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Association of Quality of Life and Anxiety Indicators with the Physical Capacity of Elderly: A Crossover Study

Asociación de Indicadores de Calidad de Vida y Ansiedad con la Capacidad Física de las Personas Mayores: Un Estudio Transversal

Associação dos Indicadores da Qualidade de Vida e da Ansiedade com a Capacidade Física de Idosos: Um Estudo Transversal

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ABSTRACT

The aging process can lead to muscle weakness, decreased physical capacity, and joint mobility, thus reducing the quality of life of the elderly population and consequently increasing their levels of anxiety. The objective of this study was to correlate the indicators of quality of life and anxiety with the physical capacity of the elderly. In the present study, 12 elderly people ($M = 68$; $SD = 5$ years old) were selected, who answered a quality of life questionnaire (SF-36) and the indicators of functional ability, pain, general health status, and mental health and the BAI questionnaire to determine the level of anxiety. Physical capacity was determined by the six-minute walk test (6MWT), observing the number of laps and distance covered. The study was accepted by the local ethics committee and everyone signed the informed consent form. For statistical analysis, descriptive statistics with mean \pm standard deviation and Pearson's correlation with a level of significance at ≤ 0.05 for rejecting the null hypothesis. The distance covered in the 6MWT (486.8 ± 58.4 m) had a significant correlation with MS (68.7 ± 14.2 ; $r = 0.60$, $p = 0.04$) and with the level of anxiety (5.2 ± 4.0 ; $r = -0.65$, $p = 0.02$). The distance covered was associated with mental health and anxiety. More studies should be carried out to better determine the impact of physical activity on the quality of life of the elderly.

Keywords: mental health, aging, physical activity, anxiety.

RESUMEN

El proceso de envejecimiento puede conducir a debilidad muscular, disminución de la capacidad física y movilidad articular, reduciendo así la calidad de vida de la población anciana y consecuentemente aumentando sus niveles de ansiedad. El objetivo del estudio fue correlacionar los indicadores de calidad de vida y ansiedad con la capacidad física de los ancianos. En el presente estudio fueron seleccionados 12 adultos mayores (68 ± 5 años), quienes respondieron un cuestionario de calidad de vida (SF-36) y los indicadores de capacidad funcional, dolor, estado general de salud y mental. salud y el cuestionario BAI para determinar el nivel de ansiedad. La capacidad física se determinó mediante la prueba de caminata de seis minutos (6MWT), observando el número de vueltas y la distancia recorrida. El estudio fue aceptado por el comité de ética local y todos firmaron el formulario de consentimiento. Para el análisis estadístico se utilizó estadística descriptiva con media \pm desviación estándar y prueba de correlación de Pearson con $\alpha \leq 0.05$. La distancia recorrida en el 6MWT (486.8 ± 58.4 m) tuvo una correlación significativa con la EM (68.7 ± 14.2 ; $r = 0.60$, $p = 0.04$) y con el nivel de ansiedad (5.2 ± 4.0 ; $r = -0.65$, $p = 0.02$). La distancia recorrida se asoció con la salud mental y la ansiedad. Se deben realizar más estudios para determinar mejor el impacto de la actividad física en la calidad de vida de las personas mayores.

Palabras clave: salud mental, envejecimiento, actividad física, ansiedad.

RESUMO

O processo do envelhecimento pode ocasionar fraqueza muscular, diminuição da capacidade física e da mobilidade articular, podendo assim diminuir a qualidade de vida da população idosa e também consecuentemente aumentar os seus níveis de ansiedade. O objetivo deste estudo foi correlacionar os indicadores da qualidade de vida e da ansiedade com a capacidade física de idosos. No presente estudo foram selecionados 12 idosos ($M = 68$; $p = 5$ anos), os quais responderam a um questionário de qualidade de vida (SF-36) sendo selecionados os indicadores de capacidade funcional, dor, estado geral de saúde e saúde mental e o questionário de BAI para determinação do nível de ansiedade. A capacidade física foi determinada pelo teste de caminhada de seis minutos (TC6M) sendo observado o número de voltas e distância percorrida. O estudo foi aceite pelo comitê de ética local e todos assinaram o termo de consentimento informado. Para análise estatística foi utilizada a estatística descritiva com média e desvio padrão, bem como o teste de correlação de Pearson, assumindo-se um nível de significância de ≤ 0.05 para rejeitar a hipótese nula. A distância percorrida no TC6M (486.8 ± 58.4 m) obteve uma correlação significativa com a SM (68.7 ± 14.2 ; $r = 0.60$, $p = 0.04$) e com o nível de ansiedade (5.2 ± 4.0 ; $r = -0.65$, $p = 0.02$), e não apresentou correlação significativa com a CF (80.4 ± 14.8 ; $r = 0.21$), a Dor (73.2 ± 21.0 ; $r = 0.34$) e o EGS (84.8 ± 13.2 ; $r = -0.11$). A distância percorrida obteve associação com a saúde mental e com a ansiedade. Mais estudos devem ser realizados para melhor determinar o impacto da atividade física na qualidade de vida de idosos.

