more difficulty performing tandem gait ($t(49.67) = 4.99, p > 0.001$). Participants who were able to perform tandem gait reported being more physically active ($X^2(1, N=94) = 12.52, p > 0.002$).

4. Discussion

The finding that the majority of the sample had high CAD risk is consistent with the higher mortality in the population (Saha, 2007). Differentiating if shortness of breath (SOB) with exertion was related to obesity, asthma, anxiety, and / or CAD was difficult without further tests.

The relationship between the ability to do tandem gait provides empirical validation with research reporting fear of falling (McDevitt et al., 2006; Ussher et al., 2007) in this population. The finding that those who had better balance report being more physically active indicates that balance is a factor in level of physical activity.

Orthostatic hypotension was not assessed in this sample but has been added to subsequent screening due to the prevalence of diagnosed hypertension and reports of dizziness. The findings indicated that recommendations for exercise need to be modified to promote adherence and prevent injury for individuals with SMI, especially in those with existing hip, knee, and back pain and vulnerability to falling. Some of the modifications that have been incorporated in the larger study are making sure individuals have proper foot wear, gradually introducing walking with others, suggesting walking on flat surface and walking paths, stretching to prevent injury and chair exercises for those with more severe balance issues.

These findings are limited in that the sample represents only individuals with SMI who are overweight. There was a larger percent of females which is common in weight loss programs. Women are more concerned about weight, more likely to talk to health providers about their concerns and more likely to try weight loss programs (Greiner et al., 2008). Men are more likely than women to underestimate their body weight and thus not consider participating in a weight loss program (Lee, 2008).

Representation of the sample is also limited by excluding those who had uncontrolled hypertension, were using insulin for diabetes, had sustained arrhythmia or physical limitations that prevented walking with an aid. An additional limitation is that the measure of physical activity is based on self-report which may not correspond to actual activity level.

In conclusion history and physical exam of overweight individuals with SMI revealed disorders and conditions that increase risk for injury with walking, and exercise program. Since walking is commonly recommended for weight modification, the findings show the need for initial assessment and if required, tailoring exercise to minimize health risks.

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Table 1

Frequency and Percent of Coronary Artery Risk Factors, BMI, Waist girth, Musculoskeletal and Balance for Sample N=106 ^a.

Cardiovascular Risk	N (%)
Cardiovascular diagnosis	39 (37.9)
Pulmonary diagnosis	26 (25.2)
Metabolic diagnosis	55 (53.4)
Current smoker or quit < than 6 months ago	50 (47.0)
Physically inactive (<30 minutes per day, 3 times per week)	62 (60.2)
High BMI (≥ 25)	M = 38.7 ± 9.2
Increased waist circumference (men ≥ 102 cm, women ≥ 88 cm)	M = 45.5 ± 5.17
Fall and Injury Risk	
Musculoskeletal diagnosis	37 (30.4)
Gait and Balance	
Can't toe walk	12 (12.8)
Can't heel walk	18 (19.1)
Can't tandem walk	38 (40.4)

^aData for all participants on all variables are not available