RBCDH Brazilian Journal of KINANTHROPOMETRY and Human Performance

DOI: http://dx.doi.org/10.5007/1980-0037.2012v14n1p125

original article

# The general functional fitness index and symptoms of depression in older adults

## *Índice de aptidão funcional geral e sintomas depressivos em idosos*

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**Abstract** – Depression is considered the most common mental health disorder in older adults. Studies have shown that physical activity can reduce depressive symptoms in this population with immediate clinical effects. The objective of this study was to analyze the association between symptoms of depression and General Functional Fitness Index (GFFI) in elderly physical exercise practitioners. The Geriatric Depression Scale of Yesavage (GDS-15) was used to evaluate the presence of depressive symptoms, and the AAHPERD (American Alliance for Health, Physical Education, Recreation and Dance) fitness test battery for assessment of GFFI. We used descriptive statistics and Pearson correlation with 95% confidence intervals. The population consisted of 146 elderly participants of the Floripa Ativa Program - Phase B, with the sample consisting of 77 older adults with a mean age of 67.9 (SD 5.7) years. Among them, 13 exhibited symptoms of depression and 33 were fit, with the GFFI within normal range. We found a negative (r = -0.307) and significant (p = 0.007) correlation between GDS and GFFI. This inversely proportional relationship demonstrates that subjects with a better GFFI had a lower incidence of depressive symptoms. As the GFFI value is obtained through physical tests, it can be suggested that physical exercise supported the reduction of depressive symptoms in the study group.

**Key words**: Depressive symptoms; Exercise; Older adults; Physical fitness.

**Resumo** – *A depressão é considerada o problema de saúde mental mais comum na população idosa. Estudos têm demonstrado que a prática regular de atividades físicas pode reduzir os sintomas depressivos em idosos, proporcionando efeitos clínicos imediatos. Neste contexto, o objetivo deste estudo foi verificar a associação entre a presença de sintomas depressivos e o Índice de Aptidão Funcional Geral (IAFG) em idosos praticantes de exercícios físicos. Aplicou-se a Escala de Depressão Geriátrica de Yesavage (GDS-15) para verificar a presença de sintomas depressivos e a bateria de testes físicos da AAHPERD (American Alliance for Health, Physical Education, Recreation and Dance), para obter o IAFG. Utilizaram-se a estatística descritiva e a correlação de Pearson, com nível de 95% de confiança. A população foi composta por 146 idosos, participantes do Programa Floripa Ativa - Fase B, sendo a amostra constituída de 77 idosos com média de 67,9 (DP 5,7) anos de idade. Dentre os avaliados, 13 apresentaram sintomas de depressão e 33 se enquadraram com IAFG regular. Encontrou-se uma correlação negativa (r= -0,307) e significante (p=0,007) entre o IAFG e a GDS. Esse fato demonstra uma relação inversamente proporcional, ou seja, idosos com melhor IAFG apresentaram menor incidência de sintomas depressivos. Considerando que o valor do IAFG é obtido por meio de testes físicos, sugere-se que, para o grupo estudado, a prática de exercícios físicos pode ter contribuído para atenuar os sintomas depressivos.*

**Palavras-chave**: *Aptidão física; Depressão; Exercício; Idoso.*

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Received: 12 June 2011
Accepted: 11 September 2011

## INTRODUCTION

Brazil has witnessed a gradual increase in longevity, mainly due to lower fertility and mortality rates. According to the latest census report of the Brazilian Institute of Geography and Statistics (IBGE), in 2010 in Brazil, 7.4% of the population was 65 years of older[1]. Such a trend has raised new concerns about the process known as population aging, whose consequences may translate into an increase in disability, greater disease burden in the population, and increased burden on public health care[2].

Mental illnesses are among the most common chronic diseases affecting the older adults, especially dementia and depression. In Brazil, it is estimated that approximately 20 million older adults people have depression[3]. Currently, depression ranks as the fifth most prevalent health problem in the world and is increasingly becoming a cause of death or disability[4]. Depression has serious consequences, including suffering of patients and caregivers, physical disability associated with physical illness and cognitive disorders, increased health care costs, and increased mortality related to suicide and physical illness[5].

In view of an aging population, global strategies targeting the health of older adults, such as the Active Ageing policy[6] and the Age-Friendly Cities project[7] proposed by the World Health Organization (WHO), have been developed as a guide toward longevity with quality of life, considering an active lifestyle based on the triad of health, participation and security.