Palavras chave: saúde mental, envelhecimento, atividade física, ansiedade.

INTRODUCTION

It is well known that advanced age is related to several different disabilities which, at some point, will result in reduced functional ability and decreased quality of life (QoL) (Vanleerberghe et al., 2017). Aging process is progressive, and it can vary greatly between people and is influenced by genetic and environmental factors, including lifestyle (Park et al., 2014). According to recent data, Brazilian elderly (aged 60 and over) was approximately 29.5 million

people. This number represents about 14% of the total population of the country Instituto Brasileiro de Geografia e Estatística (IBGE, 2021). It is important to emphasize that the elderly population in Brazil has grown over the years due to the increase in life expectancy and the decrease in the birth rate (Palloni & Souza, 2013). Demographic projections indicate that aging process should continue in the coming years, which will demand specific attention and

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policies to meet the needs of the elderly, specially to sedentary lifestyle and decreased quality of life (Santos & Fernandes, 2018; Lima-Costa et al., 2020).

Sedentary behavior, often observed in the elderly population is a determining factor for the elderly to reduce their autonomy and become dependent, generating a vicious cycle, since inactivity reduces physical abilities. It is associated with other conditions such as reduced self-esteem, stress, depression, and the emergence of chronic degenerative diseases, which in turn contribute even more to inactivity and consequent aging (de Souto Barreto, 2015). Functional ability represents one of the most important parameters or concepts in relation to health, physical fitness, and quality of life in this population. Thus, functional elderly are an individual who can perform independently and satisfactorily their daily living activities, maintaining their relationships and social activities, and free to exercise their rights and duties as citizens and, therefore, the loss of functional abilities represents a great loss for health and quality of life (Alencar et al., 2010; Borges et al., 2010). Even in young people, vitality, psychological well-being, and mental health appear to be essential for the good practice of physical exercise and sport (Trujillo, 2023). Other studies have shown that Physical Capacity in Elderly own that regularity and hours of physical exercise are associated with vitality and quality to life in the elderly (Antunes, 2022), as well as the level of physical activity seems to have an impact on the psychophysical health of this same population (Parra-Rizo, 2023).

Therefore, important attention has been given to this area, since physical disability affects a large part of this population, causing difficulties in the face of numerous everyday situations, reducing activities of daily living. The fact of becoming dependent makes the elderly feel devalued, which can result in the development of mental disorders, such as depression and anxiety (Meeks et al., 2007). In addition, with aging, there is a progressive reduction in physical abilities (Salthouse, 2010). Physical capacity plays a crucial role in the well-being and quality of life of the elderly, as its maintenance or improvement helps to prevent chronic diseases, maintain independence, and improve overall functional ability (Min, 2021; Rikli & Jones, 2013). During the COVID-19 pandemic, for

example, physical activity proved to be an important practice for maintaining mental health and controlling anxiety (Peterson, 2021; Zhao, 2022).

The person's quality of life and perception of well-being derive from their assessment of how much they have accomplished, what they idealize as important for a good life, and their degree of satisfaction with what has been possible to achieve so far. Thus, the quality of life of the elderly is not simply the cure or prevention of a disease, but also the psychological well-being of an individual, including anxiety and other mental disorders (Steptoe et al., 2015; Neto et al., 2016). Elderly suffering from anxiety disorders experienced extreme worry and fear in simple routine situations, in addition to some physical symptoms, which disrupt their daily activities, as they are difficult to control. Along the same lines, anxiety symptoms can affect physical development and consequently influence their quality of life (Brenes, 2006; De Beurs et al., 2015). The association between physical capacity and the level of anxiety, and its impact on the quality of life of the elderly, is still a matter of discussion in the scientific literature. Thus, the objective of the study was to associate physical capacity with anxiety levels and quality of life indicators of elderly.

