

Exploring the nexus of functional autonomy, depression, and resilience among elderly individuals¹

Explorando o nexo entre autonomia funcional, depressão e resiliência entre idosos

Explorando el nexo entre autonomía funcional, depresión y resiliencia entre personas mayores

[Research Article]

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Abstract

Population aging is a global reality that presents challenges to society. Issues such as functional autonomy, depression, and resilience stand out in promoting healthy aging. Functional autonomy, essential for independent daily activities, can be affected by depression, a common issue among the elderly, impairing motivation. Resilience, which is crucial for facing adversities, also influences well-being. The proposed study investigates the relationship among these factors in the elderly population, utilizing an interdisciplinary approach and quantitative methodology. The study's population comprises elderly individuals receiving care in Basic Health Units. Preliminary results indicate a good level of functional autonomy in the sample and associate depression with resilience. The research aims to promote effective interventions for quality of life and to comprehend the interconnection of these factors, thereby promoting healthy aging.

Keywords: depression, healthy aging, personal autonomy, quality of life.

Resumo

O envelhecimento populacional é uma realidade global, trazendo desafios para a sociedade. Questões como autonomia funcional, depressão e resiliência se destacam na promoção de um envelhecimento saudável. Autonomia funcional, essencial para atividades diárias independentes, pode ser afetada pela depressão, um problema comum entre idosos, prejudicando a motivação. A resiliência, fundamental para enfrentar adversidades, também influencia o bem-estar. O estudo proposto investiga a relação entre esses fatores em idosos, usando abordagem interdisciplinar e metodologia quantitativa. O universo do estudo é composto por idosos atendidos em Unidades Básicas de Saúde. Os resultados preliminares indicam bom nível de autonomia funcional na amostra e associam depressão e resiliência. A pesquisa visa promover intervenções eficazes para a qualidade de vida, além de compreender a interligação desses fatores, promovendo envelhecimento saudável.

Palavras-chave: autonomia pessoal, depressão, envelhecimento saudável, qualidade de vida.

Resumen

El envejecimiento de la población es una realidad global que presenta desafíos para la sociedad. Problemas como la autonomía funcional, la depresión y la resiliencia son destacados en la promoción del envejecimiento saludable. La autonomía funcional, esencial para las actividades diarias independientes, puede verse afectada por la depresión, un problema común entre las personas mayores, que afecta la motivación. La resiliencia, que es crucial para enfrentar adversidades, también influye en el bienestar. El estudio propuesto investiga la relación entre estos factores en la población de personas mayores, utilizando un enfoque interdisciplinario y una metodología cuantitativa. La población del estudio está compuesta por personas mayores que reciben atención en Unidades Básicas de Salud. Los resultados preliminares indican un buen nivel de autonomía funcional en la muestra y asocian la depresión con la resiliencia. La investigación tiene como objetivo promover intervenciones efectivas para la calidad de vida y comprender la interconexión de estos factores, promoviendo así un envejecimiento saludable.

Palabras clave: autonomía personal, calidad de vida, depresión, envejecimiento saludable.

Introduction

Our aging population is a global reality and brings with it a series of challenges for contemporary society. As life expectancy increases, understanding and addressing issues related to the health and well-being of older people is critical. Among these issues, functional autonomy, depression and resilience stand out in their significant impact on quality of life and on healthy aging process (Silva, 2022).

Functional autonomy refers to the ability of older people to carry out daily activities independently, such as personal hygiene, meal preparation, household chores and mobility. These abilities are essential for maintaining independence, self-esteem and emotional well-being in the elderly (Da Silva Nery, 2019). Depression, however, a common mental disorder among older persons, can severely compromise functional autonomy, leading to loss of the interest, motivation and energy needed to perform these activities (Jacinto, 2020).

Motivation is a complex and dynamic process that depends on a variety of factors, including biological, emotional, social and cognitive elements. Intrinsic motivation arises from internal psychological needs and is driven by personal interest and pleasure. Motivation strengthens a person's will and can be a decisive factor for a healthy life, improving quality of life and building resilience (Nope; Petro; Bonilla, 2020).

