



## Effects of a group physical activity program on physical fitness and quality of life in individuals with schizophrenia



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### ABSTRACT

**Purpose:** The purpose of this study was to evaluate the effects of a 16-week group physical activity (PA) program on physical fitness and quality of life in outpatients with schizophrenia.

**Methods:** Nineteen outpatients with schizophrenia were divided into experimental (EG) ( $n = 8$ ; mean age  $39 \pm 7$  years) and control (CG) ( $n = 11$ ; mean age  $40 \pm 6$  years) groups. The EG underwent twice a week sessions of a group PA program for a period of 16-week. The participants completed a battery of tests at baseline and after 16-week, which included the assessment of body composition (dual-energy X-ray absorptiometry), functional exercise capacity (6MWT), physical activity levels (accelerometers), quality of life (WHOQOL-Brief), and anthropometric measures. During the program different strategies were implemented to ensure the participants' adherence.

**Results:** The attendance to the program was 79.7%. In the EG a significant decrease was observed in hip circumference ( $p = 0.02$ ); a significant increase occurred in moderate to vigorous physical activity ( $p = 0.05$ ) and in the environment domain (WHOQOL-Brief) ( $p = 0.02$ ). The improvement in environment domain scores was also associated with a decrease in sedentary behavior ( $r = -0.82$ ,  $p = 0.01$ ) in the EG.

**Conclusions:** The strategies used during the program promoted a high rate of attendance. PA may have a positive impact on the participants' ability to perform activities of daily living. This study showed that a group PA program can be successfully implemented for outpatients with schizophrenia and can influence their quality of life and PA levels.

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### 1. Introduction

People with schizophrenia experience greater health problems than the general population (Hennekens, Hennekens, Hollar, & Casey, 2005; Roick et al., 2007). This condition is associated with a sedentary lifestyle, with a poor diet intake, and with the use of alcoholic beverages and smoking addiction which is on average, 3 to 4 times higher when compared to the general population (Faulkner & Biddle, 1999; Janney et al., 2013; Strassnig, Brar, & Ganguli, 2005; Van Os & Kapur, 2009). Furthermore, the majority

of this population uses antipsychotic drugs that may produce weight gain (Gothelf et al., 2002; Henderson et al., 2006). Individuals with schizophrenia have an increased risk of developing hypertension, coronary heart disease, type 2 diabetes and osteoporosis (von Hausswolff-Juhlin, Bjartveit, Lindström, & Jones, 2009; Howard, Kirkwood, & Leese, 2007; Renn et al., 2009).

Therefore, individuals with schizophrenia are more likely to experience an impaired quality of life (Allison, Mackell, & McDonnell, 2003; Faulkner, Cohn, Remington, & Irving, 2007; Sugawara et al., 2013) and a reduced average life expectancy (Allebeck, 1989; Brown, 1997; Ösby, Correia, Brandt, Ekblom, & Sparén, 2000). Worldwide, schizophrenia is ranked as the fifth cause of disability-adjusted life years (DALYs) for people between the ages of 15 and 44 (WHO, 2008).

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In the last decade, a body of research has been examining the effects of physical activity (PA) for people with schizophrenia (Bradshaw, Lovell, Bee, & Campbell, 2010; Fogarty & Happell, 2005; Knöchel et al., 2012). The regular practice of PA promotes benefits, such as the reduction of weight, body mass index (BMI), waist circumference, cholesterol, triglycerides, negative symptoms, as well as increasing mental health, cognitive functioning, physical and social functioning (Acil, Dogan, & Dogan, 2008; Attux et al., 2011; Duraiswamy, Thirthalli, Nagendra, & Gangadhar, 2007; Methapatara & Srisurapanont, 2011; Pelletier, Nguyen, Bradley, Johnsen, & McKay, 2005; Poulin et al., 2007; Prouteau et al., 2005; Van Citters et al., 2010).

In order to promote an active lifestyle for individuals with schizophrenia, different PA programs have been developed. Attux et al. (2011), Bradshaw et al. (2010), Goldberg et al. (2013), Methapatara and Srisurapanont (2011) and Poulin et al. (2007) promoted counseling programs focusing on nutrition, healthy lifestyle and PA. Besides this, other authors promoted intervention programs, mainly based on walking and gym activities (e.g., stationary bicycle, indoor rowing, treadmill, and resistance exercises) (Beebe et al., 2005; Chen et al., 2009; Daumit et al., 2011; Dodd, Duffy, Stewart, Impey, & Taylor, 2011; Marzolini, Jensen, & Melville, 2009; McDevitt, 2005; Vittaca, Paneroni, Comini, & Bianchi, 2013).