METHODS

Study Design

The type of this present study was predictive, explanatory and cross-sectional according to Ato et al. (2013). Thus, the study is characterized by a cross-sectional design, where exposure to the cause factor is present to the effect at the same time or time interval investigated. They are used in studies on effects for permanent causes, or factors dependent on permanent characteristics of the sample (Campana et al., 2001), such as the effect of physical capacity on anxiety and quality of life in the elderly. A cross-sectional study describes a phenomenon that occurred at an undefined time, represented only by the presence of a disease or condition (Haddad, 2004), such as, for example, anxiety levels in the elderly. Thus, there is no obligation to know how long the duration of exposure to a cause generates an effect, the cross-sectional design is used when the exposure is relatively stable over time and the effect (or illness)

is long-lasting. Therefore, this design presents itself as a photograph or snapshot taken in a population through sampling, analyzing the existence or lack of exposure and the presence or absence of the effect (or disease) in the individuals in the sample (Fletcher, 2003).

Participants

Our sample was composed of 12 elderly (non-probabilistic, of convenience; 8 male and 4 female; height 1.64 cm and weight 68.34 kg) aged 68 ± 5 years. For inclusion, participants should be a) apparently healthy individuals enrolled in the ages between ≥ 60 and ≤ 80 years; and b) physically active for the past six months in any exercise modality. Participants were excluded for analysis if they: a) had dropped-out from the experiment; b) history or presence of musculoskeletal injuries; c) populations with diabetes, hypertension, cardiovascular diseases, or suffering some specific clinical condition diseases.

All participants were initially informed about the procedures and signed a free and informed consent form, according to Norms for Conducting Research in Humans (CNS resolution 466/2012). The study was approved by the Human and Animal Research Ethics Committee of Nova Iguacu University (number: 1194518.8.0000.8044). The present study was carried out in accordance with the Declaration of Helsinki and with the Ethics Standards for Research in Sports and Exercise Sciences (Harriss, 2019).

Materials & Instruments

To evaluate the sample, the following instruments and tests were used: SF-36, BAI and the six-minute walk test (6MWT).

SF-36

SF-36 is a generic instrument whose conceptual basis is "health-related quality of life". This construct is represented by 36 questions divided into eight domains: physical functioning, physical role, pain, general health, vitality, social role, emotional role, and mental health. Items are scored by a Likert scale. All items of SF-36 are used to score the eight domains, except for item 2, which refers to a self-report of health transition. Each item contributes to only one domain. After recalibrating two items and

reverse the score of nine items, the responses to items are summed. The highest scores represent better health status. One score for missing values is computed if items of one scale are not responded. Scores range from 0 to 100, 0 indicating the less favorable health status and 100 the most favorable one. SF-36 is a questionnaire that can be administered by self-administration, administration by computer, personally or by phone calls by a trained interviewer and is adequate for individuals above 14 years of age. It can be administered in 5 to 10 minutes with high degree of acceptability and quality of data (Ciconelli et al., 1999).

BAI

The Beck anxiety scale or Beck inventory is a self-report questionnaire with 21 multiple choice questions, which assesses the severity of anxiety symptoms on a scale from 0 ("absent") to 3 ("severe, I can hardly bear it"). These questions are about how the individual has felt in the previous week and it is expressed as common symptoms of anxiety. Each question has four possible answers, and the one that most closely resembles the individual's mental state should be signaled. The instrument has a maximum score of 63 points, and the participants are classified according to the degrees of anxiety: minimum: 0–10, mild: 11–19, moderate 20–30, and severe: 31–63 (Quintão et al., 2013).

6MWT

The Six-Minute Walk Test (6MWT) was performed according to the American Thoracic Society (ATS) protocol (Singh et al., 2014) and was applied individually to each participant by a trained researcher. All participants received instructions about the test procedures, and each one was told that if he had any discomfort or pain, he would be allowed to rest for as long as necessary. The 6MWT was performed on a flat surface 30 m in length. Each meter was marked, and cones were positioned at the beginning and at the end of the path. To carry out the test, the participant was instructed to walk, not run, as fast as he could for 6 min. At the end of each minute, he received a verbal incentive ("You're doing great, keep it up") and was informed of the time remaining until the end of the test. The researcher notified the participant 30 s before the end of the test, giving a clear command to indicate the