Resilience emerges as a key to promoting adaptation and helping older persons to overcome their adversities. As a concept, resilience refers to the ability to deal with stress in a healthy way, adapt to changes and recover from traumatic experiences (SILVA JÚNIOR, 2019). It empowers older adults to cope with depression, maintain functional autonomy and improve their quality of life (Pinto, 2018).

Strength training reinforces an older individual's ability to perform external tasks, such as sitting or standing. This correlates to an increase in functional autonomy and the power to cope with adversity or situations involving stress (Sousa *et al.*, 2021).

The human organism faces stressful situations, which leave their mark on our lives. The body contains resources that act as a reserve of energy and skills, which we use to overcome life's challenges. The autonomic nervous system plays a crucial role in regulating health and restoring balance, acting as a kind of counterbalance to the immune system (Schneider, 2021). Cognitive skills acquired throughout life also contribute to preserved function in old age. The ability to perform calculations and maintain a good memory help seniors deal with daily demands, make informed decisions and maintain a high quality of life, as well as ward off the danger of depression (Freitas e Soares, 2019).

It is observed that resilience, social support and levels of satisfaction with life are inversely proportional to the development of depression in the elderly. Cognitive problems, on the other hand, vary directly with depression signs and symptoms (Cordeiro *et al.*, 2020). Primary care practitioners play a significant role in care and possess the ability to identify and monitor depressive symptoms in elderly people (Chiloffi *et al.*, 2018; Santos *et al.*, 2020).

As argued by Oliveira (2021), postponing the negative outcomes of frailty in older adults is crucial to preserving their functional capacity, autonomy and independence for as long as possible, resulting in a better quality of life. Oliveira recommends an objective assessment carried out by an interdisciplinary team, to identify and reduce the risk of frailty in the elderly population.

Furthermore, the condition of living alone for the elderly can intensify feelings of loneliness, which can sometimes result in pathologic depression. Some individuals fear being found helpless in an accident or unforeseen illness while they are alone at home. They may also feel uncertain about the future and concerned about who will take care of them in case of need (Doblas e Conde, 2018) .

Functional independence and social support are factors associated with higher levels of resilience. Functional independence allows people to be autonomous and use their resources and skills to face challenges and overcome adversity. In turn, social support provides an emotional, practical and informative network, which strengthens the ability to deal with stressful situations and promotes psychological well-being (Lima *et al.*, 2019).

To preserve autonomy and quality of life in older persons, it is crucial to properly investigate and treat depression, which is the most common mood disorder in this age group. Depression tends to be both chronic and underdiagnosed, resulting in psychological distress (Silva *et al.*, 2019).

According to Wang *et al.* (2021), a better quality of life is associated with several benefits, such as personal achievements, better performance in studies, stable interpersonal relationships, and a longer life. On the other hand, a poor quality of life is linked to emotional instability, harmful behavioral changes and low self-esteem, which can trigger depression and consequently a deterioration of functional status.

Athletics can bring about a better quality of life. Group sports and strength training can benefit both physical functional, and mental health in sedentary older adults. In addition, group sports have shown advantages in terms of fun and intrinsic motivation rooted in the social interaction they offer (Laosa; León-Zarceño, 2022).

Aging is a dynamic and progressive process that makes the body more vulnerable. Health promotion is fundamental to a pleasant old age, covering aspects beyond physical health (Medeiros, 2021). By understanding the factors that influence functional autonomy, depression and resilience in the elderly, it will be possible to develop more effective intervention strategies that promote healthy aging and quality of life at this stage of life (Rodrigues, 2021). In addition, this study will contribute to the advancement of scientific knowledge and to the promotion of more appropriate public policies aimed at the elderly population.

Given the importance of these phenomena, this study aims to investigate the relationship between functional autonomy, depression and resilience in elderly people. An interdisciplinary approach will be carried out, integrating knowledge from Psychology, Gerontology and Public Health, aiming at a more comprehensive.