Despite the growing research, several important issues about PA for individuals with schizophrenia need further enlightenment. One important issue is the lack of agreement on which kind of PA recommendations and interventions are suitable for this population (Gorczyński & Faulkner, 2010; Vancampfort, Knapen, et al., 2010). Similarly, Dubbert, White, Grothe, O'Jile, and Kirchner (2006) and Lindamer et al. (2008) argued that an accurate measurement of PA is fundamental to achieve the effectiveness of the programs.

Another important issue is the lack of research regarding the importance of PA programs in the quality of life for individuals with schizophrenia. Although it is widely recognized that PA contributes to a healthy lifestyle and better quality of life (Chaoyang, Ford, Mokdad, Jiles, & Giles, 2007; Fleury et al., 2013; Vancampfort, Probst, Scheewe, et al., 2011) there are a lack few studies have focused on the impact of PA programs in the quality of life of individuals with schizophrenia (Chen et al., 2009; Daumit et al., 2011; Vittaca et al., 2013).

Specifically regarding mental illness, the motivation and adherence strategies used in PA programs are another important issue to ensure the effectiveness of programs. Such strategies are quite valuable since they can influence the satisfaction of the individuals in the programs (Vancampfort, Probst, Sweers, et al., 2011), and consequently, their levels of attendance.

In this context, the purpose of this study was to evaluate the effects of a 16-week group PA program on physical fitness and quality of life of outpatients with schizophrenia. Specifically, the focus was on the anthropometric characteristics, the body composition, the functional exercise capacity, the PA levels, and the quality of life of the participants. In this study outpatients with schizophrenia enrolled in a 16-week program were compared to patients with the same diagnosis with no adjuvant program.

## 2. Methods

### 2.1. Participants

Nineteen outpatients with a psychiatric diagnosis of schizophrenia (DSM-IV) were recruited from two different psychiatric rehabilitation units to participate in the PA program. The group of participants who accepted the invitation participated in the EG and

those who refused to participate in the PA program participated in the CG. The diagnosis had been made by well experienced (>10 years clinical experience with these groups) psychiatrists. Apart from this condition, one or more cardiovascular risk factors had to be present (Grundy, Pasternak, Greenland, Smith, & Fuster, 1999), namely physical inactivity (not engaged in regular [>3 days/week] PA in the 16 weeks prior to the beginning of this study), smoking addictions (smoking regularly [>10 cigarettes/week] for more than 15 years) and family history of cardiovascular disease (if first-degree relatives have had strokes or if both parents have suffered from heart disease before the age of 55). Exclusion criteria included uncontrolled hypertension (defined as a systolic blood pressure >160 mmHg or diastolic blood pressure >110 mmHg); severe chronic obstructive pulmonary disease; peripheral vascular disease; and musculo-skeletal limitations that would have been aggravated by regular PA (Marzolini et al., 2009).

This study was carried out following the Declaration of Helsinki guidelines for human research. The Faculty Ethics Committee (CEFADE 24.2013) approved this study. After a detailed explanation of the study's goals, benefits and risks all the participants gave written informed consent.

### 2.2. Study design

This study was a quasi-experimental design.

### 2.3. Produces

The PA program was implemented for 16 weeks at the facilities of a Faculty of Sport. The sessions took place at either indoor or outdoor facilities according to weather conditions or organization needs (i.e., the places were used according to the sports equipment needed for each specific activity and also according to the availability of the Faculty). The participants used public transportation to get to the sports facilities without receiving any financial support to commute. The program occurred twice a week and each session was 55–60 min in duration. The participants were also encouraged to perform a third unsupervised session with similar activities. Regarding the intensity of the activities, the initial prescription was, on average, 65%–75% of heart rate reserve measured by a portable heart rate monitor (Polar TEAM<sup>2</sup> Pro – Polar<sup>®</sup>) worn by the participants throughout the sessions. The prescription progressed after 8 weeks, on average, to 75%–85% of heart rate reserve and remained at this intensity until the end of the program. To obtain subjective information about the perceived exertion of the participants, the VAS Scale was used at the end of each session according to the scale low – high (Question: How was the intensity of the session for you?).

The program comprised a small group approach mixing different types of PA at aerobic level. The activities were based on small-sided games (2v2, 3v3, 4v4) of volleyball, handball, basketball, soccer and walking/jogging. Basic sports competencies/skills such as shooting, passing, and dribbling were also the focus of the program.

During the program the research team implemented different strategies to ensure the participants' adherence. Therefore, the following recommendations from literature (Beebe & Harris, 2013; Beebe & Smith, 2010; Bernard & Ninot, 2012; Dodd et al., 2011; Tetlie, Heimsnes, & Almvik, 2009; Vancampfort et al., 2009; Warren et al., 2011) were applied: i) to organize the exercises with small groups of participants ( $n = 2-4$ ); ii) to provide adequate trained support (i.e., supervised by a qualified adapted physical education teacher with 5 years of experience in the field); iii) to continuously encourage and give positive feedback throughout the sessions; iv) to make telephone calls to participants who missed PA

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