

Self-assessment of health in the elderly population: impact of a physical exercises program¹
Autoevaluación de la salud en la población mayor: impacto de un programa de ejercicios físicos
Autoavaliação da saúde na população idosa: impacto de um programa de exercícios físicos

[Research article]

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Abstract

The objective of the study was to evaluate the Self-Assessment of Health (SAH) in elderly individuals before and after participating in a physical exercise program. It was a quasi-experimental study conducted with 96 elderly participants ($\bar{X} = 67 \pm 6.07$ years) enrolled in a 16-week physical exercise program. Before and after the program, participants filled out a medical history form and the Short Form 36 Health Survey Questionnaire (SF-36). The study found a prevalence of obesity (75.6%), with the predominant health conditions being hypertension (27.08% of the sample) and diabetes (5.21%), while 7.29% reported having both conditions. A notable enhancement in SAH was observed following the completion of the exercise program, both in terms of physical health ($\Delta\% = 3.75\%$, $p = 0.0002$), mental health ($\Delta\% = 17.95\%$, $p = 0.004$), and the overall SAH index ($\Delta\% = 6.75\%$, $p = 0.001$). This suggests the importance of physical exercise programs for the self-assessment of health in elderly individuals.

Keywords: physical exercise, self-assessment programs, mental health, exercise therapy

Resumen

El objetivo del estudio fue evaluar la Autoevaluación de la Salud (AS) en personas mayores antes y después de involucrarse en un programa de ejercicio físico. Fue un estudio cuasi-experimental realizado con 96 participantes de edad avanzada ($\bar{X} = 67 \pm 6.07$ años) inscritos en un programa de ejercicio físico de 16 semanas. Antes y después del programa, los participantes completaron un formulario de historial médico y el Cuestionario de Encuesta de Salud Short Form 36 (SF-36). El estudio encontró una prevalencia de obesidad (75.6%), con las condiciones de salud predominantes siendo la hipertensión (27.08% de la muestra) y la diabetes (5.21%), mientras que el 7.29% informó tener ambas condiciones. Se observó una mejora notable en la AS después de finalizar el programa de ejercicio, en lo que respecta a la salud física ($\Delta\% = 3.75\%$, $p = 0.0002$), la salud mental ($\Delta\% = 17.95\%$, $p = 0.004$) y el índice general de SAH

($\Delta\%$ = 6.75%, $p = 0.001$). Esto indica la relevancia de los programas de ejercicio físico para la autoevaluación de la salud en la población de adultos mayores.

Palabras clave: ejercicio físico, programas de autoevaluación, salud mental, terapia de ejercicio

Resumo

O estudo teve como objetivo avaliar a Autoavaliação de Saúde - AS, de pessoas idosas, antes e após a realização de um programa de exercícios físicos. Trata-se de um estudo quasi-experimental, realizado com 96 pessoas idosas ($X = 67 \pm 6,07$ anos), participantes de um programa de exercícios físicos com duração de 16 semanas. Os participantes, antes e após o programa, preencheram uma anamnese de o Short Form 36 Health Survey Questionnaire (SF-36). Encontrou-se prevalência de obesidade (75,6%); com condição predominante de hipertensão (27,08% da amostra), diabetes (5,21%), enquanto 7,29% relataram ambos. Observou-se uma melhora significativa na AV, após a realização do programa de exercícios, tanto nos aspectos de saúde física ($\Delta\%$ = 3,75%, $p = 0,0002$), mental ($\Delta\%$ = 17,95%, $p = 0,004$), como no índice geral de AS ($\Delta\%$ = 6,75%, $p = 0,001$). Pode-se concluir a importância de programas de exercícios físicos para a AS das pessoas idosas.

Palavras-chave: exercício físico, programas de autoavaliação, saúde mental, terapia por exercício

Introduction

Quality of life is a multifaceted concept that has been the focus of intense debates across various domains over time, receiving multiple interpretations according to different eras and contexts. In its broadest definition, it considers the outcome of one's personal evaluation of their living conditions within their cultural context and value system, taking into consideration their goals, expectations, and concerns, as well as being directly influenced by the person's physical and psychological state (Pequeno et al, 2020; World Health Organization [WHO], 1998).

