







Original article

Anthropometric profile, strength and flexibility in elderly from rural and urban area - a comparative study

Perfil antropométrico, força e flexibilidade de idosos da zona rural e urbana: um estudo comparativo

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Abstract

Objective: analyze and compare the anthropometric profile, strength and flexibility in elderly people from rural and urban areas. **Materials and Methods:** this is a quantitative, cross-sectional and comparative research. Measurements of handgrip strength of the dominant hand were performed using a dynamometer, flexibility was also measured using the goniometry technique, and finally, an anthropometric profile was evaluated using the Body Mass Index (BMI) protocol. Being evaluated 64 elderly, both sexes, selected intentionally. **Results:** no statistically significant difference in the comparison of strength and flexibility variables. However, the average BMI of the elderly in the urban area classified a significant number with obesity, including presenting higher average values than the elderly in the rural area. **Conclusion:** the elderly group in the rural area presented more satisfactory results compared to the elderly group in the urban area. It is necessary that the elderly evaluated in the urban area seek a better quality in food and physical exercise practice.

Keywords: Anthropometry. Muscle Strength. Pliability. Aged. Comparative Study.

Resumo

Objetivo: analisar e comparar o perfil antropométrico, força e flexibilidade em idosos da zona rural e urbana. **Materiais e Métodos:** trata-se de uma pesquisa de caráter quantitativo, corte transversal e comparativo. Foram realizados mensuração de força de preensão manual da mão dominante, através de um dinamômetro, também mensuração da flexibilidade, através da técnica de goniometria e, por fim, avaliação do perfil antropométrico, pelo protocolo do Índice de Massa Corporal (IMC). Sendo avaliados 64 idosos, ambos os sexos, selecionados de forma intencional. **Resultados:** não houve diferença estatisticamente significativa na comparação das variáveis força e flexibilidade. Entretanto, a média do IMC dos idosos da zona urbana classificou um número significativo com obesidade, inclusive apresentando valores médios superiores aos idosos da zona rural. **Conclusão:** o grupo de idosos da zona rural apresentou resultados mais satisfatórios comparados com o grupo de idosos da zona urbana. Faz-se necessário que os idosos avaliados da zona urbana busquem uma melhor qualidade na alimentação e prática de exercícios físicos.

Palavras-chave: Antropometria. Força muscular. Flexibilidade. Idosos. Estudo comparativo.

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Received in: 08/19/2022. **Approved in:** 02/15/2023.

How to cite this article: Fonseca JES, Simões WFS, Almeida JLS, Soares WD. Anthropometric profile, strength and flexibility in elderly from rural and urban area - a comparative study. Revista Bionorte. 2023 jan-jun;12(1):346-353. <https://doi.org/10.47822/bn.v12i1.491>





Introduction

One of the biggest challenges for public health is population aging, a phenomenon that occurs not only in Brazil, but worldwide. Although it represents an achievement of humanity, the growth of the senile phase causes economic, political, social and health implications in actuality¹.

Any person who is at least 60 years old in developing countries, such as Brazil, is considered elderly according to the World Health Organization (WHO)². Even considering the chronological age of 60 years as the starting point of old age, this data may not correspond to their biological age^{3,4}. Therefore, other factors such as physical, health, functionality and mental conditions directly influence the aging process, thus characterizing as an individualized process another, such as muscle strength, anthropometric profile and flexibility.

Muscle strength is essential to maintain functional capacities; loss of muscle strength is a limiting factor for performing basic tasks of daily living, which leads the elderly to a functional inability⁵. Loss of strength and muscular endurance are usually associated with anthropometric changes, which can lead to functional disabilities, such as sitting and getting up from a chair, using public transport, bathing, among other daily life activities (DLA's). It is estimated that, each year, about 10% of the population over 75 years of age lose their daily independence in one or more activities⁶.

On the other hand, the decrease in lean mass and the increase in the percentage of body fat are also processes of important changes that occur in aging, so that such changes can affect health and anthropometric evaluation⁷.