Specifically regarding the health of the older adults[8], attention is drawn to chronic noncommunicable diseases (NCD) and functional disability, highlighting the important role of physical activity, healthy eating, and mental health, among other aspects, for the maintenance of good standards of health. The list of important services to be offered to the older adults includes preventive screening, physical activity, injury prevention education, nutritional counseling, and therapies targeting mental health[9].

Several scales have been developed to assess depressive symptoms. Among these, the Geriatric Depression Scale (GDS) is the most often used to detect depressive symptoms in the older adults population and to monitor the severity of symptoms over time. This instrument has already been validated in Brazil[10].

Although it is known that biological and social aspects play an important role in triggering depression, the influence of aging is not generally considered as part of this process. In this context, it is well established in the literature that regular physical activity can reduce depression or its symptoms in the older adults, providing immediate clinical effects[6]. According to Martinsen[5], changes in lifestyle, such as a habit of regular exercise, may improve physical fitness level, be a major preventive factor, or even help in the treatment of diseases.

The objective of this study was to investigate the association between the general functional fitness index (GFFI) and the presence of depressive symptoms in older adults engaged in physical activity.

## METHODS

The study population involved 146 older adults participating in the "Active Floripa" program – phase B, which was conducted in 6 local public health units (*Ingleses*, *Capoeiras*, *Saco Grande*, *Lagoa da Conceição*, *João Paulo*, and *Córrego Grande*) located in Florianópolis, city capital of the state of Santa Catarina, Southern Brazil. The study was based on a convenience sample of 77 older adults aged 67.9±5.7 years, 19 men and 58 women. Inclusion criteria were age 60 years or over and tests performed in December 2008. Participants attending less than 75% of classes in a semester were excluded from the study.

The older adults participated in a physical activity program consisting of 60-minute physical exercise classes, 3 times a week. At least 50% of classes were performed at an intensity between 60 and 75% of maximum heart rate. Monitoring was performed by palpating the radial artery for 15 seconds.

The following physical qualities were emphasized in the physical activity program: strength endurance, balance, flexibility, coordination, and aerobic endurance. Specific exercises to strengthen pelvic floor muscles and for muscle relaxation were also performed.

Sociodemographic data (age, sex, marital status, income, and education) were collected from the participants' registration forms.

We used the short form of the GDS (GDS-15), an instrument developed by Yesavage that has been widely used and validated as a diagnostic tool for depression in older adults patients[9,10]. The GDS-15 is a 15-item scale used to identify depressive symptoms in the older adults. The questions are answered "yes" or "no", and a score ≥ 5 points is suggestive of depression, whereas a score ≥ 11 points indicates severe depression.

The GFFI is an indicator calculated by the sum of physical tests included in the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD) Functional Fitness Assessment for Adults Over 60 Years[11]. The tests measure coordination, upper body strength and aerobic endurance, flexibility, agility, and dynamic balance. The sum of the percentiles of physical tests results in the GFFI value.

GFFI is obtained by calculating score percentiles from the results of all five AAHPERD tests. The data are ranked from worst to best result, receiving scores from 0 to 100%, respectively. Based on this ranking, the data are divided into five groups, establishing a qualitative classification of values as follows: below the 20th percentile (very poor); between the 21st and 40th percentile (poor); between the 41st and 60th percentile (regular); between the 61st and 80th percentile (good); above the 81st percentile (very good).

Data were collected during individual interviews for the application of GDS and AAHPERD tests with the older adults participating in the "Active Floripa" program – phase B in the place where the classes were held, outside of class hours. Physical tests and GDS were administered

by previously trained Physical Education students under the supervision of trained professors. Data were analyzed using the Statistical Package for the Social Sciences (SPSS), version 15.0, for Windows®. Descriptive statistics (mean, standard deviation, absolute and relative frequency) and Pearson correlation coefficient were calculated. The level of significance was set at 95%.

The study was approved by the Research Ethics Committee of Universidade Federal de Santa Catarina (protocol no. 011/06), Brazil, and written informed consent was obtained from all participants.

## RESULTS

Of 77 older adults included in the study, most participants had a monthly family income of 1 to 2 minimum wages (n = 27), were married (n = 41) and had 4 to 7 years of education (n = 33) (Table 1).

