



Are physical activity levels associated with better health outcomes in people with epilepsy?



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ABSTRACT

The aim of the study was to investigate the association of physical activity in three categories (inactive, insufficiently active and active) with health outcomes in people with epilepsy. The dependent variables and the instruments used in the study were: a) quality of life – measured by Quality of Life in Epilepsy-31 for adults and Quality of Life in Epilepsy for Adolescents, b) side effects of medication – measured by Adverse Events Profile, c) depression – measured by Neurological Disorders Depression Inventory for Epilepsy, and d) state and trait anxiety – measured by State-Trait Anxiety Inventory. Physical activity levels were analyzed using the International Physical Activity Questionnaire (IPAQ) for adults in the commuting and leisure domains and Physical Activity Questionnaire for Adolescents (PAQ-A). Simple and multiple linear regression was used in the statistical analysis. The cross-sectional study with one hundred and one individuals was conducted in Pelotas/RS, Brazil, at the Neurology Clinic of the Faculty of Medicine of the Federal University of Pelotas. In the crude analysis, physical activity was positively associated with quality of life ($p < 0.001$) and negatively associated with depression ($p = 0.046$), state of anxiety ($p = 0.014$), trait of anxiety ($p = 0.015$) and side effect of medication ($p = 0.01$). In addition, physical activity levels explained 10% of the quality of life ($R^2 = 0.10$). In the adjusted analysis, physical activity remained associated with side effect of medication ($p = 0.014$) and was not associated with trait anxiety ($p = 0.066$). However, quality of life showed a positive linear trend ($p = 0.001$) while depression ($p = 0.033$) and anxiety state ($p = 0.004$) showed a negative trend according to physical activity levels. Physical activity was associated with health outcomes, and can be a nonpharmacological treatment in people with epilepsy for improving health and life conditions.

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1. Introduction

Epilepsy is a neurological disease which affects around 65 million people in the world [1]. Fisher et al. [2] proposed that this disease is characterized by a brain disorder defined by any of the following conditions: (1) at least two unprovoked seizures occurring in an interval longer than 24 h; (2) one unprovoked seizure and a risk greater than 60% of a new seizures; and (3) diagnosis of an epilepsy syndrome. When compared to the general population, people with epilepsy (PWE) show higher levels of depression and anxiety [3], which leads to a reduction in the quality of life scores [4–6]. In addition, the drugs used in the treatment of the disease, despite promoting significant seizure control [7], cause several side effects such as: weight gain [8], reduction in bone

mineral density [9], fatigue/tiredness, gastrointestinal disorders, appetite reduction, and hand shaking, among others [10].

Historically, PWE have been advised against participation in physical exercise and sports, mainly because of overprotection, fear, and ignorance about the risks and benefits of physical activity practice [11]. However, a number of studies reported that these activities may have a positive influence on the frequency and severity of seizures. Thus, recommendations in clinical practice and attitudes toward sports and epilepsy have changed considerably [11,12]. Recently, The Task Force on Sports and Epilepsy developed a consensus paper with general guidance concerning participation in physical exercise and sports for PWE. These suggestions are directed to physicians and other health care professionals involved in the treatment of PWE [12].

Studies, which compare physical activity levels and physical fitness among PWE and the general population, concluded that PWE had worse physical fitness and a greater number of individuals who never performed any physical activity [13,14]. In addition, a study, which compared teens with epilepsy to their siblings without epilepsy, found that

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teens with epilepsy participated less in sports activities than their control siblings [15].

Physical activity practice promotes several health benefits. In 2012, in a Lancet physical activity series, Lee et al. [16] reported that if physical inactivity levels were reduced by 25%, around 1.3 million deaths would be avoided each year. In addition to the benefits regarding chronic diseases, it is well known that physical activity practice reduces the levels of depression [17] and anxiety [18] in the general population, thus, improving quality of life [19]. Studies evaluating the association between physical activity practice and depression/anxiety in PWE reported positive results for the physically active [20,21]. A different study evaluating the influence of physical activity in the quality of life of PWE showed that the group which performed physical activity improved the general scores in this aspect and the control group did not show any alteration [22].

It is well known that PWE show worse health scores and undoubtedly, physical activity plays an important role in improving these scores in the general population [16–18]. However, few studies on this topic were found [20,23], mainly in low- and middle-income countries [21] where approximately 80% of PWE are living [24]. Therefore, the aim of this study was to verify the association between physical activity levels (inactive, insufficiently active and active) with scores regarding quality of life, depression, anxiety and side effects of medication in PWE.

2. Materials and methods

2.1. Participants

A cross-sectional study was carried out aiming at determining the influence of physical activity on different health outcomes in PWE. The study was conducted in Pelotas, southern Brazil, at the neurology clinic of the Faculty of Medicine of the Federal University of Pelotas. One hundred and one individuals (101) between 12 and 75 years diagnosed with epilepsy participated in the study. Data collection was carried out for five months, from December 1st 2015 to April 30th 2016.

