

# The importance of regular physical activity in the mental health of the older adults

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**Abstract:** The present study had the general objective of evaluating the relationship between physical activity and mental health in older adults. For this, a cross-sectional survey was carried out with 35 older adults aged between 60 and 76 years old ( $65.31 \pm 4.50$ ). To assess the level of physical activity, the six-minute walk test (6MWT) was used, while mental health was measured using the geriatric depression scale (GDS). A comparison was made between the physically active and inactive groups (classified by the 6MWT) using the Student's *t*-test for GDS scores. In addition, the Ancova test was performed to compare groups for mental health outcome (GDS). The results show us that the mean age of the individuals was 65.31 with a standard deviation of 4.50. Among the older adults, 12 were classified as physically active and 23 as inactive. However, the main finding of this study lies in the difference between the groups for the mental health outcome, since the physically active group had a mean GDS lower (Mean = 3.33) than the physically inactive group (Mean = 7.30), with statistical significance ( $p = 0.05$ ). This is in line with the literature on the benefits of physical activity in preventing and reducing mental disorders. The study makes room for further studies, especially clinical and longitudinal trials, in order to better understand these real impacts of physical activity.

**Keywords:** older adults; mental health; physical activity

## 1. Introduction

The growth of the older population at the national and global levels presents itself as a major challenge for public health, considering that this population carries greater risks of chronic degenerative diseases and other morbidities (Spernovasilis et al., 2021). In this sense, maintaining health to prevent multimorbidities is extremely important in this population. Therefore, the promotion of educational actions in health is extremely important.

Furthermore, the literature tells us that there is an intimate relationship between the innate multimorbidities of old age and the individual's lifestyle, that is, there appear to be modifiable risk factors to mitigate the involvement of these pathologies (Lourida et al., 2019; Silva et al., 2014). Specifically, in relation to mental health, recent studies show that regularly practicing physical activity appears to positively contribute to the treatment of mental disorders such as depression and anxiety (Kandola et al., 2019; Pickersgill et al., 2022).

The mechanisms promoted by physical activity that result in improvements in mental health, although still somewhat unknown, seem to be related to three main aspects: neurobiological changes, through the release of substances such as brain-derived neurotrophic factor (BDNF) that promote neuroplasticity (neural capacity to adapt to changes) (Vecchio et al., 2018); psychophysiological, through changes in the

autonomic nervous system and homeostatic return after stressful episodes (Salmon, 2001); and psychosocial, through relationships with peers provided by physical activity, thus meeting the basic psychological need for social relationships (Menhas et al., 2023; Salvy et al., 2009).

On the other hand, physical inactivity and poor lifestyle habits can contribute to the development of several chronic non-communicable diseases (NCDs) (Menhas et al., 2021). It is worth noting that NCDs are among the biggest causes of mortality in advanced ages, as there are generally functional disabilities and a lower degree of autonomy due to the degenerative processes that occur (Ribeiro et al., 2016).

Therefore, we can see that in this aging process, maintaining mental and physical health through the practice of physical activity seems to be a great ally in preventing the development and/or progress of psychological and physical illnesses (Chapman et al., 2013; Liu et al., 2024) by increasing autonomy, including in the daily life activities of the older adults (Rodrigues et al., 2016). Therefore, physical activity becomes a great ally in maintaining mental health, becoming a modifiable factor in the relationship with constant improvement in cognitive factors in successful aging (Liu et al., 2024; Moore et al., 2015; Rowe and Kahn, 1997; Vecchio et al., 2018).

Thus, the general objective of the present study was to evaluate the relationship between physical activity and mental health in older adults. As specific objectives, we list: evaluating the physical activity levels of the older adults; and assessing the mental health of the older adults. We believe that with the findings of this study, it is possible to contribute to increasing understanding of the benefits of physical activity, especially the importance of reaching recommended levels for health, in relation to mental health aspects.

## **2. Methods**

This is a cross-sectional study carried out with 35 older adults (23 women and 12 men) aged between 60 and 76 years. Prior to their participation in the research, individuals had to agree to participate by signing the Free and Informed Consent Form (FICF).

Participants were invited as volunteers by verbal invitation to participate in the study, configuring a non-probabilistic convenience sample. The data were obtained in the period between 2nd and 12th June 2023.

This study met the criteria relating to the guidelines and regulatory standards for research with human beings, in accordance with Resolution 466/12 of the National Health Council and the Declaration of Helsinki.

The study assessed the functional capacity of older adults using the 6-Minute Walk Test (6MWT) and evaluated symptoms of depression using the Geriatric Depression Scale (GDS).

