

OVERWEIGHT NEGATIVELY INFLUENCES FUNCTIONAL CAPACITY OF OLDER PEOPLE IN DAILY ACTIVITIES

Excesso de peso influencia negativamente a capacidade funcional de idosos em atividades cotidianas

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ABSTRACT

OBJECTIVE: To evaluate nutritional status, health conditions, and their impact on the functional capacity of aging adults in a community center in Campo Grande, state of Mato Grosso do Sul. **METHODS:** This is a cross-sectional, population-based study with 47 participants of both sexes, aged 60-96 years. Functional capacity was defined by the basic and instrumental activities of daily living, operationalized by the Katz index and the Lawton and Brody scale. A sociodemographic questionnaire and two 24-hour reminders were used to evaluate food consumption; hand grip strength and nutritional status were also evaluated. A structural equation model was used to analyze the relationship and associations between variables. **RESULTS:** The sample showed good functional capacity for the basic activities of daily living, but there was a high frequency of losses in instrumental activities, especially for tasks such as managing finances, cooking, cleaning and performing small domestic repairs. Low functional capacity is in agreement with the low hand grip strength found. Most participants were classified as eutrophic (51.06%). When applying the structural equation model, a standardized coefficient of 0.45 was obtained; indicating a mean and significant effect ($p = 0.02$) of body mass index on dependence for basic activities, with direct effect. **CONCLUSION:** Overweight negatively influences the functional capacity of older adults to perform basic activities of daily living.

KEYWORDS: aging; anthropometry; muscle strength; body mass index; hand strength; activities of daily living.

RESUMO

OBJETIVO: Avaliar o estado nutricional, as condições de saúde e suas influências na capacidade funcional de idosos de um centro de convivência em Campo Grande, Mato Grosso do Sul. **MÉTODOS:** Trata-se de um estudo transversal, de base populacional, com 47 idosos de ambos os sexos, com idade entre 60 e 96 anos. A capacidade funcional foi definida por meio das atividades básicas e instrumentais da vida diária, operacionalizadas pelo índice de Katz e pela escala de Lawton e Brody. Foram aplicados um questionário sociodemográfico e dois recordatórios de 24 horas para avaliação do consumo alimentar; e foram avaliados a força de preensão manual e o estado nutricional. Um modelo de equação estrutural foi empregado para analisar a relação e as associações entre as variáveis. **RESULTADOS:** A amostra mostrou boa funcionalidade para as atividades básicas da vida diária, mas uma frequência alta de prejuízos nas atividades instrumentais, principalmente para tarefas como cuidar das finanças, preparar a própria refeição, limpar e realizar pequenos reparos domésticos. A baixa funcionalidade vai ao encontro da baixa força de preensão palmar encontrada. A maior parte dos idosos foi classificada como eutrófica (51,06%). Ao aplicar o modelo de equação estrutural, obteve-se um coeficiente padronizado de 0,45; indicando efeito médio e significativo ($p = 0,02$) do índice de massa corporal sobre a dependência para as atividades básicas, com efeito direto. **CONCLUSÃO:** O excesso de peso influencia negativamente a capacidade funcional de idosos para desempenhar atividades básicas da vida diária.

PALAVRAS-CHAVE: envelhecimento; antropometria; força muscular; índice de massa corporal; força da mão; atividades cotidianas.

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INTRODUCTION

Aging is a phenomenon marked by functional decline and loss of autonomy. Body changes resulting from this period, regarded as normal, such as progressive decrease in muscle mass and increase of adipose tissue, lead to a decrease in functional capacity.¹ This process can be accelerated by several factors, including nutritional aspects, presence of multiple chronic diseases, and physical inactivity, negatively affecting the performance of activities of daily living.²

Functional capacity, assessed by the performance of activities of daily living, is a key component in the evaluation of the health of older adults, since it is related to their adaptation in the social environment. When there is impairment of functional capacity, there are implications for patients, the family and the community, such as greater probability of falls, fractures, disabilities, dependence, recurrent hospitalizations, and increased mortality.³

The difficulty or need for help to perform daily activities in some domain of life, or functional disability, can be measured from the perspective of 2 domains: basic activities of daily living (BADLs),⁴ relation of 6 activities, hierarchically related, composed of activities such as dressing, bathing, feeding; and instrumental activities of daily living (IADLs),⁵ related to the individual's independence in society, such as shopping, preparing meals, and using transportation.