**Table 1**. Sociodemographic characteristics of older adults participating in the "Active Floripa" program – phase B. Florianópolis, Southern Brazil, 2006

| Variables | Absolute frequency (n) | Relative frequency (%) |
|---|---|---|
| Sex | | |
| Female | 58 | 75.3 |
| Male | 19 | 24.7 |
| Income* | | |
| Up to 1 minimum wage | 06 | 7.8 |
| 1 to 2 minimum wages | 27 | 35.0 |
| 2 to 3 minimum wages | 11 | 14.3 |
| 3 to 4 minimum wages | 15 | 19.5 |
| 4 to 6 minimum wages | 12 | 15.6 |
| More than 6 minimum wages | 06 | 7.8 |
| Marital status | | |
| Married | 41 | 53.2 |
| Widow(er) | 31 | 40.3 |
| Divorced, separated, single | 05 | 6.5 |
| Level of education | | |
| Illiterate | 01 | 1.3 |
| 1 - 3 years | 15 | 19.5 |
| 4 - 7 years | 33 | 42.8 |
| 8 years or more | 28 | 36.4 |

* One minimum wage was equivalent to R$ 350.00 *reais* (Brazilian currency) per month in 2006.

Only a few participants (n = 13) reported depressive symptoms, and 33 had a regular GFFI (Table 2).

There was a significant negative correlation (r = -0.307; p = 0.007) between GFFI and GDS score, demonstrating that the higher the GFFI, the lower the GDS score (Figure 1).

**Table 2**. GDS and GFFI classification of older adults participating in the "Active Floripa" program – phase B. Florianópolis, Southern Brazil, 2006

| Variables | Absolute frequency (n) | Relative frequency (%) |
|---|---|---|
| GDS-15 | | |
| Presence of depressive symptoms | 13 | 16.9 |
| Absence of depressive symptom | 64 | 83.1 |
| GFFI | | |
| Very poor | 05 | 6.5 |
| Poor | 20 | 26 |
| Regular | 33 | 42.9 |
| Good | 17 | 22.1 |
| Very good | 02 | 2.6 |

GDS-15 = 15-item Geriatric Depression Scale; GFFI = general functional fitness index.

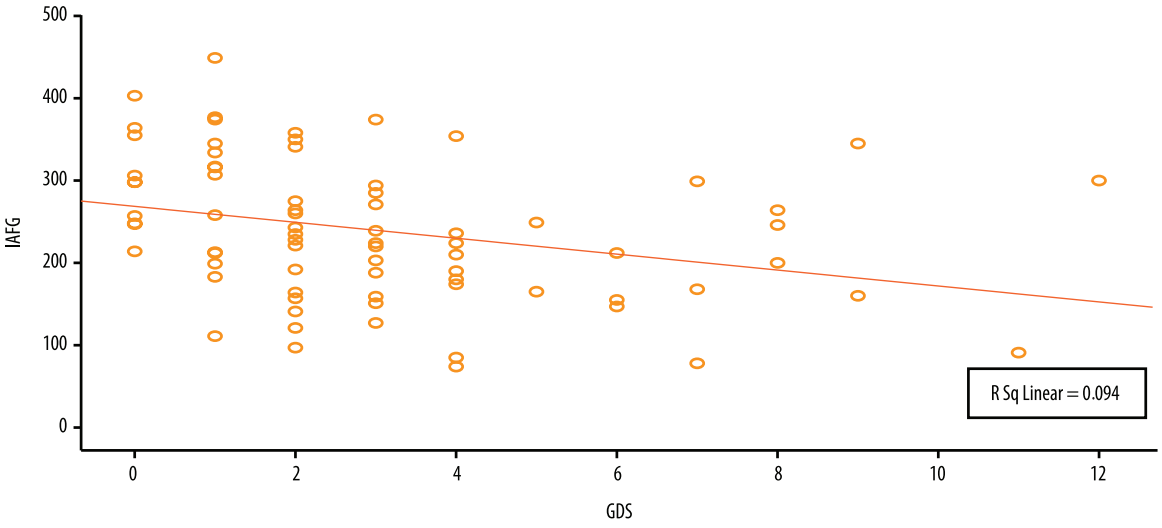


**Figure 1**. Correlation between general functional fitness index (GFFI) and Geriatric Depression Scale (GDS) in older adults participating in the "Active Floripa" program – phase B. Florianópolis, Southern Brazil, 2006.

## DISCUSSION

In this study, the prevalence of older adults with depressive symptoms (n = 13, 16.9%) was within the range of percentages for the world population aged 65 years or older, ranging from 5 to 35% according to disease severity[12].

Although depression is a psychiatric illness commonly found among the older adults, recognition and diagnosis is often difficult due to its multifactorial character and because the disease is generally regarded as an aging-related disorder[13].