It is expected that our results will support the implementation of actions and policies aimed at promoting the health and well-being of this population.

Methodology

The study in question will follow a quantitative, descriptive and correlational approach.

The universe of the study will be composed of elderly people assisted by the Basic Health Units (UBS) in nine neighborhoods of the city of Aracaju. 11 specific UBSs will be included. The total number of elderly people in these areas is estimated to be approximately 14,000 people.

To constitute the sample group, visits will be made to the UBSs, during which the elderly will be invited to a preliminary lecture that will describe the project, evaluations, expected benefits, ethical protections and to clarify any doubts. After the lecture, volunteers will be invited to participate in the project.

UBS volunteers must present a medical certificate releasing them to practice physical exercise, in addition to a referral from the UBS of origin, identification and CPF. They will be screened based on inclusion criteria (age over 60 years and commitment to participate in a physical exercise program by signing the Informed Consent Form) and exclusion criteria (motor limitations or comorbidities that would prevent participation in the exercise programs). All pre-selected subjects will fill out a *Revised Physical Activity Readiness Questionnaire* (rPAR -Q) to assess the safety of their participation in the physical exercise program.

To determine the sample size, results from a previous pilot project carried out with 39 elderly people from some UBSs were used. Considering a 95% confidence interval, the standard

deviation of this sample and the estimated maximum difference between the sample mean and the true population mean, a sample size of 220 elderly people was calculated to achieve statistical significance. To plan for possible attrition, an additional 10% was added, totaling 242 seniors.

The present study was approved by the Research Ethics Committee of Universidade Tiradentes, and assigned CAAE n° 26524719.4.0000.5371, in opinion n° 3.936.886 of March 26, 2020.

After the preliminary procedures (medical screen and r-PARQ) and those related to the research's ethical precautions, the basic variables were evaluated.

Assessment of Functional Autonomy

Functional autonomy is essential for older persons, influencing their dignity, integrity and freedom of choice. With aging, natural changes in the body often lead to a decrease in autonomy, and therefore independence. Neuromuscular alterations result in lower tolerance of physical exercise, greater functional dependence and increased risk of falls, fractures, hospitalizations and mortality. The loss of functional autonomy compromises general health, perception of life and quality of life.

To assess functional autonomy in study subjects, the GDLAM Battery was used. Tests from the functional independence assessment protocol of the Latin American Development Group for Maturity (GDLAM) were used, consisting of walking 10 meters (P10m), rising from a sitting position (EPS), rising from the prone position (EPDV); putting on and taking off a T-shirt (VDC) and getting up from a chair and moving around the house (LCMC). Walking speed for a 10 meter distance is measured and.

The Sit-Up Test (LPS) assesses the functional capacity of the lower extremities, where the individual must stand up and sit down five consecutive times, without arm support. The Stand-Up Test (LPDV) assesses the individual's ability to get up from the floor as quickly as possible.

The test of getting up from a chair and moving around the house (LCMC) evaluates the agility and balance of the elderly, where they must walk around cones in the shortest possible time. The T-shirt on-and-off test (VTC) assesses the functional autonomy of the upper limbs, measuring the time required to put on and remove a T-shirt.

The times for these tests were measured in seconds, and the GDLAM Index (GI) was calculated using a formula for normalizing the test results to estimate a value in scores.

Depression Level Assessment

The present study used the Protocol of the Center for Epidemiological Studies Depression Scale (CESD) to assess depression. This scale consists of 20 items, where each item is scored from 0 to 3, resulting in a maximum total score of 60 points. The CESD is used to identify signs of depression and also to assess the severity of symptoms.

According to the scores obtained on the CESD scale, it is possible to determine the presence and intensity of depression. The criteria for interpreting the scores are as follows: a score below 16 indicates no depression, a score between 17 and 23 indicates moderate depression, and a score equal to or above 24 indicates severe depression.