Difficulty in preparing one's own meals and eating, situations commonly related to functional disability, can lead to lower food intake and, consequently, compromise the nutritional status (NS) of aging adults.⁶

The change in NS is another common problem in this population. Malnutrition, considered one of the most common disorders in this phase of life, may result in decreased muscle strength, further contributing to functional disability.⁷ Regarding overweight, there is little in the literature that relates it to the performance of activities of daily living.

Therefore, the present study aimed to evaluate the impact of NS on the functional capacity of older adults attending a community center for older people in Campo Grande, state of Mato Grosso do Sul, besides assessing the nutritional profile, health conditions, and autonomy of this population.

METHODS

This is a cross-sectional, descriptive, population-based epidemiological study conducted at a community center for older adults in the city of Campo Grande, state of Mato

Grosso do Sul. A total of 284 aged adults are enrolled in the unit. Exclusion criteria included age lower than 60 years, failure to complete the study protocol in full, and presence of disabling diseases (paralysis, stroke, difficulty walking or responding to the questionnaire). Data collection took place from June to October 2017.

To assess functional capacity, the Katz scale was used to measure the BADLs and the Lawton and Brody scale⁵ to measure the IADLs. Participants were rated as independent if they did not report the need for help to perform any BADL or IADL; and dependent if they reported needing help in at least one of the activities of each dimension. As proposed by Hoeymans et al.,⁸ a scale of hierarchical functional incapacity was constructed, distinguishing three categories:

- independent;
- dependent in IADLs;
- dependent in BADLs and IADLs.

Participants who reported dependence in BADLs, but not in the IADLs, were rated in the latter category, referring to dependence in both dimensions.

The anthropometric evaluation consisted in the measurement of weight, height, and waist, arm, and calf circumferences.^{9,10} The circumference measurements were performed with the aid of an inelastic tape measure, with an accuracy of 1 mm. Body mass index (BMI) was obtained by the ratio of body weight in kilograms to height in squared meters (BMI = weight/ height²). We used the nutritional status classification of the elderly proposed by Lipschitz,¹¹ including low weight (less than or equal to 22 kg/m²), eutrophy (greater than 22 kg/m² and less than 27 kg/m²), and overweight (greater than to equal to 27 kg/m²). For the waist circumference (WC), we used the points for classification of abdominal obesity, namely: > 102 cm for men and > 88 cm for women. For the classification of calf circumference (CC), the values that were considered to be equal or greater than 31 cm for both sexes were used. Lower values are indicative of risk of malnutrition in older adults.

Hand grip strength was measured using a manual hydraulic dynamometer. The dynamometers were calibrated before starting the data collection. The tests were performed in the position recommended by the American Society of Hand Therapists (ASHT).

For the evaluation of food consumption, two 24-hour reminders (R24h) were applied on non-consecutive days. For better data validity, R24h was employed with the multiple pass method. The following data were recorded: food type, preparation, place and time of consumption, and quantity in household

measures, use of utensils, and photographic album to guarantee the standardization of the quantity consumed.¹² Consumption data were obtained with the aid of Dietpro® software version 5.5i, Agromidia Ltda. (Viçosa, state of Minas Gerais, Brazil). Carbohydrates, total proteins, total lipids, total dietary fiber, calcium, and iron were considered as nutrients for the evaluation of the diets, and had their values compared with the daily recommendations of Dietary Reference Intakes (DRI) for individuals of both the sexes, for the corresponding age group.