### **2.1. Procedures**

After signing the informed consent form, the individuals underwent the six-minute walk test (6MWT) in a 30-meter corridor. In the 6MWT, the older adults were instructed to walk as much as possible at their own pace for six minutes, without running, being able to reduce the pace or interrupt the test according to their needs, as

well as returning to the test, if possible, as long as the six-minute timer has not yet finished. The participant will also be encouraged by catchphrases (such as, for example, “you are doing great”) and will be informed about the time remaining to finish the test (“only 2 minutes left”).

It is worth noting that according to the individual results of each participant, the individuals were divided into two groups, physically active and physically inactive, based on the results of the 6MWT prediction equation (Enright and Sherrill, 1998) (that use individual variables such as age, height, weight, and gender), that is, older adult people who did not reach the minimum recommended in the equation were classified as physically inactive, while the older adults who managed to equal or exceed what was required by the 6MWT predictive equation were placed in the physically active group.

Soon after, the individuals responded to the Geriatric Depression Scale (GDS) (Almeida and Almeida, 1999; Yesavage et al., 1982) in the form of an interview, that is, the researcher verbally prepared the questions for the participants and filled them in according to the answers.

## **2.2. Instruments**

### **2.2.1. Six-minute walk test**

The 6MWT was performed in a 30-meter corridor in a flat location in accordance with guidelines (Peeters and Mets, 1996). The 6MWT is widely used to assess functional exercise capacity. Over time, it has proven to be reliable, objective, inexpensive, and easy to apply, regardless of the patient’s age or educational level. It has clinical value for obtaining an indicator of functional capacity, evaluating the response to the implementation of therapeutic approaches, and predicting morbidity and mortality in patients with respiratory and cardiovascular pathologies. Predictive equations were used to identify and classify individuals into physically active and inactive groups.

Proposed equation to evaluate the 6MWT (Enright and Sherrill, 1998):

- Men:  $6MWT (7.57 \times \text{height cm}) - (5.02 \times \text{age}) - (1.76 \times \text{weight kg}) - 309$
- Women:  $6MWT (2.11 \times \text{height cm}) - (2.29 \times \text{weight kg}) - (5.78 \times \text{age}) + 667$

### **2.2.2. Geriatric depression scale**

The geriatric depression scale is dedicated to tracking symptoms of depression in older adults with yes or no answers, in which each positive answer generates one point. It was developed by Yesavage et al. (1982) and validated in Brazil by Almeida and Almeida (1999).

Interviews were carried out, in which the older people were assessed for depressive symptoms using the GDS. The version used in the present study is the reduced version with 15 questions (GDS-15).

The study adopted a cutoff point for scores of 5, 6, and 11. Values below six were considered normal, values between six were considered indicative of mild depression, and values above 11 indicated severe depression.

### 2.3. Statistical analysis

Firstly, it was checked whether the sample was parametric, that is, whether it presented a normal distribution in the Kolmogorov-Smirnov test. As the result was favorable to a normal distribution, the Student's *t*-test was used to compare the means between the independent samples separated by the cutoff point of being considered physically active or inactive for the GDS scores.

Furthermore, it was verified whether there was a significant difference between genders using Pearson's chi-square test, and the Ancova test was performed to compare groups for the mental health outcome (GDS). All statistical tests were performed using the Statistical Package for the Social Sciences – SPSS software (version 21.0).

### 3. Results

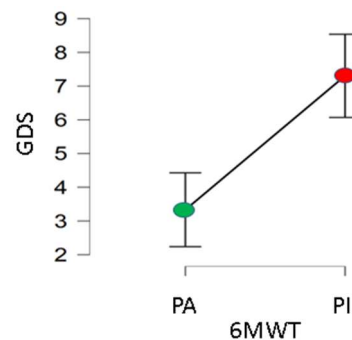
In **Table 1**, we can see that 35 older people participated in the research. Among active (PA) and physically inactive (PI) older adults, the majority were women (23 participants—65.7%). Furthermore, we can observe that the physically active group was smaller (12 participants) than those considered inactive (23 participants), but still had lower rates of depression.

**Table 1.** Sample characteristics of physically active and inactive older adults and depression index.

Variable	All (n = 35)	Physically Active (n = 12)	Physically Inactive (n = 23)	Statistic	<i>p</i>
Idade (anos)	65.31 ± 4.50	65.50 ± 4.58	65.21 ± 4.57	<i>t</i> = 0.173	0.904
Sexo				X <sup>2</sup> = 0.699	0.403
Homem	12 (34.3%)	3 (35%)	9 (39.1%)		
Mulher	23 (65.7%)	9 (75%)	14 (60.9%)		
EDG	5.94 ± 3.14	3.33 ± 1.72	7.30 ± 2.85	<i>t</i> = -4.404	0.050*

Note: X<sup>2</sup>: Pearson's chi-square test; *t*: Student's *t* test; \*statistically significant; ± standard deviation.

