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Original/*Ancianos*

Nutritional status of institutionalized elderly Brazilians: a study with the Mini Nutritional Assessment

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Abstract

Objective: **To assess the nutritional status of elderly living in nursing homes in the city of Salvador, Brazil and associated factors.**

Methods: **Cross-sectional study performed with 359 individuals of both sexes, ages equal or over 60 years old, located in Nursing Homes in the urban area of the city of Salvador, Bahia, Brazil.**

Results: **Regarding nutritional status according to Mini Nutritional Assessment (MNA), 66.3% of the evaluated elderly were malnourished and at risk of malnutrition. When comparing sexes, it has been observed that among men the prevalence of this condition (76.6%) was higher than in women (62.4%). It has been observed, as a result of the multivariate analysis, that only the variable functional capacity for Activities of Daily Living (ADL) was statistically significant. There was moderate correlation between MNA and Mini-Mental State Examination (r=0.454; p<0.0001), as well as between MNA and the ADL scale (r=0.569; p<0.0001). There was weak negative correlation between MNA total score and age (r=0.159; p=0.002).**

Conclusion: **Malnutrition and malnutrition risk were conditions of remarkable importance, with almost two-thirds of the elderly in this situation. ADL functional capacity must be monitored given their close relationship with the nutritional status of the elderly. An interdisciplinary approach in the context of institutionalization is needed due to the association between nutritional status and variables of different dimensions.**

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Key words: *Nutritional Status. Elderly. Nursing homes. Mini Nutritional Assessment.*

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ESTADO NUTRICIONAL DE ANCIANOS BRASILEÑOS INSTITUCIONALIZADOS: UN ESTUDIO CON EL MINI NUTRITIONAL ASSESSMENT

Resumen

Objective: **Evaluar el estado nutricional de los ancianos residentes en Hogares para Ancianos, en la ciudad de Salvador, Brasil y factores asociados.**

Métodos: **Estudio transversal con 359 individuos mayores de 60 años, de ambos sexos y residentes en hogares de ancianos en la zona urbana de la ciudad de Salvador, Bahia, Brasil.**

Resultados: **En cuanto al estado nutricional de acuerdo con Mini Nutritional Assessment (MNA), el 66,3% de los ancianos evaluados estaban desnutridos y en riesgo de desnutrición. La prevalencia de esta afección fue mayor entre los hombres (76,6%) en comparación con las mujeres (62,4%). Se ha observado, como resultado del análisis multivariado, que sólo la capacidad funcional variable para Actividades de la Vida Diaria (AVD) fue estadísticamente significativa. Hubo correlación moderada entre MNA y Mini Examen del Estado Mental (r = 0,454; p <0,0001), así como entre MNA y la escala AVD (r = 0,569; p <0,0001). Hubo correlación débil negativa entre la puntuación total del MNA y la edad (r = 0,159; p = 0,002).**

Conclusión: **La desnutrición y el riesgo de desnutrición fueron de importancia excepcional de las condiciones, porque casi dos tercios de los ancianos estaban en esta situación. La capacidad funcional para AVD debe ser supervisada por su estrecha relación con el estado nutricional de las personas mayores. Un enfoque interdisciplinario en el contexto de la institucionalización es necesario debido a la asociación entre el estado nutricional y variables de diferentes dimensiones.**

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Palabras clave: *Estado Nutricional. Anciano. Hogares para Ancianos. Mini Nutritional Assessment.*

Abbreviations

MNA: Mini Nutritional Assessment.
HD: Health District.
GDS: Geriatric Depression Scale.
ADL: Scale of Daily Living Activities.
SPSS: Statistical Package for Social Science.
CI: Confidence intervals.
BMI: Body mass index.
PR: Prevalence ratios.

Introduction

Population is aging at an accelerate rhythm due to significant declines in mortality and fertility rates occurring in a relatively short time[1]. In Brazil, it is estimated that, during the next four decades, the elderly population will more than triple, and Brazil will increase from 20 million seniors in 2010 to approximately 65 million in 2050. This process is characterized not only by a proportional increase in the elderly, but also in life expectancy, making this age group able to reach older ages[2].

This scenario has triggered an increase in demand for Nursing homes[3]. However, institutionalization imposes changes in daily life of the elderly, which can undermine their health[4].

Whereas the peculiarities of the aging process and elderly institutionalization have an impact on the nutritional status of these subjects, it is extremely important to perform a nutritional evaluation in these population, including appropriate methods[5].