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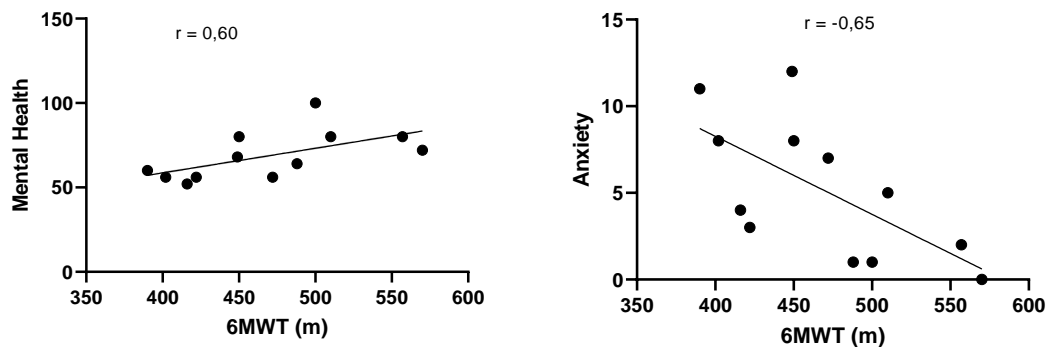
end of the test (“Stop”). At that time, the researcher marked the point at which the participant had come to a stop (Scremin et al., 2020).

Procedures

The study was conducted in two visits. In the first visit, researchers held a meeting with possible volunteers at Nova Iguaçú University. They were instructed about the goals and ethical procedures and gave their informed consent. In the second visit, data collection was performed by trained researchers in the laboratory. Individuals responded to the instruments SF-36 and BAI and performed the 6MWT. All individuals received the same verbal instructions, and any doubts were clarified before the questionnaires were filled out. The instruments also contained written instructions on how to complete them. During the application of the instruments, there was no communication between individuals and there was no time limit imposed.

Figure 1

Correlation between functional ability and quality of life and anxiety: (A) 6MWT and Mental Health; (B) 6MWT and Anxiety.



DISCUSSION

The present study showed that the walking covered in the 6MWT (physical capacity) was associated with levels of anxiety and mental health in elderly individuals. In this way, the study explored the relationship among physical capacity, anxiety symptoms and quality of life (mental health) in Brazilian elderly. According to our results, it is observed that the elderly who reached greater distances had lower levels of anxiety, as well as the

Statistical analysis

Our sample is normal according to Shapiro-Wilk test, then descriptive statistic measures, expressed as mean (M) and standard deviation (SD) were used to obtain data from BAI, SF-36 and 6MWT. In addition, a bivariate Pearson's correlation was performed to associate BAI, SF-36 and 6MWT. Significance was defined at $\alpha \leq 0.05$ level. The statistical software used was GraphPad Prism version 8.0.

RESULTS

We found a positive correlation between 6MWT ($486.8 \pm 58.4m$) mental health (68.7 ± 14.2 ; $r = 0.60$, $p = 0.04$; figure 1A), contrary to what was observed between 6MWT and functional ability (80.4 ± 14.8 ; $r = 0.21$), 6MWT and pain (73.2 ± 21.0 ; $r = 0.34$), and 6MWT and general health state (84.8 ± 13.2 ; $r = -0.11$). In addition, we found a positive correlation between 6MWT ($486.8 \pm 58.4m$) and anxiety level (5.2 ± 4.0 ; $r = -0,65$, $p = 0.02$; figure 1B).

better the mental health, more laps in a shorter period of time they concluded. Significant associations were found between physical capacity and mental health, and physical capacity and anxiety.

The findings found in this study reveal that physically active individuals have a good perception of the state of anxiety, suggesting that being physically active can promote benefits on

psychological aspects (Mammen & Faulkner, 2013). In addition, being physically active also seems to influence a specific domain of quality of life, that of mental health, which is inherently subjective and included in all important aspects of a person's life (Scully et al., 1998; Penedo & Dahn, 2005).