The CESD scale used in the study underwent proper validation and demonstrated satisfactory internal consistency. Internal consistency is assessed using Cronbach 's alpha coefficient, which indicates the reliability of the scale items in measuring the same construct. In the case of the CESD scale, validation studies reported Cronbach 's alpha values between 0.80 and 0.86, which indicates an acceptable internal consistency and reliability of the items in assessing depression symptoms.

Assessment of the Degree of Resilience

The Wagnild and Young Resilience Scale is a validated mechanism used to measure the resilience of research participants. It consists of 25 items with responses on a Likert scale from 1 to 7. The results are divided into three categories: low, medium, and high resilience, based on scores from 25 to 175. The scale assesses beliefs related to resilience, such as serenity, perseverance, self-confidence, meaning in life and self-sufficiency. Analysis of scale data helps researchers plan strategies and select research topics.

For the treatment of the collected data, the Shapiro-Wilk test was initially performed to verify if the collected data have a Gaussian distribution and Levene 's test was used to assess the homogeneity of the collected data.

Based on these procedures, statistical methods were determined as parametric (for distributions close to normality) or non-parametric.

For data collection, location measures and dispersion measures were used. Among the former, the average was calculated as it is a measure of central tendency. Dispersion measures estimate the variability in the data. For this purpose, the standard deviation and the minimum

and maximum values were verified. In addition to these measures, absolute and relative frequency measures will be used.

The inferential statistics used will be Pearson's Correlation Test or Spearman's Correlation Coefficient, depending on whether the variables are respectively parametric or non-parametric.

Sample Characteristics

Tables 1 and 2 present the sample characteristics of the older persons participating in the study. This information is essential to understand the selected sample.

Table 1. Descriptive data of age , weight, height and body mass index of the volunteers .

VARIABLES	AVERAGE	DP	MAX.	MIN No.
Age (years)	68.45	6.44	84.00	60.00
Body mass (kg)	63.88	12.36	89.00	40.00
Height (m)	1.51	0.07	1.71	1.41
BMI (kg/m ²)	12.28	4.98	41.85	19.84

Caption: BMI – body mass index; kg – kilograms; m – meters; DP – deviation default; no – number ; max. – maximum; min – minimum .

The variables analyzed include age, body mass, height and BMI. –For age, the mean found was 68.45 years, with a standard deviation of 6.44. the maximum age observed was 84 years old , while the minimum age was 60 years old. For body mass, the average was 63.88 kg, with a standard deviation of 12.36. Body mass maximum and minimum observed were 89 kg and 40 kg, respectively. Average height measured 1.51 meters, with a standard deviation of 0.07, with maximum observed value of 1.71 meters, and minimum of 1.41 meters. Finally , the average BMI of the sample was 28.12 kg/m², with a standard deviation of 4.98. The maximum BMI observed was 41.85 kg/m², while the minimum was 19.84 kg/m². These information provide an overview of sample characteristics studied, which will be relevant to further analysis of the data.

Table 2 presents the sociodemographic data of the participants, demonstrated through absolute values and corresponding percentage .

Table 2. Sociodemographic data of the volunteers.

SOCIODEMOGRAPHIC DATA		n = 372	
AGE GROUP		No	%
60 – 69 years old		240	64.51
70 – 79 years old		120	32.26

80 or more years	12	3.23
ETHNICITY		
White	132	35.48
Black	48	12.90
Brown	192	51.62
MARITAL STATUS		
Single	168	45.16
Married	120	32.26
Widowed	84	22.58
EDUCATION		
No Schooling / Incomplete Elementary School	120	32.26
Elementary School Completed	84	22.58
High School Completed	132	35.48
Higher Education Completed	36	9.68
DAILY ACTIVITY		
Family caregiving	156	41.94
Formal work / family	96	35.48
Retired	132	22.58
MONTHLY FAMILY INCOME		
Up to 2X minimum wage	216	58.06
2 to 4X	60	16.13
4 to 10X	12	3.23
I prefer not to say	84	22.58
HISTORY OF CHRONIC DISEASES IN THE FAMILY		
Yes	288	77.42
No	84	22.58
PRE-EXISTING CHRONIC DISEASES AND USE OF CONTROLLED MEDICINE		
Has chronic disease or uses prescription medications	324	87.10
No chronic disease or prescription medications	48	12.90
STRESS SELF-CONTROL		
Poor / Bad	72	19.35
Average	168	45.17
Good / Excellent	132	35.48
SMOKER		
Nonsmoker	348	93.55
Up to 10 cigarettes/ day	24	6.45
ALCOHOLIC DRINKS/WEEK		
Nondrinker	312	83.87
Up to 5 per week	60	16.13
From 5 to 9 per week	0	0.00

Caption: N - number of participants ; % - percentage.