In the past decades, instruments have been developed that allow evaluating the nutritional statues of elderly, as the Mini Nutritional Assessment (MNA). This tool is able of expressing the malnutrition phenomenon, being of easy application and low cost and for these reasons it has been widely used by researchers and practitioners in the world[6].

Thus, the present study aims to assess the nutritional status of elderly living in nursing homes in the city of Salvador, Brazil and associated factors.

Methods

Cross-sectional study performed with individuals of both sexes, ages equal or over 60 years old, located in Nursing Homes in the urban area of the city of Salvador, Bahia, Brazil.

A survey was made in 29 Nursing Homes in the city, with a total of 1239 elderly, (323 men and 916 women). The sample size calculation was performed to ensure its representativeness, being stratified by Health District (HD) of the city, with sample power of 80%, totaling 412 individuals. However, MNA application was possible in 359 elderly, residents in 15 Nursing Homes, located in eight HD, due to the high number of frail elderly, with severe physical or mental impairment that prevented the collection, or because they were absent of the Nursing Homes due to hospitalization.

A previously standardized and coded questionnaire was used, and specific scales for assessment of nutritional status, cognitive, psychological and clinical aspects and functional capacity were applied. A properly trained multidisciplinary team performed data collection and the procedures were standardized as a measure of quality control and consistency.

Nutritional Status

For the assessment of nutritional status, MNA has been used. These instrument consists in 18 items covering 4 blocks: anthropometry (body mass index, calf circumference and arm circumference), dietary (number of meals, autonomy to feed, water and food ingestion), global assessment (medicines, residence, mobility, dementia, stress and nutritional status). The interpretation is based on the total score, being considered as malnourished individuals who obtained scores lower than 17; between 17 and 23.5, at risk of malnutrition; and when the score is greater than or equal to 24 they are considered as adequate[7].

Cognitive ability

Cognitive functions were assessed from the applications of the Mini-Mental State Examination[8,9]. Diagnostic criteria considering schooling were the ones recommended by Bertolucci *et al*.[10].

Suspected depression

Suspected depression was evaluated according to the Geriatric Depression Scale in its short version (GDS-15) of Yesavage *et al*.[11], adapted and classified according to Sheikh and Yesavage[12].

Clinical aspects

To review clinical aspects the previously standardized and coded questionnaire has been used, containing questions regarding the use of medication and presence of comorbidity (hypertension, diabetes mellitus and dyslipidemia).

Functional capacity

For the assessment of functional capacity the Scale of Daily Living Activities (ADL) has been used[13].

Data processing and statistical analysis

Data were analyzed with the Statistical Package for Social Science (SPSS), version 16.0. Individuals malnourished and at risk were grouped for analysis, involving *t-Student*'s test to compare averages, and the verification of association with several variables were made by Pearson's Chi-square test and Fisher's test, when needed. For correlation analysis the Pearson's correlation coefficient was used. For all of the above analyzes a significance level of 5% was considered.

Poisson regression has been performed, presenting the reasons for raw and adjusted prevalence and their respective confidence intervals at 95% (CI 95%). Variables that were associated with significance level under 10% ($p<0.10$) were included in the model.

Ethical aspects

The Ethics Committee of the Federal University of Bahia School of Nutrition, under decision 11/2012, approved this study.

For this study the authorization of Nursing Homes was previously required, through their respective directors and/or senior administrators and elderly participation in the study was voluntary, by signature or fingerprint on the Statement of Informed Consent. All results were returned to the Nursing Homes.

Results

Elderly residents were evaluated in 15 institutions, located in eight Health Districts in the city of Salvador. Sociodemographic characteristics, body mass index (BMI), morbidity and institutionalization length are presented in table I. From 359 individuals, the majority (72.7%) were female. Individual were between 60 and 102 years old and more than half (54.6%) were over 80 years old. The average age was 74.3 (+8.7) years among men and 81.5 (+8.7) years among women ($p<0.0001$). Among the evaluated elderly, the proportion of individuals who had finished elementary school was 71.3%.

Regarding morbidity profile and medication use, it is highlighted that more than half of the evaluated individuals (55.6%) had hypertension, and used three or more medications per day (60.6%).

According to BMI, 44.3% were underweight, 34.3% normal weight and 21.4% were overweight. The average BMI was 22.7 kg/m^2, with no statistically significant difference between men and women (data not shown).