Prior to the emergence of the WHO's concept of well-being, one of the prevailing methods for its evaluation centered on the individual's self-report of their health condition, commonly known as self-rated health (SRH). SRH involves a patient's self-perceived assessment of their overall well-being, encompassing physical, social, and emotional dimensions. Consequently, a spectrum of health assessment tools emerged, ranging from specific and

intricate approaches designed for subgroups or individuals with particular medical conditions, which may not comprehensively encompass all facets of well-being, to more general tools aimed at summarizing the overall health status of a population. Among these comprehensive instruments, the Short Form 36 Health Survey Questionnaire (SF-36) stands out. It comprises inquiries related to 8 domains: functional capacity, physical limitations, pain, general health, vitality, social interactions, emotional limitations, and mental well-being. Therefore, this inventory seeks to address the subjectivity introduced by the respondents when conveying their self-assessed health, covering physical and mental health, as well as overall self-evaluation (Doosti-Irani et al, 2019; Kaplan & Hays, 2022).

In a context where life expectancy has increased due to advances in healthcare and effective interventions in relation to Non-Communicable Chronic Diseases (NCDs), the elderly population has experienced substantial growth both globally and in Brazil. However, it should be recognized that increased longevity does not necessarily guarantee satisfactory well-being for the elderly, given the dependence on a good public healthcare system and social security that maximize positive outcomes at the individual level (Pequeno et al, 2020).

Despite research from other nations focusing on the overall assessment of self-perceived health in the elderly population, and some Brazilian studies presenting results focused on subgroups within this context, there is a gap in national research that encompasses a comprehensive analysis of this demographic group. Considering the socio-cultural and public health differences among various global populations, it is imperative to assess the reported well-being specifically among the Brazilian elderly contingent. This assessment is essential both to promote state health promotion actions and to drive the active aging process, taking into account the needs, abilities, and inherent characteristics of this demographic segment (Davino de Medeiros et al, 2020; Silva et al, 2019).

Considering the above, our research endeavors to examine the evolution of self-rated health in the elderly population utilizing the public healthcare system in Brazil, employing the SF-36 questionnaire, before and after a 16-week period of engagement in a physical exercise program, all while gathering and scrutinizing sociodemographic data and information about the previous health conditions in this particular group of seniors.

Methodology

The research employed a quantitative, cross-sectional, and quasi-experimental methodology.

Sample

The sample consisted of elderly residents in Aracaju, users of the municipal healthcare network, and duly registered in the healthcare units of their neighborhoods. The participating neighborhoods were: Aeroporto, Atalaia, Castelo Branco, Coroa do Meio, Farolândia, Grageru, Inácio Barbosa, Jabotiana, and Ponto Novo. The covered Primary Healthcare Units (UBSs) are as follows: UBS Antônio Alves; UBS Augusto Franco; UBS Augusto César Leite; UBS Ávila Nabuco; UBS Dona Sinhazinha; UBS Fernando Sampaio; UBS Geraldo Magela; UBS Hugo Gurgel; UBS Dr. Max de Carvalho; UBS Madre Tereza de Calcutá; and UBS Manoel de Souza Pereira.

As an eligibility criterion for the study, individuals aged 60 or older who had provided informed consent were considered, with approval from the Tiradentes University's Ethics and Human Research Committee. Exclusions consisted of participants facing motor and mobility challenges, as well as those dealing with acute pathological conditions or chronic illnesses.

The sample ended up comprising 96 patients ($\bar{X} = 67 \pm 6.07$ years).

Statistical analysis

The data were processed using descriptive statistics, including mean, standard error, median, standard deviation, minimum, maximum, and absolute delta. Furthermore, the analysis included considering the total possibilities of comparison that will be employed, always with $\alpha = 5.00\%$. The t-Student test was used for in/6tragroup comparisons, and the analysis of variance (ANOVA) method was employed for intergroup comparisons.