2.2. Procedure

First, the director of the Medicine Faculty was contacted to obtain authorization for data collection. After which a visit was made to the clinic with the purpose of meeting the staff.

Data collection was carried out as follows: first, using the records of the neurology clinic in 2015, patients with epilepsy were diagnosed. Following this procedure a telephone contact was made with these individuals explaining the aims of the research and inviting them to take part. Second, at neurological service days, the researcher accessed the patient records prior to consultation to verify those who were diagnosed with epilepsy. While the patients waited for their consultation, the researcher invited them to participate in the study. This procedure was not conducted for first-time patients. In this case, the researcher waited for the consultation and if the doctor diagnosed the patient with epilepsy, he/she would invite him/her for the study.

2.3. Demographic and epilepsy data questionnaires

2.3.1. Dependent variables

The following continuous dependent variables were used in the present study: a) quality of life, measured using Quality of Life in Epilepsy Inventory-31 for adults (QOLIE-31) [25] and Quality of Life in Epilepsy Inventory for Adolescents (QOLIE-AD-48) [26]. The QOLIE-31 is made up of 31 questions distributed into seven domains: general quality of life, seizure worry, emotional wellness, energy and fatigue, cognitive function, social functioning and medication effects. On the other hand, QOLIE-AD-48 is made up of 48 questions distributed into eight domains: epilepsy impact, memory and concentration, attitude toward epilepsy, physical functioning, epilepsy stigma, social support, scholar behavior,

and health perception. Both instruments generated a continuous total score ranging from zero to 100. The higher the score, the higher the quality of life. This study used only the total score from both questionnaires. b) Side effects: the Adverse Effects Profile (AEP) scale is made up of 19 questions which were answered using a Likert-type scale; individuals with scores ranging from 19 to 76 and individuals above 45 points are considered at higher risk of side effects [27]. c) Depression was measured using the Neurological Disorders Depression Inventory for Epilepsy (NDDI-E) which consists of six questions generating a continuous score ranging from six to 24 points. Scores higher than or equal to 15 indicate a diagnosis of depression [28]; d) Anxiety: the short version of the State-Trait Anxiety Inventory (STAI) was used. The questionnaire is divided in two instruments, one assesses the anxiety status (STAI-S-6) and the other the anxiety traits (STAI-T-6). Each one consists of six questions ranging from six to 24 points. The higher the scores, the higher the state and anxiety traits [29].

2.3.2. Independent variable

To measure physical activity in adolescents and adults, the Physical Activity Questionnaire for Adolescents (PAQ-A) [30] and the International Physical Activity Questionnaire (IPAQ) [31] – long version, were respectively used. The IPAQ measures physical activity levels for a normal week in the domestic, leisure, commuting and work domains. However, this study only used the leisure and commuting domains, as the domestic and work domains seemed overestimated [32].

In the present study, the physical activity variable was categorized as follows: a) adults – inactive (less than 10 min of physical activity per week), insufficiently active (10 min or more per week and less than 150 min per week) and active (150 min or more of physical activity per week). b) Adolescents: inactive (0 min of physical activity per week), insufficiently active (more than 0 min and less than 300 min per week) and active (300 min or more of physical activity per week). Additionally, to calculate the scores for the IPAQ domains, minutes of vigorous physical activity were multiplied by two. The same process was followed for PAQ-A, in which sports were considered vigorous physical activities and, as a result, the reported time was also multiplied by two. The physical activity scores for leisure and commuting were added. As a cut-off point for the individuals considered active, recommendations from the World Health Organization (WHO) of 300 min of physical activity per week for adolescents and 150 min for adults in a week were used [33].

2.3.3. Control variables

The following variables were collected: 1) sociodemographic – sex (male/female), age (years), skin color (white, black, brown), marital status (single, married, widower, divorced), schooling (years), number of children (zero, one, two, three or more), income (reais), occupation (employed, unemployed, student or retired), and on social welfare (yes/no); 2) clinic – number of seizures during lifetime (≤ 15 seizures, > 15 seizures), seizure type (generalized, focal, focal secondarily generalized or unknown), etiology of seizures (idiopathic, symptomatic or unknown) duration of epilepsy (≤ 15 years, > 15 years), treatment (monotherapy/polytherapy), active epilepsy (yes/no) and seizure control (controlled, not always controlled, not controlled); 3) behavioral – smoking (never, ex-smoker, smoker); 4) health related – quality of sleep assessed by the Pittsburgh Sleep Quality Index (PSQI), containing 19 questions distributed in seven domains: subjective quality of the sleep, sleep latency, sleep duration, sleep efficiency, sleep disorders, drug-induced sleep use and diurnal disorder. Each item ranges from zero to three making up a total score of 21. The scores between zero and four indicate good sleep quality, scores between five and 10 show bad sleep quality and a score above 10 a sleep disorder is characterized [34]; stress levels – measured using Perceived Stress Scale (PSS-10), made up of 10 items regarding the situation in the last 30 days. Each item is answered according to the Likert scale ranging from zero (never) to four (very

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