Flexibility is one of the most important factors in functional capacity, causing a partial loss of independence of movements in the DLA's due to a significant reduction in the aging process⁸. Healthy lifestyle habits such as regular physical activity, balanced diet with adequate intervals, adequacy and regularity of sleep, maintenance of adequate weight, not consuming alcohol and not smoking significantly influence the physiological age of the elderly, reflecting on their state of health and assisting in autonomy and functional capacity⁹.

Within this context, the objective was to evaluate and compare the anthropometric profile, strength and flexibility of elderly people in rural and urban areas, in the city of Montes Claros – MG.

Materials and Methods

This is a descriptive research, with a quantitative, transversal and comparative approach.

The sample consisted of 64 elderly, of both genders, selected intentionally. The research was carried out in the Community Association of Canto do Engenho and Sesc - Social Service of Commerce, in Montes Claros – MG. Initially a meeting was scheduled for the communication of the research and how it would be carried out. After the authorization for its realization, made official by the signing of the agreement of the institutions participating in the study, a meeting was held with the elderly for the explanation of the justification and methodology. Those who accepted to participate voluntarily signed the Informed Consent Form. Individuals who had changes in segments that prevented the application of the tests were excluded.

For the evaluation of the anthropometric profile, the Body Mass Index (BMI) protocol was used, which consists of the ratio between body weight and height squared (kg/m^2). In the evaluation of body weight, a portable digital scale with a capacity of 150 kilos and accuracy of 0.10 grams was used and the height (m) was measured with inelastic polyester tape measure, size 1.5m, color blue.

In the evaluation of the grip force, a Gripp digital dynamometer with a capacity of 100 kgf was used.

In the evaluation of flexibility levels, we opted for the goniometer 360° of transparent plastic, evaluating the hip flexion movements at 90° , concomitant with knee flexion at 90° , for the evaluation of flexibility of the ischiostibial muscles of the dominant leg.

Data were collected between the months of March and April 2022 in a room reserved for this purpose. The data were collected individually by the researchers themselves, observing the biosecurity protocols for issues of the COVID-19 pandemic. After data collection, these were planned in the Excel program and analyzed descriptively. The variables analyzed, referring to the groups of elderly residents in the urban and rural areas, were compared by the Student T test at the significance level of 5%.

Ethical care

This study was sent to the Research Ethics Committee of the State University of Montes Claros and approved under opinion n. 2.721.804/2018.

Results

The elderly participants in the study had an age range between 61 and 94 years (72.5 ± 7.1 years), with a predominance of females. As for BMI, a high rate of obesity was observed in most urban areas. There was a total incidence of regular strength and decreased flexibility, with no

significant difference between groups (Table 1).

Table 1. Characterization of the sample regarding gender, body mass index, strength and flexibility, in elderly people from urban and rural areas of the city of Montes Claros-MG, Brazil. (n=64).

Variables	n	%
Gender		
Female	49	76.6
Male	15	23.4
Body Mass Index		
Malnutrition	11	17.2
Nutritional risk	13	20.3
Eutrophic	13	20.3
Overweight	12	18.8
Obesity	15	23.4
Strength		
Regular	28	43.8
Good	25	39.1
Excelent	11	17.1
Flexibility		
Decreased	36	56.3
Below average	08	12.5
Average	13	20.3
Above average	07	10.9

It was found that only the variable BMI showed significant difference between the groups, and the elderly in the urban area presented a statistically higher average than the elderly in the rural area (Table 2).

Table 2. Comparison between groups (urban and rural areas) of the variables body mass index, flexibility and strength among elderly people in the city of Montes Claros-MG, Brazil. (n=64).

Variables	Mean and standard deviation	Significance
Body Mass Index		
Urban Zone	27.5 ± 4.9	0.013*
Rural Zone	24.4 ± 4.3	
Flexibility		
Urban Zone	47.8 – 13.5	0.588
Rural Zone	49.7 – 14.1	
Strength		
Urban Zone	21.04 – 7.4	0.140
Rural Zone	24.25 – 9.5	

* $p \leq 0.05$, significant by Student's T test.