For data on the social, economic, demographic, and health profile of this population, a structured questionnaire was applied as an interview. The protocol included the following independent variables: sex, age (in complete years), education (education level), profession, marital status (single, married, divorced, widowed), physical activity, self-reported ethnicity (Caucasian, Afrodescendant, Asian) and health conditions (presence of self-reported pathologies, hospitalization, falls and self-assessment of health).

The team of interviewers was submitted to previous training to apply the questionnaire, conduct the interview and the nutritional assessment, and it was composed by nutritionists and nutrition scholars.

The results are presented through descriptive statistics, such as arithmetic mean, standard deviation and percentage. For the food consumption variables, as the data presented a normal curve (Kolmogorov-Smirnov), we used parametric statistics, using the ANOVA test, followed by the Tukey's test. A structural equation model (SEM) was used to analyze the structural relationship and the associations between the variables. Standardized coefficients (SC) were interpreted according to Kline:¹³ a SC of 0.10 indicates small effect; SC > 0.10 and < 0.30 indicate mean effect; and SC > 0.50 indicates strong effect. In all tests, a significance level of 5% or a corresponding value and a 95% confidence interval (95%CI) were used. The analyses were performed in Stata software, version 14 (StataCorp., CollegeStation, USA).

The study was approved by the Research Ethics Committee of the institution, under approval certificate number 1 997 354. Participants joined only after signing the Informed Consent Term, following the explanation of the study design, as well as the information on free withdrawal, if they so desired, and the guarantee of anonymity and secrecy of the information provided, according to Resolution n. 466/2012 of the National Health Council.

RESULTS

Of the 284 aging adults enrolled in the community center, a total of 47, of both sexes, completed the study

protocol in full, mostly women (87%). Participants' ages ranged from 60 to 96 years. The predominant ethnic group was Caucasian (80.2%), followed by Afrodescendant (15.2%), and Asian (4.6%). Regarding schooling, most participants reported having attended elementary school, as described in Table 1. Systemic arterial hypertension (39.1%) and diabetes mellitus (26.1%) were the most common pathologies. The prevalence of independence in the BADLs was high (63.8%), however, in the IADLs it was quite low (4.3%).

The analyses were not separated by sex, since the number of males was low ($n = 6$).

The data in Table 2 show the population distribution according to the functional capacity for BADLs and IADLs. Most participants were independent for the BADLs, and no assistance was needed to perform these activities. On the other hand, the IADLs, which are more complex activities, demanded more help for their execution by the sample evaluated.

The mean BMI was 29.1 kg/m², ranging from 14.1 to 48.1 kg/m²; and its classification, as well as other anthropometric and food consumption data are described in Table 3. The average prevalence of adequacy of iron consumption was 79.3%; and of fibers, 43.7%.

When the SEM was used to analyze the relationships of the variables, a standardized coefficient of 0.45 was obtained, indicating a significant effect ($p = 0.02$) of the BMI on the dependence for the BADLs, with a direct effect. The other variables analyzed, such as calf circumference ($p = 0.582$), arm ($p = 0.923$), right and left hand grip ($p = 0.169$; $p = 0.220$; respectively) and food consumption (data not shown) did not have a significant effect on the functional capacity of the older adults evaluated.

DISCUSSION

The present study aimed to evaluate the impact of nutritional status on the functional condition of older people living in a community center, besides investigating their nutritional profile, health conditions, and autonomy. Most participants were considered totally or partially dependent, mainly in the instrumental domain.

When analyzing the effect of nutritional aspects on the dependence of the aging adults with SEM, it was possible to notice the negative influence of excess weight, evaluated by the BMI (above 27 kg/m²), in the performance of BADLs by the older adults, with medium and direct effect. The other nutritional aspects analyzed did not have a significant effect on the functional capacity of the participants.

Table 1 Descriptive and functional capacity characteristics of older people in a community center. Campo Grande, state of Mato Grosso do Sul, 2017.