Finally, to ensure the scientific rigor of the research, a significance level of $p < 0.05$ was adopted, signifying a 95% confidence level in the accuracy or inaccuracy of the statements made during the investigations (α error), thereby allowing for a 5% chance of random outcomes. The power of the experiment (β error) was assessed, allowing for an acceptance level corresponding to 80%.

All statements, whether positive or negative, were limited to the study in question, depending on the acceptance level set for the population, as indicated by the power of the experiment.

Research ethics

The study adhered to the guidelines outlined in Resolution 466/12 of the National Health Council, issued on December 12, 2012, which pertains to the regulations governing research involving human participants. Additionally, it followed the principles outlined in the Helsinki Declaration (Resolution No. 466, 2012; World Medical Association [WMA], 2008).

For access to healthcare units, approval was granted by the Coordination of the Center for Continuing Health Education (CEPES). In light of this, each Primary Healthcare Unit (UBS) received an Institution Information Form (TII) specifying all procedures, risks, and precautions.

Furthermore, each voluntary participant expressed their willingness by signing the Informed Consent Form (ICF), which contained the same information as the Institution Information Form (TII) and included all details regarding risks and benefits, as well as the social significance of the research with advantages for the study subjects. These aspects were duly explained to the elderly individuals.

The research received its initial approval from the Ethics Committee for Research Involving Human Subjects at Tiradentes University on March 26, 2020, under the reference number 3,936,886 - CAAE: 26524719.4.0000.5371.

Materials and methods

Following the explanation and completion of the Informed Consent Form (ICF), participants proceeded to provide their medical history (anamnesis) and complete the Self-Perceived Health Questionnaire (SF-36), which comprises 11 questions and a total of 36 items. The instrument was easy to administer, and there were no difficulties in its application due to its straightforward and understandable questionnaire format.

Intervention

The strength training protocol, which the participants were subjected to, included a two-week familiarization period, followed by 16 weeks of training consisting of two weekly sessions

conducted in the afternoon. Participants were categorized into groups according to their pre-determined schedules.

The strength exercises, utilizing a resistance exercise machine circuit (weightlifting), as depicted in Figure 4, will be prescribed according to the perceived effort scale of OMNI-Res (Robertson et al., 2003), similar to the approach employed in the study conducted by Kukkonen-Harjula et al. (2007), as illustrated in Figure 1.

FIGURE 1 should be placed here

Figure 1 - OMNI-Res Perceived Exertion Scale

Source: Adapted from Robertson et al (2003)

In the perceived exertion scale, levels 2 and 3 were used during the familiarization phase. Throughout the 16-week training period, the load will be adjusted to 20 so that participants perceive the effort at levels 7 to 8 (Strong). This criterion also served as feedback for adjusting the load every two weeks.

The neuromuscular training was performed with the following sequence of exercises: barbell biceps curl, leg extension machine, triceps with high pulley crossover, leg curl machine, dumbbell shoulder press, bench squat with plate on the chest, pec deck, leg press, front lat pulldown, plank, and finally, pelvic lift, with a two-minute rest between sets (Figure 2).

The strength exercises were performed at a moderate speed in both the eccentric and concentric phases, lasting approximately 2 seconds. The intervals between sets and between exercises were always at least 2 minutes. The elderly participants in the project followed the proposed physical exercises in a structured circuit format, which emphasized strength exercises while respecting the individuality of the participants.

FIGURE 2 should be placed here

Figure 2 - Exercise Execution Order

Source: Elaborated by the authors

Results

Sample Characterization

The Table 1 presents the results of the sociodemographic and economic characterization of the interviewed elderly individuals.