Other studies also seem to further confirm the cross-sectional findings that show significant effects of functional ability as a prerequisite for mental health and quality of life (Garber et al., 2010). Quality of life is a multidimensional measure that encompasses physical, psychological, and social aspects (World Health Organization, 1997). When it comes to the elderly, quality of life is related to the ability to perform basic and instrumental activities of daily living, such as dressing, bathing, cooking, managing medications and maintaining meaningful social relationships (National Institute for Health and Care Excellence [NICE], 2015). Functional ability is an important indicator of autonomy and independence, and the loss of this ability can lead to significant limitations in daily life (Fried et al., 2001). Anxiety can lead to reduced participation in social activities, increased dependence on others, and less engagement in physical activities, which can lead to a decrease in functional ability over time (Brenes et al., 2005; Meeks et al., 2011). Anxiety can affect the functional ability of elderly, making it more difficult for them to carry out their daily activities. On the other hand, improving the functional ability and quality of life and can help reduce anxiety symptoms in elderly (Penedo & Dahn, 2005).

Corroborating our results, previous prospective studies have discovered that alterations in functional capability are linked with changes in depression. (Lenze et al., 2001; Yang, 2006; Schieman & Plickert, 2007). Anxiety in late life was also found to be a risk factor for disability (Lenze et al., 2001). Lenze et al. (2001) showed that depression is an independent risk factor for disability in elderly; similarly, disability was found to be a risk factor for depression. Anxiety in late life was also found to be a risk factor for disability. Increased disability due to depression is only partly explained by differences in socioeconomic measures, medical conditions, and cognition. In the same way, Yang (2006) demonstrated that satisfaction with support, perceived control, and self-esteem serve as mediators

for the impact of disability on the escalation of depressive symptoms in adulthood. Psychological resources take on a significant role in mediating the effects of functional impairment. Perceived control and self-esteem account for 53% of the total effect of initial disability and 43% of the total effect of alterations in disability on changes in the CES-D depression scale. Self-esteem appears to be the most potent mediator. Schieman & Plickert (2007) gathered information from a longitudinal investigation involving elderly Americans. Changes in functional abilities were linked to changes in depression, however, the patterns varied based on the interplay between race, gender, and socioeconomic status. These findings add to the research by merging concepts of double and triple risk and differential vulnerability outlooks. Although multiple contingency assessments present analytical challenges, this complexity is required for accurately defining the impact of functional limitations on mental health. By improving functional ability, elderly can feel more confident and independent, thus reducing anxiety levels (Landers & Arent, 2007; Netz et al., 2005).

The positive physical and physiological changes that give greater functional autonomy to the elderly also have a positive impact on the quality-of-life levels and can be achieved through different physical activity programs (Park et al., 2014). Strategies based on the practice of physical exercises are effective in improving functional ability, mental health, and quality of life. For example, Tsen et al. (2023) showed that telehealth (i.e., instructions at a distance to practice exercise) improved physical capacity, mental health and quality of life of elderly with dementia, reducing the deleterious effects arising from social distancing on during the COVID-19 pandemic. (Tsen et al., 2023). Regular physical activity is known to have a protective effect, not only preserving but often enhancing physical functionality and strength in elderly (Cress et al., 1999). This in turn contributes to the maintenance of independence, the ability for daily tasks and overall quality of life (Keysor, 2003). In addition, physical exercise has been demonstrated to yield significant benefits for mental health. It can act as a natural antidepressant, reducing symptoms of anxiety and depression (Strohle, 2009), while also boosting overall mood and emotional well-being. The social interaction

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often associated with group-based activities can further contribute to these positive mental health effects (Cacioppo et al., 2006; Hawkey & Cacioppo, 2010). Additionally, exercise has been linked to improved sleep and cognitive function, acting as a safeguard against memory loss, dementia, and cognitive decline (Laurin et al., 2001). Thus, the role of physical exercise extends far beyond the physical domain, establishing itself as a key component in ensuring both the physical and mental health of elderly (Warburton et al., 2006).

It should be noted that this study had some limitations, such as 1) the cross-sectional design, which does not allow establishing causality relationships; 2) the use of a questionnaire that may underestimate or overestimate the results found; 3) the low sample size, which can make data interpretation difficult; and 4) and the impact of functional ability on men and women may differ (6). However, gender analyzes were not possible in this study, due to very small responses in some of the variables.

PRACTICAL APPLICATIONS

Considered, the results of this study allow us to conclude that having good physical capacity (being physically active) contributes to having a good psychological state (anxiety) and good quality of life (mental health). It is understood that, to maintain mental health and acquire a good quality of life, it is suggested that the elderly practice physical activities on a regular basis to maintain good levels of physical capacity. Thus, these results may favor the development of health actions, based on a better understanding of the relationship among physical capacity, psychological state, and quality of life.

CONFLICT OF INTEREST AND FINANCING

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