Some studies have reported on health status as one of the main aspects associated with depression, including functional decline, chronic diseases, cognitive impairment[14], poor social conditions[15], advanced age, and female sex[16].

However, it is worth noting that no theory has satisfactorily explained the etiology of depression in the older adults. Changes in the central nervous system (CNS) and increased biological susceptibility are possible

explanations, in addition to the fact that the older adults are subject to a greater number of psychological and social stressors than any other age group, such as social decline, loss of productive roles, loneliness, and loss of loved ones. Moreover, deterioration of physical and mental capacity restricts the individual's ability to interact with the environment, intensifying social isolation. Therefore, depression in the older adults appears to be a heterogeneous product of the interaction between several predisposing and triggering factors, in varying proportions[17].

In this study, 33 (42.9%) participants had a regular GFFI. It is important to note that this index is assessed according to the individual's age range, and the higher the GFFI, the better the functional fitness. These results corroborate the findings of Ribeiro et al.[18], who investigated GFFI using AAHPERD tests in women with a mean age of 67.7 years participating in a 5-month exercise program and found that 42.9% of the group had a regular GFFI. Similar results were also found by Rosa et al.[19], who reported that most of their program participants had a regular GFFI.

A habit of regular physical activity is an important factor for the maintenance of functional fitness in older adults[20]. Although the natural aging process and/or aging-related factors lead to a loss of different physical qualities, regular physical exercise seems to reduce the negative effects of aging on physical capacity, delaying impairment in activities of daily living and prolonging active, independent and healthy life expectancy of the older adults[19].

Furthermore, national[22] and international[23] studies report on the benefits of physical activity on depressive symptoms, which are corroborated by the present results, based on the significant correlation ($r = -0.293$; $p = 0.01$) between GFFI and GDS score. This finding shows an inversely proportional relationship, i.e., in the study sample, older adults with a better GFFI had lower prevalence of depressive symptoms.

According to systematic reviews conducted by Frazer et al.[22] and Blake et al.[24], there is evidence that exercise improves mood and reduces depressive symptoms in the older adults.

In this sense, according to Chodzko-zajko et al.[25], regular exercise participation by older adults is associated with significant improvements in psychological health and well-being. Blumenthal et al.[26] conducted a study with 156 older adults with depressive symptoms and reported that, after 16 weeks of treatment, regular physical activity may be considered an alternative to antidepressants for treatment of depressive disorder.

Physical exercise for the older adults has been suggested based on the beneficial effects on their self-esteem and self-concept[25]. Physical activity, especially when performed with others, increases self-esteem in the older adults, contributes to improved psychosocial relationships and emotional balance, in addition to being associated with several factors that result in a better quality of life[27].

Gains in muscle strength, bone mass and performance of joints are other benefits that older adults can achieve by engaging in adequate physi-

cal activity on a regular basis. These aspects are also an important factor in the prevention of limitations in activities of daily living, falls, and other accidents, which are also seen as comorbid conditions associated with depression[27].

From the standpoint of mental health, in the older adults, psychomotor slowness and lack of physical mobility cause low self-esteem, decreased participation in community activities, and reduced involvement in social life and relations. As a consequence, mental suffering, the sense of functional disability and feelings of isolation and loneliness are intensified and may lead to depression. Therefore, engagement in physical activity appears to be important in this context, because a habit of regular exercise may prevent the development of depressive symptoms or even help to reduce these symptoms[11].

The main limitations of this study were: (a) convenience sampling, which prevents a generalization of results; (b) absence of a control group, which would allow us to better exploit the results and has prevented us from drawing some conclusions from the results; (c) and the fact that all the older adults investigated were already participating in a physically active group, which is likely to be an indicator that these individuals have less evidence of depressive symptoms. However, a strength of this study is that it describes the characteristics of older adults engaged in a physical activity program, which serve as a source of information for professionals in this field. Another strength to be mentioned is the fact that the sample was assessed by means of a set of tests that has been used worldwide.

The present study found a significant inverse association between GFFI and GDS score, demonstrating that older adults with a better GFFI had fewer depressive symptoms. Considering that GFFI values can be obtained by means of physical tests, it is worth noting that, in the study group, regular exercise participation may be supporting the absence of depressive symptoms.

Finally, this study confirms the importance of physical exercise participation by older adults, as depressive symptoms are often detected in the older adults because of several biological, psychological and social changes occurring at this stage of life.

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