Table 1:*Sociodemographic and economic characterization of interviewed elderly individuals*

Variables	n	%
Gender		
Female	81	84.38%
Male	15	15.63%
Etnia		
Multiracial	30	31.25%
Black	27	28.13%
White	37	38.54%
Indigenous	1	1.04%
Was not informed	1	1.04%
Marital status		
Married	37	38.54%
Single	24	25.00%
Widower	22	22.92%
Divorced	12	12.50%
Was not informed	1	1,04%
Educational Level		
Never studied	4	4.17%
Completed elementary school	15	15.63%
Completed high school	36	37.50%
Complete higher education	13	13.54%
Others	28	29.17%
Daily activity performed		
Just study	5	5.21%
Study and work	4	4.17%
Study and takes care of the family	4	4.17%

Works and takes care of the family	54	56.25%
Studies, works and takes care of the family	1	1.04%
Was not informed	28	29,16%
Professional occupation		
Retired	37	38.54%
Others	59	61.46%
Monthly income (sum of your income with those of the people who live with you)		
Up to 02 minimum wages	57	59.38%
From 02 to 04 minimum wages	23	23.96%
From 04 to 10 minimum wages	15	15.63%
Others	1	1.04%
Total	96	100.00%

Source: Elaborated by the authors

Among the 96 responding elderly individuals, the average age was 67 years, and in terms of gender, 81 were women, and 15 were men. There was a predominance of the white ethnicity (38.54%), married marital status (38.54%), and completed high school education level (37.50%) in their respective categories.

Furthermore, there was a prevalence of working and taking care of the family (56.25%) as the everyday activities performed, and the majority of the interviewed elderly individuals (38.54%) reported being retired. Regarding income, the range of up to two minimum wages prevailed (59.37%). Concerning daily activities, the most common is working and taking care of family members, encompassing 56.25% of the sample.

Occupations vary, with retirement being the most common, representing 38.54%, and other types of services grouped under the category "others" comprising 61.46% of the sample. When it comes to monthly income, the majority have an income of up to 2 minimum wages (59.38%). Categories with income between 2 to 4 minimum wages and between 4 to 10 minimum wages represent 23.96% and 15.63%, respectively.

The Table 2 presents the results of the characterization of pathologies, medications, and lifestyle habits of the interviewees.

Table 2:

Characterization of pathologies, medications, and lifestyle habits of the interviewees

Variables	n	%
Pathologies		
Hypertension	26	27.08%
Diabetes	5	5.21%
Hypertension and diabetes	7	7.29%
Hypertension, diabetes and other comorbidities	8	8.33%
Other comorbidities	16	16.67%
No comorbidities	6	6.25%
Medications		0.00%
Makes use of	75	78.13%
Don't use	6	6.25%
Smoking		0.00%
Don't smoke	86	89.58%
Smokes	8	8.33%
Alcoholism		
Don't drink	65	67.71%
Drink	31	32.29%
Self-control of stress		0.00%
Excellent	11	11.46%
Good	33	34.38%
Regular	44	45.83%
Bad	1	1.04%
Lousy	5	5.21%
Total	96	100.00%

Source: Elaborated by the authors

Regarding pathologies, the predominant condition is hypertension, affecting 27.08% of the sample. Diabetes is reported by 5.21% of the participants, while 7.29% have both hypertension and diabetes. Additionally, 8.33% have hypertension, diabetes, and other comorbidities, while 16.67% have other comorbidities. A total of 6.25% do not have any comorbidities. Concerning medications, a significant portion reported using medications (78.13%), with those used for hypertension control being the most commonly reported. As for smoking, the vast majority of participants, 89.58%, do not smoke, while 8.33% reported being smokers. Regarding alcohol consumption, the majority, 67.71%, do not consume alcohol, while 32.29% stated that they do consume alcohol. Regarding self-control of stress, the responses vary; however, the prevalent responses were regular (45.83%) and good (34.38%).

Table 3 presents the characterization of the pathological backgrounds of the interviewees for Stroke, Acute Myocardial Infarction, Hypertension, Diabetes Mellitus, and Obesity.