Discussion

The majority of the sample was constituted by the female sex, a predominance that can be verified in the Brazilian elderly population^{10,11} and also proven in other countries, as in the research conducted by Anes *et al.*¹², made with elderly people from urban and rural areas in the Northeast of

Portugal, in which 58% were women.

The results showed a predominance of overweight and obesity in the sample studied. This finding is also seen in the study¹³ carried out in Goiânia, Brazil, where they sought to identify the prevalence of abdominal obesity in the elderly, highlighting that the concentration of these in the sample was in lower economic classes and performed by Souza *et al.*¹⁴ who presented the majority of the elderly classified as eutrophic. In the comparison between the groups, it was possible to observe a dominance of adequate weight in the elderly evaluated in the rural area, being this fact possibly associated with the activities of greater effort developed by this population, such as land cultivation (vegetable gardens, swiddens) distance between the residence and the work areas, use of bicycles and horses as a means of locomotion, creation and treatment of animals¹⁵.

The results presented in this study confirm the already established in others with the elderly population, showing that overweight, not malnutrition, is the main nutritional problem of the Brazilian elderly population^{16,17}. Another study conducted in Porto Alegre – RS with 73 elderly people, comparing institutionalized and non-institutionalized elderly, highlights the prevalence of overweight¹⁸. A study conducted in the city of Montes Claros- MG¹⁹ is similar to that found in Londrina, Paraná¹⁶. Analyzing the same profile of the elderly in the study of Porto Alegre, it was noticed prevalence of overweight, and that the greater social interaction and independence of the non-institutionalized elderly resulted in a lower incidence of malnutrition. These data show the nutritional transition that the population as a whole has been suffering, with overweight exceeding the numbers of malnutrition²⁰.

Obesity and overweight are correlated to nutritional transition, which can be described as increased energy intake. Currently, the Western lifestyle is consistent with the reduction of physical exercises²¹. It is known that a number of comorbidities increase with obesity and can occur at any age; however, in old age, it becomes a worrying fact, since overweight is associated with cardiovascular problems, type 2 diabetes, metabolic syndrome, dyslipidemias and a higher decline of sex hormones²².

It is still widely discussed the classification of nutritional status by BMI in the elderly, taking into account that this does not portray the distribution of fat and related changes, resulting from the aging process, being considered, then, a limited indicator to assess risks in elderly²³. The criteria for diagnosis and the data used as a reference should be specific, due to the changes that most often accompany the individual in the aging process²⁴. It is also important to note that the present study was conducted amid the COVID-19 pandemic, when, according to Malta *et al.*²⁵,

social isolation is highly related to increased sedentary lifestyle, inadequate diet, depression and high stress in the elderly, which may have influenced the results of this study in relation to the high number of overweight and obese individuals.

There was no significant difference in the variables strength and flexibility among the elderly, data that contradict the study of Urgate *et al.*²⁶, in which they evaluated flexibility and strength of sedentary and active elderly in Filadelfia/GV. Strength and flexibility are key capabilities for performing activities of daily living in the aging process. With age, these factors decrease, and may thus lead the elderly to have reduced quality of life, increasing the risk of falls and loss of joint mobility. As a form of prevention, the elderly should always be guided to remain active²⁷.

The study presents inherent limitation to cross-sectional research, due to the impossibility of the cause and effect relationship.

Conclusion

The findings of this study demonstrate that there was no difference in relation to the elderly groups, with the variables strength and flexibility among those surveyed. There was a high rate of overweight and obesity, and the group of elderly people in the urban area had a mean BMI significantly higher than the elderly in the rural area. It is expected that new research will be carried out to complement the results found in this study.

Author's Contributions

All authors approved the final version of the manuscript and declared themselves responsible for all aspects of the work, including ensuring its accuracy and completeness.

Conflict of interest

The authors declare that there are no conflicts of interest.

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