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Medication and physical activity and physical fitness in severe mental illness

David Perez-Cruzado[a], Antonio Cuesta-Vargas[a,b,*], Elisa Vera-Garcia[a,c], Fermín Mayoral-Cleries[c]

[a] Department of Physiotherapy, University of Malaga, Spain
[b] School of Clinical Science, Faculty of Health Science, Queensland University Technology, Australia
[c] Hospital Regional de Málaga, Grupo de Investigación de Salud Mental, IBIMA, Spain

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ABSTRACT

Anti-psychotic medication has emerged as the primary medical treatment for people with severe mental illness, despite the great risks involved in the use of this medication. In addition, this population suffers from problems of obesity, sedentary lifestyle and poor physical fitness, which is aggravated by the use of this type of medication. The objective of this study is to explore the influence of the most commonly used antipsychotics in this population (Olanzapine and Risperidone) on physical activity and the physical fitness of people with severe mental illness. Sixty-two people between 26 and 61 years of age with severe mental illness were assessed. All participants were evaluated with a battery of 11 physical tests to assess their physical fitness and with the IPAQ-short version questionnaire to determine their level of physical activity. The doses of Risperidone and Olanzapine were also evaluated in all participants. Significant differences were found for physical activity, with higher levels reported in those patients with severe mental illness who did not take any of these medications. Regarding physical fitness, significant differences were only found for the consumption of Risperidone, with better physical fitness levels seen in patients who did not consume this medication; on the other hand, for the consumption of Olanzapine, differences were found in muscular strength, balance and aerobic condition with better values in non-Olanzapine consumers compared with Olanzapine consumers.

1. Introduction

Severe mental illness (SMI) includes functional psychosis, and an ICD-10 diagnosis of a functional affective or non-affective psychotic disorder (codes F10-F22, F24, F25, F28-F31, F32.3 and F33.3) (Ruggeri et al., 2000). In most developed countries, second-generation (atypical) antipsychotics have emerged as the drug of choice for individuals with severe mental disorders (Komossa et al., 2010). These are even used in young patients with other mental health problems, such as non-psychotic disorders like autism or intellectual disability (Park et al., 2016), despite the increased risk of diabetes, dyslipidemia and cardiovascular disease as a side effect of this medication (Mangurian et al., 2016; Nicol et al., 2016).

These health problems are aggravated in people with severe mental disorders, in whom are also found high levels of obesity, as well as sedentary lifestyle and poor physical fitness (Vancampfort et al., 2013a,2016b) and may be associated with the use of antipsychotics (Koivukangas et al., 2010; Vancampfort et al., 2016a). Inactive patients with SMI present considerably higher levels of sedentary than to other types of patients with different pathologies, thus presenting a deterioration of health as well as lower physical fitness compared to a control group of healthy individuals (Vancampfort et al., 2015,2013b,c).

In patients with schizophrenia and schizoaffective disorders, physical fitness seems to emerge as an important modifiable risk factor for metabolic and cardiovascular diseases, as well as morbidity and mortality (Vancampfort et al., 2015,2013b,c).

In addition to the modifiable lifestyle factors and side effects of psychotropic medications, poor access to medical care as well as low quality of the medical care received are problems that SMI patients face daily (Wang et al., 2016). As a result, this population frequently suffers from associated problems such as greater social exclusion, fewer employment opportunities or a greater dependence on others to accomplish activities of daily living (Vancampfort et al., 2016c).

Among the different second-generation antipsychotics, Olanzapine and Risperidone are those which show the greatest improvement in general health; therefore, these are the most frequently used from this group of medications when compared with other second-generation antipsychotics (Komossa et al., 2010). Given the potential for a higher incidence of SMI diseases, and as a result of the introduction of second-

* Corresponding author at: Cátedra de Fisioterapia, Universidad de Malaga, Andalucia Tech, Instituto de Investigacion Biomédica de Malaga (IBIMA) Grupo de Clinimetria (F-14). Av/ Arquitecto Peñalosa, 3 (Teatinos Campus Expansion) 29071 Malaga (Spain).

E-mail addresses: d_perez_cruzado@hotmail.com (D. Perez-Cruzado), acuesta@uma.es (A. Cuesta-Vargas), elisavera82@hotmail.com (E. Vera-Garcia), fermin.mayoral.sspa@juntadeandalucia.es (F. Mayoral-Cleries).

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generation antipsychotic drugs, research aimed at optimising the physical health these individuals with schizophrenia should be carried out with a sense of urgency (Vancampfort et al., 2012a,b). The aim of the present study is to explore whether patients with SMI who are being treated with second-generation antipsychotics (Olanzapine and Risperidone) show differences in their activity and physical fitness compared with those with SMI who take other pharmacological treatments in order to define whether this population is at elevated risk of other disorders and if a specific intervention is justifiable.

2. Methods

2.1. Participants

The study procedure was approved by the Ethics Committee of Research, Malaga Northeast. The participants were recruited during a 6 month period from the mental health service of the Hospital Regional University of Malaga. The total sample consisted of 62 participants (37 men and 25 women), between 26 and 61 years of age, diagnosed with SMI by a psychiatrist of the Hospital Regional University of Malaga (a set of pathologies with, an ICD-10 diagnosis of an affective or non-affective functional psychotic disorder [codes F20-F22, F24, F25, F28-F31, F32.3 and F33.3]). Prior to participation in the study, participants had to sign an informed consent form to participate. The inclusion criteria were: (1) individuals aged between 18 and 65 years, (2) individuals who had not suffered a psychotic crisis in the last 4 weeks (these people were isolated), and (3) individuals who did not have any cardiovascular, neuromuscular or endocrine pathology that prevented them from performing physical exercise or limited their physical fitness. Participants were grouped into Risperidone consumer, Olanzapine consumer, non-Risperidone consumer and non-Olanzapine consumer. Non-Risperidone consumer and non-Olanzapine consumer participants received another kind of antipsychotic medication.