Variables	n	%
Number of chronic diseases		
None	13	27.66
1	13	27.66
2	9	19.15
3 or more	12	25.53
Physical activity		
Yes	43	91.49
No	4	8.51
Schooling		
Illiterate	10	21.28
Elementary School	31	65.96
High School	6	12.76
Marital status		
Single Children	1	2.12
Married	13	27.66
Separated	7	14.90
Widowed	26	55.32
Weight loss in the last 3 months		
Does not know	18	38.30
Between 1 and 3 kg	18	38.30
Greater than 3 kg	11	23.40
Self-assessment of health*		
Worse	4	8.51
Does not know	3	6.38
Equal	14	29.79
Best	26	55.32
Functional capacity		
Independent	2	4.25
Dependent on IADLs	28	59.58
Dependent on BADLs and IADLs	17	36.17

*Self-assessment of health compared to other seniors; IADLs: instrumental activities of daily living; BADLs: basic activities of daily living.

Population aging and overweight are emerging public health problems today. The demographic transition, due to the aging of the population, is directly related to the epidemiological transition, in which there is an increase in the number of chronic noncommunicable diseases (CNCDs), among which stands out the increase in the prevalence of overweight in this population.^{14,15} Overweight among the aging adults may be due to changes in their diet in recent decades, with increased consumption of processed foods rich in sugars and fats.¹⁶

Obesity worsens the physical function of older adults, leads to fragility and dependence, and compromises quality of life. Given the increasing prevalence of obesity in the near future, it is believed that the individuals who will present greater fragility will be the obese, the disabled and older adults.¹⁶ According to Santos et al.,¹⁷ overweight and obesity associated with the aging process may interfere with

Table 2 Independence of older adults in a community center, according to basic activities of daily living and instrumental activities of daily living. Campo Grande, state of Mato Grosso do Sul, Brazil, 2017.

Activities	Independent*	
	%	95%CI
Basic activities of daily living		
Bathing	84.78	75.92–90.86
Dressing and grooming	84.78	75.92–90.86
Toileting	86.95	78.22–92.52
Transferring bed/chair	89.13	80.77–94.12
Stool and urine control	80.43	70.86–87.42
Feeding	69.56	59.24–78.23
Instrumental activities of daily living		
Using the phone	76.08	66.13–83.82
Managing transportation	76.08	66.13–83.82
Shopping	73.91	63.81–81.98
Meal preparation	4.34	1.61–11.20
Housecleaning	2.17	0.05–8.48
Home maintenance	2.17	0.05–8.48
Wash and ironing clothes	2.17	0.05–8.48
Managing medications	2.17	0.05–8.48
Managing finances	2.17	0.05–8.48

*Independence: ability to perform activities alone; 95%CI: 95% confidence interval.

the functional capacity, causing a decrease in physical abilities, impairment of the motor system and, therefore, in the mobility to perform certain tasks.

In this sense, some studies have presented different results on the relation between overweight and functional capacity decrease in older adults. Excess weight and its relation with functional capacity were evaluated by Sousa et al.⁷ in institutionalized older adults. In this population, overweight was not very prevalent, unlike the data described here, and did not interfere in the participants' dependence on BADLs.⁴

In a study with non-institutionalized overweight women, there was a below-reference physical fitness index. However, the methodology to evaluate the functional capacity adopted by these researchers was different from the one we applied,

and instruments were used that evaluated coordination, resistance and physical agility, variables that were impaired by excess weight.¹⁸

Oliveira et al.,¹⁹ in a study conducted with older adults from a community group, assessed the correlation of body mass with motor performance. The authors found significant statistical difference across BMI variables (above 27 kg/m²) and balance limitation ($p = 0.008$), and limitation of the activity of crouching and picking up a pencil on the floor ($p = 0.004$).

In the evaluation of the function status of the lower and upper limbs of older adults, measured by the ability to touch the neck, hand strength, and get up alone from a chair, Tecchi and Gessinger¹⁴ did not find a significant association between BMI and the functional status of older adults. According to

Table 3 Nutritional status of older people in a community center. Campo Grande, state of Mato Grosso do Sul, Brazil, 2017.