Table 3:

Characterization of the pathological antecedents of the interviewees

Variables	n	%
Family medical history [Stroke]		
Has no family history	49	51.04%
Father	13	13.54%
Mother	11	11.46%
Brother	5	5.21%
Family medical history [Acute Myocardial Infarction – AMI]		
Has no family history	51	53.13%
Father	7	7.29%
Mother	7	7.29%
Brother	16	16.67%
Family medical history [Arterial Hypertension – AH]		
Has no family history	34	35.42%

Father	5	5.21%
Mother	16	16.67%
Brother	14	14.58%
Family medical history [Diabetes Mellitus]		
Has no family history	43	44.79%
Father	7	7.29%
Mother	14	14.58%
Brother	16	16.67%
Family medical history [Obesity]		
Has no family history	70	72.92%
Father	2	2.08%
Mother	1	1.04%
Brother	3	3.13%
Total	96	100.00%

Source: Elaborated by the authors

As can be seen in the table, the majority reported not having a family history, with this percentage being higher than those related to having a father, mother, or sibling affected by these pathologies.

Self-Health Assessment

Table 4 and Table 5 present, respectively, the results of the diagnostic assessment and the summative assessment with the corresponding average values of the following domains appraised by the SF-36 in the interviewee cohort: functional capacity, pain, physical appearance, general health status, vitality, social aspects, limitations due to emotional aspects and mental health. Each domain is assigned a final score between zero and 100, where zero represents the poorest overall health status, and 100 signifies the optimal health status.

Table 4:

Diagnostic assessment with the values of the domains evaluated by the SF-36 in the interviewed group

Domain	Average
Functional capacity (FC)	80
Physical limitations (PL)	85
Pain (P)	85
General health status (GHS)	80
Vitality (V)	75
Social aspects (SA)	70
Limitations due to emotional aspects (LE)	65
Mental health (MH)	60

Source: Elaborated by the authors

In Table 4, within the domain of functional capacity (FC), the average is 80, indicating an overall good level of functional capacity. Regarding physical limitations (PL), the average is 85, suggesting a tendency towards fewer limitations in this aspect. In terms of pain (P), the average is 85, which may indicate that the sample in question does not experience much pain or much limitation due to pain. In general health status (GHS), the average is 80, indicating that, on average, participants report a satisfactory overall health status. For vitality (V), the average is 75, suggesting a moderate level of energy in the sample. In terms of social aspects (SA), the average is 70, indicating a reasonable level of social health, with some interference from emotional and physical problems. Regarding limitations due to emotional aspects (LE), the average is 65, which may point to a tendency for fewer limitations in this emotional aspect. As for mental health (MH), the average is 60, possibly suggesting a moderate level of mental health in the sample.

Table 5:

Summative Assessment with the Values of the Domains Evaluated by the SF-36 in the Interviewed Group

Domain	Average
Functional capacity (FC)	80
Physical limitations (PL)	85
Pain (P)	85

General health status (GHS)	85
Vitality (V)	80
Social aspects (SA)	85
Limitations due to emotional aspects (LE)	60
Mental health (MH)	85

Source: Elaborated by the authors

In Table 5, within the domain of functional capacity (FC), the average is 80, suggesting that, on average, participants maintained good functional capacity throughout the follow-up period. For limitations due to physical aspects (PA), the average is 85, indicating that, on average, participants have good functionality. Regarding pain (P), the average was 85, which may indicate that the sample does not experience pain or experiences little limitation due to pain. In general health status (GHS), the average is also 85, indicating that participants report a satisfactory overall health status. For vitality (V) and social aspects (SA), both averages are good (80 and 85, respectively), showing a noticeable improvement in the patients' condition. In terms of limitations due to emotional aspects (LE), the average is 60, indicating that participants may have reported a decrease in emotional limitations during the follow-up. Regarding mental health (MH), the average presented is 85, possibly suggesting an improvement in the perceived mental health of the participants over the weeks.

Inferential Statistics

The table 6 presents the results of inferential statistics derived from the data gathered through the SF-36 questionnaire at the beginning and in the summative analysis.