2.2. Study design and procedures

A cross-sectional study was performed. Data on sociodemographic variables were collected using a semi-structured interview format when the study was introduced to the participants and the aim of the research was explained. Anthropometric measurements (body weight, height and waist circumference) were collected according to the standards of the International Society for the Advancement of Kinanthropometry (Marfell-Jones et al., 2006).

The assessors were one physiotherapist and one occupational therapist who had previously been trained in the proper performance of physical tests and the scoring scale. The scale was explained to the patients and the examiners demonstrated how to perform the tests.

2.3. Outcome measures

The following 11 physical tests were used to measure physical fitness: passive knee extension test; calf muscle flexibility test; anterior hip flexibility test; functional shoulder rotation test; timed-stand test; partial sit-up test; seated push-up test; grip test; single leg stance, open and closed eyes; functional reach test; and the two minute step test (Cuesta-Vargas et al., 2011). Those tests include measures of the various categories of physical fitness (flexibility, balance, strength, and endurance).

Passive knee extension (PKE): The participant was positioned supine on a treatment table with hip and knee flexed at 90°. The passive knee extension was measured using a goniometer, with the fulcrum placed over the lateral femoral epicondyle and its arms in the direction of the greater trochanter and lateral malleolus respectively. Their ankle remained in a neutral position or in plantar flexion. If the knee went fully extended, the final value was recorded as 0°. If the knee did not extend, the value was recorded as negative (e.g., −40°). If the knee went beyond the fully straight position into hyperextension, the value was recorded as positive (e.g., +5°). The reliability of the PKE test was explored and compared with other clinical tests for assessing hamstring muscle as proposed by Gajdoski et al. (1993).

Calf Muscle Flexibility (CMF): The participant was positioned supine on a table, with the hip and knee on the side to be measured in as much extension as possible. The fulcrum of the goniometer was placed over the lateral malleolus, with one of its arms in the direction of the fibular head and the other one in parallel to the lateral midline of the fifth metatarsal. Their ankle was passively dorsiflexed and its angle measured while their knee remained in extension. If the participant could not reach neutral position, the angle was recorded as negative (e.g., −10°). If the participant went beyond neutral, it was recorded as positive (e.g., +10°). If the participant only reached neutral, it was recorded as 0°. The reliability of this test can be found in Ekstrand et al. (1982).

Anterior Hip Flexibility (AHF): The participant was positioned supine on a table, both hips flexed to 90°. The hip to be measured was flexed up to 100° with a hand beneath the lower back to ensure that it remained flattened. Opposite hip was kept at 90° and not allowed to move into extension during the test. The fulcrum of the goniometer was placed over the greater trochanter, with its arms aligned with the lateral midline of the pelvis and with the lateral midline of the femur respectively. The degrees of extension between the pelvis and thigh were measured before the pelvis began to move forward. If the thigh lowered to the table surface, the result was recorded as 0°. If the thigh did not reach the table, the angle was recorded as negative (e.g., −25°). The reliability of this test can be found in Ekstrand et al. (1982).

Functional shoulder rotation (FSR) (Apley's Scratch Test): The participant stood or was seated facing the back of a chair. The participant was instructed to reach one arm behind the head and down the back, while the other arm reached behind the hip and up the back. The participant was instructed to "try to touch their index fingers together." A tape measure was used to measure the distance in cm between the index fingers in this position (one arm was in flexion/abduction/lateral rotation; the other was in extension/adduction/ medial rotation). The arm on top defined the recorded side (i.e., left arm on top = left; right arm on top = right). If the fingertips touched, the distance was recorded as 0. If the fingertips could not touch, the separation was recorded as negative (e.g., 15.2 cm). If the fingers overlap, the overlap was recorded as positive (e.g., +2.5 cm). The FSR is a reproducible measure of upper extremity function task that was validated in people with disabilities. The reliability of this test can be found in Edwards et al. (2002).

The Timed-Stands Test (TST): The timed-stands test was the method to quantify functional lower extremity muscle strength (hip and knee extension). The test requires the participant to complete 10 full stands from a seated position as quickly as possible without the use of their arms. The participant was seated in a firm straight-backed chair with the elbows flexed to 90° during the test. The participant had to stand 10 times as quickly as possible and the time to perform the task in minutes and seconds was recorded. If the participant could not perform 10 repetitions, the number of repetitions and the time taken was recorded. The TST is a reproducible measure of lower extremity function that was validated in people with disabilities. The reliability of this test can be found in Newcomer et al. (1993).

Partial Sit-Up Test (PSUT): The partial sit-up test was the method to quantify abdominal muscle strength/endurance. The test requires the participant to complete as many sit-ups as possible from a supine position in one minute. The participant was positioned supine on a table or mat, with the legs placed on a chair or stool to keep their hips and knees bent at 90°. Their arms were placed straight out in front of the chest with the elbows extended during the entire test. Test-retest reliability and validity was established in a previous study (Faulkner et al., 1989).

Seated Push-Up (SPU): The seated push-up test is a method of