Regarding age ranges, most participants were concentrated in the 60-69 age group, representing 64.51% of the total. Women aged between 70 and 79 made up 32.26% of the group, while those aged 80 and over represented just 3.23%. As for ethnicity, white women are

the majority group, with 35.48% of representation, followed by brown women, who correspond to 51.62% of the total. Black women represent 12.90% of the group. Regarding marital status, single volunteers are the majority, totaling 45.16% of the group, while married women numbered 32.26% and widows 22.58%. With regard to education, most of the volunteers have completed high school, representing 35.48% of the total. Participants with no schooling or incomplete primary education corresponded to 32.26%, while those with completed primary education made up 22.58%. Women with completed higher education represented 9.68% of the group.

When asked about daily activities, most volunteers took care of family, representing 41.94% of the total. Women with jobs and family responsibilities made up 35.48% of the group, and retired women represented 22.58%.

When stratified economically, most participants had an income of up to 2X minimum wage, totaling 58.06%. Those with income between 2 and 4X minimum wage corresponded to 16.13%, while those with income between 4 and 10X minimum wage represented only 3.23%. A significant percentage of 22.58% preferred not to disclose their family income.

Considering family history of chronic disease, most volunteers (77.42%) endorsed this history, while 22.58% did not have this history.

Regarding pre-existing chronic diseases and the use of prescription drugs by the volunteers, the vast majority (87.10%) reported having chronic illnesses or using prescription drugs. Only 12.90% of the participants denied chronic diseases or prescription drug use. As for stress control, 45.17% of the volunteers considered their personal control of stress to be average, followed by 35.48% who considered it good/excellent and 19.35% who evaluated it as poor/poor. Most volunteers (93.55%) did not smoke, while only 6.45% reported smoking up to 10 cigarettes a day. Regarding the consumption of alcoholic beverages, most volunteers (83.87%) denied drinking, while 16.13% consume up to 5 drinks per week. No participant reported consuming 5 to 9 drinks per week.

Table 3 - Functional Autonomy of the sample group

Table 3 presents data related to the functional autonomy of a specific sample group. This table includes several metrics that were measured to assess the functional autonomy of individuals in the group. Each metric is accompanied by its mean, standard deviation, and a corresponding rank. Below are the details of each metric and its respective classification:

Metric	Average	Standard deviation	Classification
C10m (sec)	3.45	5.795	Very good
LPS (sec)	6.01	8.231	Very good
LPDV (sec)	2.61	2.927	Good
VTC (sec)	9.19	10.361	Good
LCLC (sec)	22.97	35.298	Very good
GI (scores)	14.79	22.913	Very good

Metrics analyzed include C10m (time taken to walk 10 meters), LPS (time taken to rise from a sitting position), LPDV (time taken to rise from a prone position), VTC (time taken to go up and down stairs), LCLC (time required to get up from a chair and walk to a line) and GI (functional independence index). The mean and standard deviation of each metric are presented, indicating the central tendency and dispersion of the data, respectively. These results provide crucial information about the functional autonomy of the sample group, allowing a better understanding of the physical and functional performance of these individuals.

The metrics C10m (sec), LPS (sec) and LCLC (sec) were rated "Very Good", indicating excellent performance in these areas. LPDV (sec) and VTC (sec) were rated "Good", demonstrating satisfactory performance. The GI (scores) metric also received a "Very Good" rating. These results suggest that the sample group has a good level of functional autonomy, with a generally positive performance in the evaluated metrics.