Table 6:

Inferential Statistics of the SF-36 Questionnaire Results

Parameter	Assessment		Counting	
	Diagnostic	Summative	Variation	Significance
Physical Health	80±27.8	83±32.3	3.75%	0.0002
Mental health	65±23.5	76, 67±29.5	17.95%	0.004
General Self-Assessment	91.43±35.04	97.6±34.4	6.75%	0.001

Source: Elaborated by the authors

The table presents significant findings from a study that investigated the self-assessment of health in an elderly population in Brazil before and after a physical exercise program, using the SF-36 questionnaire. The results reveal notable improvements in different aspects of health. In physical health, there was an average increase of 3.75 points, with statistical significance of $p < 0.0002$. Mental health also showed significant improvements, with an average increase of 17.95 points and statistical significance of $p < 0.004$. The overall self-assessment of health had an average variation of 6.75 points, with statistical significance of $p < 0.001$. These findings highlight the positive impact of the exercise program on the physical and mental well-being of the elderly population, along with their holistic perception of health.

Discussion

The results obtained in this article show that social and individual factors can exert an influence on the self-rated health of the sampled elderly population ($n=96$). In this context, by applying the SF-36 questionnaire to measure the patient's state of health and quality of life, it was possible to assess the patients across 8 domains, which include functional capacity, physical limitations, pain, overall health, vitality, social factors, emotional limitations, and mental health. (Flórez et al, 2022; Knapik et al, 2019; Yhanes-Ruíz, 2022; Zhu et al, 2021).

From this multidimensional perspective, it was possible to infer inequalities based on gender and race in accessing and utilizing the examined services. In this sense, as other studies on primary health care in Brazil and its challenges reveal, it was observed that cultural and social paradigms have a major impact on self-rated health, since there is a great divergence between men and women in relation to seeking primary care, with females (84.38%) being more active in this search; with regard to ethnicity, whites (38.54%) are more present in relation to the others (browns, blacks and indigenous people) (Cobo et al, 2021).

Furthermore, with regard to the clinical analysis of the patients under scrutiny, it can be seen that chronic non-communicable diseases (CNCDs) are present, with hypertension (27.08%) being the most prevalent, followed by diabetes (5.21%). It is therefore worth pointing out that CNCDs currently represent the main burden of disease and death in the Brazilian population and pose a significant public health challenge. Additionally, the increasing longevity and rising

proportion of elderly individuals, with consequent more frequent use of health services, will result in high spending in this sector (Figueiredo et al, 2021; Paulo da Silva et al, 2021; Sardinha et al, 2020; Silva et al, 2019).

Additionally, 78.13% of the sample population uses medication. Hence, it is crucial to focus on the factors associated with the use of medicines, polypharmacy, self-medication, the high cost of medicines, inappropriate use and drug interactions. In addition, high numbers were observed in relation to the non-use of tobacco and alcohol — 89.58% and 67.71% respectively — which indicates a reduction in the prevalence of these in this population (Santos et al, 2021).

Also, with regard to the diagnostic evaluation of the domains analyzed by the SF-36, it was possible to conclude that physical limitations and pain (both mean = 85) attained satisfactory results. Thus, it is undoubted that these spheres have a positive impact on the well-being of the elderly and the aging process, contributing to the maintenance of the patient's mental state and the prevention of mental disorders — depression, anxiety and suicide — as revealed by the conventional average of the mental health domain (average = 60) and limitations due to emotional aspects (average = 65) of the questionnaire. On the other hand, functional capacity and general state of health obtained a high average (80), which are essential clinical assessment criteria for this population in terms of clinical-functional status (Branco de Oliveira et al, 2019; D'Aurea et al, 2019; Estes De la Osa y León-Zarceño, 2022; Lera et al, 2021).

Conclusion

The outcomes of this research hold substantial importance in underpinning the formulation of public policies targeted at the elderly demographic in Brazil. The findings undeniably demonstrate that engagement in a physical exercise regimen can yield substantial and favorable effects on both the physical and mental well-being, as well as the overall self-assessment of health, within this demographic. The improvement observed in health indicators demonstrates that investing in physical activity programs for the elderly can be an effective strategy to promote healthy aging and quality of life. Hence, it is imperative for health authorities to take these findings into account during the formulation and execution of public policies tailored to meet the distinct requirements of the elderly population. This involves fostering consistent physical activity and bolstering the well-being of this demographic. Furthermore, these results emphasize the significance of embracing a comprehensive approach to elderly

health, encompassing both physical and mental well-being, to foster active and positive aging within our society.

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