Variables	Mean	SD	Min.	Max.	95%CI
Body measurements					
Weight (kg)	69.96	15.61	31	114	66.76–73.17
Height (m)	1.55	0.08	1.38	1.76	1.54–1.57
FPPD (kg)	16.72	0.60	7	30	15.51–17.92
Dietetic data					
Total calories (kcal)	1305.28	495.66	408.72	2840.72	1202.88–1407.68
Carbohydrates (%VET)	52.22	15.09	12.51	85.02	49.10–55.34
Proteins (%VET)	23.65	11.13	5.21	90.67	21.23–25.95
Protein/kg/day	0.93	0.06	0.11	3.68	0.8137–1.0549
Lipids (%VET)	25.45	12.23	4.87	77.64	22.92–27.97
Fibers (g)	17.08	12.72	1.03	100.46	14.45–19.71
BMI					
Low weight (%)	4.25	-	-	-	-
Eutrophy (%)	51.06	-	-	-	-
Excess weight (%)	44.69	-	-	-	-
CC					
Risk for malnutrition (%)	12.77	-	-	-	-
WC					
Low risk CVD (%)	19.15	-	-	-	-
Increased risk CVD (%)	17.02	-	-	-	-
High risk CVD (%)	63.83	-	-	-	-

SD: standard deviation; 95%CI: 95% confidence interval; RHGS: right hand grip strength; TEV: total energy value; BMI: body mass index; CC: calf circumference; WC: waist circumference; CVD: cardiovascular diseases.

the author, overweight and malnutrition did not interfere in the functional status of the aging adults, as assessed by the function of the lower and upper limbs.

In the literature, the relationship between malnutrition and loss of functional capacity is highly discussed. Malnourished older people are more dependent on daily life activities.²⁰ Malnutrition, as well as being overweight, is a common problem in older adults and may contribute to increased mortality, reduced quality of life, and results in decreased muscle strength and action capacity, contributing to the decreased in functional capacity.

Among the activities of daily living most affected in undernourished older adults, we highlight the act of eating,^{21,22} also found in the present study. For the individuals in this sample, the feeding activity was the one with the lowest independence (69.52%). Such a finding may strongly impact the nutritional and functional status of these individuals, since, according to the results described herein and also those already described in the literature, maintenance of reference weight seems to be the best nutritional diagnosis for the preservation of the functional capacity of older adults.

Despite the difficulty in feeding, when the food consumption of the sample was evaluated, the average protein intake per kg of body weight was 0.93 grams, higher than the recommended dietary intake (RDA) of 0.8 g / kg body weight per day²³ (IOM, 2006). However, Valenzuela et al.²⁴ suggest that the protein intake should be 1.2 g / kg / day for the reduction of muscle mass loss in older adults. Protein intake data from the sample are in agreement with the impairment of functional capacity. A satisfactory protein supply is associated with the reduction and prevention of muscle mass loss, reducing the risk factor for frailty in older adults, as well as helping to improve physical and mental functions.²⁵

These results should be considered in the light of some limitations. First, we can cite the low adherence of older adults in participating in the research, thus leading to a small sample. Also, because of the cross-sectional methodological design, it was not for this study to seek explanations for the association found. It is necessary that longitudinal studies be conducted to investigate in greater detail the relationships between aspects of the nutritional status of older adults and functional capacity and, consequently, to develop strategies of health promotion and disease prevention in this population.

CONCLUSION

The data indicated that BMI over 27 kg / m², classified as overweight, has a negative effect on the functional capacity of older adults in the performance of daily tasks, which can lead to problems related to increased dependence, associated with loss of autonomy and decreased quality of life in this age group. This is an important condition that requires specialized health care professionals, with an emphasis on food and nutrition.

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CONFLICT OF INTERESTS

The authors declare no conflict of interests.

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