In **Figure 1**, we can see that there was a significant difference between the groups (*p* = 0.05), with the physically active group presenting a lower average in terms of the occurrence of depression (3.33 ± 1.72) compared to the physically inactive group (7.30 ± 2.85).



**Figure 1.** Comparison between groups of DGS scores. Note: PA: physically active; PI: physically inactive; GDS: Geriatric Depression Scale; 6MWT: 6-minute walk test.

## 4. Discussion

The results of the study demonstrate that physical exercise appears to be related to reducing depression rates, thus improving the functional capacity of older adults. In the current study, the average number of indicators of depressive symptoms in the group of active older adults was much lower than in the group of inactive older adults, therefore, in the aging process, physical exercise is not only an ally in promoting autonomy to the older adults in order to promote physical functionality, but also promotes forms of prevention and recovery of cognitive functions in a healthy way, as demonstrated by the literature on successful aging (Bosnes et al., 2019; Chapman et al., 2013; Vecchio et al., 2018).

Some recent studies show similar results, as in the findings of Liu et al. (2024), who reported that physical activity influences general health behaviors, which leads to an increase in well-being and mental health, ultimately affecting psychological resilience, as demonstrated in a conceptual model proposed.

However, it seems that it is not just the act of physical activity alone that would result in optimized benefits in terms of mental health conditions (i.e., depression and anxiety), as we could consider by making an analogy to the WHO slogan, “every step counts”, as recent data suggest that there is an optimal level of weekly physical activity to optimize positive results in terms of mental health (so that exaggerated values above or below this percentage can even result in harm) (Shimura et al., 2023). According to the authors, it is necessary to have 25.7 h/week for depression, 21.6 h/week for state anxiety, 22.58 h/week for trait anxiety, and 25.41 h/week for resilience (Shimura et al., 2023).

Studies warn that exercise would improve mental health through neural (increase in neurotrophic substances such as BDNF and irisin), psychophysiological (regulation of the autonomic nervous system), and social (sense of social belonging) mechanisms (Dishman et al., 2000; Fu and Levine, 2013; Z. Tan et al., 2021; Wrann et al., 2013).

In relation to social benefits, specifically, the literature (Hou, 2021; Li and Quach, 2021), also shows that, especially in older adults, considering the bioecological model of human developmental (Bronfenbrenner and Morris, 2006; Navarro and Tudge, 2023), exercise can be an important means of promoting social interaction with peers, building the notion of social communities (Portegijs et al., 2022), which in addition to promoting benefits in terms of the biopsychosocial well-being of this population, considering that social relationships are a basic psychological need (Shin and Park, 2022; Siedlecki et al., 2014; Z. Tan et al., 2021), would benefit these individuals in terms of adherence to the practice due to the motivation of social commitment (Schlenk et al., 2021), as happens in practices such as CrossFit, for example (Dominski et al., 2020, 2021).

However, there are limitations to this study, one of which concerns the small sample size, but it seems to be a common problem in carrying out exercise intervention studies in older adults (Bethancourt et al., 2014) because this non-probabilistic convenience sampling method was used, but it can increase selection bias. Furthermore, this is a cross-sectional study, which impacts the extrapolation and generalization of data. Finally, the mental health indices were self-reported, which affects the social desirability bias (which may overestimate or underestimate the data)

(H. C. Tan et al., 2022) and the memory, since, in patients with mental disorders, such as depression, it seems to be increased (Bianchi et al., 2020).

However, the data corroborates the previous understanding that exercise may then act to slow the progress of degenerative diseases, NCDs, and other mental disorders (Portugal et al., 2013; Ribeiro et al., 2016). Therefore, the adoption of a healthier lifestyle model, such as being more physically active, can then increase survival, with neurological changes such as neural stimulation that can contribute to successful aging, ensuring a better quality of life and contributing to the development of skills to deal with aging on a daily basis in a healthier way.

## 5. Conclusion

Therefore, we can see that physical exercise, especially in old age, is of great value in reducing mental disorders, such as depression, as evaluated in the present study. Therefore, in addition to the physical benefits of exercise, such as reducing body fat, regular practice appears to improve levels of physical functionality, optimize activities of daily living, and reduce the incidence of mental disorders. However, more studies, especially those with a longitudinal approach, are needed to better understand the real implications of physical activity on mental health in older adults.

**Author contributions:** Conceptualization, VMLM and SGM; methodology, VMLM and SGM; formal analysis, VMLM; investigation, SGM; resources, VMLM and SGM; data curation, VMLM; writing—original draft preparation, VMLM and SGM; writing—review and editing, VMLM; visualization, SGM; supervision, VMLM; project administration, VMLM. All authors have read and agreed to the published version of the manuscript.

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