Results

In this study, three dimensions were analyzed: functional autonomy (GDLAM), level of depression (Classif_D) and degree of resilience (Classif_R) in different age groups (G1 to G5).

Regarding dimension 1, Functional Autonomy (GDLAM), several metrics were examined to assess functional autonomy in different age groups. These metrics included the mean and standard deviation of various physical abilities, such as the ability to walk, rise from a chair, lie face down, and others. The results indicated that, in general, no significant differences were observed in the distributions of functional autonomy ratings (GDLAM) between the different age groups. This suggests that functional autonomy does not vary considerably with age in different age groups.

Furthermore, regarding dimension 2, Depression Level (Classif_D), in this dimension, the depression level classifications (L - Low, M - Medium and H - High) were analyzed in relation to age groups. The results showed that depression ratings were distributed similarly

across age groups, and no significant differences were found. This suggests that the level of depression is not significantly affected by age.

With regard to dimension 3, Degree of Resilience (Classif_R), resilience classifications (L - Low, M - Medium and H - High) were examined in relation to age groups. Once again, the results showed no significant differences in the distribution of resilience ratings between age groups. This implies that the degree of resilience also does not vary considerably with age in different groups.

Given the inferential analysis (relationships between dimensions), association analyzes between dimensions were carried out. The intersections between GDLAM and Depression, GDLAM and Resilience, as well as Depression and Resilience were examined. The results showed that there are no significant associations between the distributions of GDLAM and Depression, as well as GDLAM and Resilience. In other words, functional autonomy does not seem to be directly related to the level of depression or degree of resilience in different age groups.

However, a significant association was found between Depression and Resilience ratings. This means that, in general, individuals at low risk of depression tend to have a high degree of resilience and vice versa. This suggests a connection between the emotional state (depression) and the ability to adapt and overcome (resilience) in different age groups.

In summary, the results indicate that functional autonomy, the level of depression and the degree of resilience do not vary significantly with age in different age groups. However, there is a significant relationship between depression and resilience ratings, which may have implications for emotional well-being across different age groups.

Conclusion

In conclusion, the research emphasized the importance of addressing issues related to the health and well-being of the elderly population, especially in the context of increasing life expectancy. The study focused on functional autonomy, depression and resilience as key factors affecting quality of life and healthy aging in older people.

Functional autonomy, which encompasses the ability of an elderly person to carry out daily activities independently, was considered a crucial aspect for maintaining independence, self-esteem and emotional well-being. Depression, a common mental disorder among older people, has been identified as a significant threat to functional autonomy and can lead to a loss of motivation and energy to perform daily tasks. Resilience, the ability to adapt to stress and

overcome adversity, has emerged as a key factor in promoting healthy aging and helping older people cope with depression.

Furthermore, research has emphasized the positive impact of strength training on functional autonomy, demonstrating its potential to improve a person's ability to perform everyday tasks. Moreover, the autonomic nervous system and cognitive abilities have been identified as critical components for maintaining a high quality of life and warding off depression.

The study also established a connection between social support, resilience and the development of depression in older people. This highlights the importance of a strong support network in promoting psychological well-being and coping with stress. Primary care professionals have been recognized as playing a vital role in identifying and monitoring depressive symptoms in the elderly population.

In this way, the research shed light on the importance of delaying the negative outcomes of frailty in older people to preserve their functional capacity and independence.

The results supported the idea that promoting the health and well-being of older people goes beyond physical health, encompassing psychological, social and emotional aspects. The study methodology, using quantitative, descriptive and correlational approaches, involved a large sample of older people from diverse backgrounds, making the results applicable to a wide range of older people.

In sum, the present research revealed that functional autonomy, depression and resilience are closely interconnected in the context of aging. Understanding and addressing these factors is crucial to promoting healthy aging and improving the quality of life of older people. The results provide valuable information for the development of more effective intervention strategies and to inform public policies aimed at the elderly population, ultimately contributing to a better quality of life for the elderly population.

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