Regarding nutritional status according to MNA, 66.3% of the evaluated elderly were malnourished and at risk of malnutrition. When comparing sexes, it has been observed that among men the prevalence of this condition (76.6%) was higher than in women (62.4%) (Fig. 1).

Table I
Socio-demographic characteristics, BMI, morbidity and institutionalization length of the institutionalized elderly in Salvador, Bahia, 2014

Variables	*N*	*%*
Gender		
Male	98	27.3
Female	261	72.7
Age		
60 to 79 years	163	45.4
80 years or more	196	54.6
BMI		
Underweight	159	44.3
Appropriate	123	34.3
Overweight	77	21.4
Education		
Up to complete primary education	204	71.3
From the incomplete secondary education	82	28.7
Morbidities		
Hypertension	188	55.6
Diabetes	60	18.1
Dyslipidemia	55	16.7
Use of medications		
Less than 3 per day	138	39.4
Three or more per day	212	60.6
	Mean	*Standard deviation*
Age (years)	79.5	9.3
BMI (kg/m^2)	22.7	5.3
Institutionalization length (years)	6.1	8.9

BMI: Body Mass Index.

A relation has been found between nutritional status and sociodemographic characteristics (Table II). It is observed that only gender ($p=0.012$) and education ($p=0.042$) were associated with nutritional status.

Regarding the variables related to elderly health, it has been found that dyslipidemia, cognitive capacity, the suspicion of depression and functional capacity for ADLs was associated to nutritional status (Table III).

The raw and adjusted Prevalence ratios (PR) of independent variables and their respective confidence intervals are presented in table IV. It was observed, as a result of the multivariate analysis, that only the variable functional capacity for ADL was statistically significant.

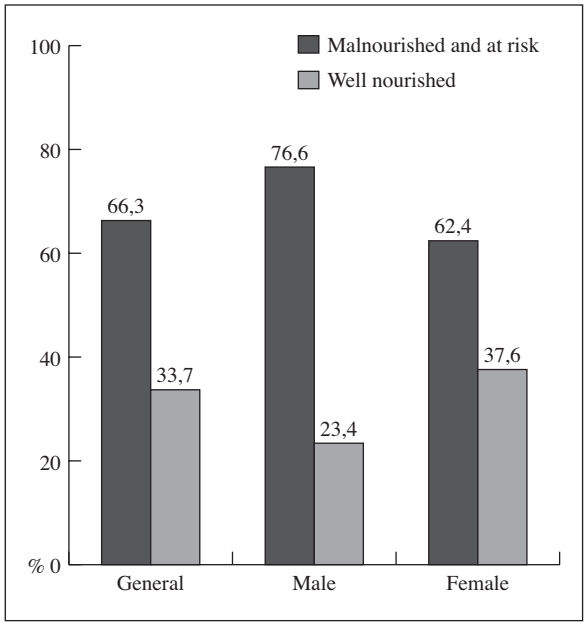

Fig. 1.—Classification of nutritional status (MNA – Mini Nutritional Assessment) according to the gender of the institutionalized elderly in Salvador, Bahia, 2014.

There was moderate correlation between MNA and Mini-Mental (r=0.454; p<0.0001), as well as between MNA and the ADL scale (r=0.569; p<0.0001). There was weak negative correlation between MNA total score and age (r=0.159; p=0.002) (data not shown).

Discussion

Approximately two thirds of the evaluated elderly in Nursing Homes of Salvador where malnourished or at risk of malnutrition, according to MNA. Although few studies evaluate the nutritional status of institutionalized elderly, many of these have shown similar results, both in Brazil[14] as well as in other countries[15,16,17].

Such evidences point to the nutritional vulnerability of institutionalized elderly, emphasizing the importance of nutritional care geared to this population, since malnutrition in this group is associated with increased morbidity and dependence[18].

Malnutrition in the elderly, generally, is related to adverse socioeconomic conditions, as well as depressive states and pathophysiological factors[19,20,21,22]. In the institutionalization context, it is common to have the presence of aspects that affect the elderly alimentation, among them, are the food preparation and monotony of menus. A negative impact may be observed due to the institutional feeding routine[4]. In the present study, nutritional status was associated with gender, education, dyslipidemia, cognitive ability, suspected depression and functional capacity for ADLs.

Elderly men had a greater potential for malnutrition and malnutrition risk. This result is similar to the one found by Menezes and Marucci[23], who identified a high proportion of elderly with low weight, especially among men, an aspect attributed to the fact of women having longer weight gain (plateau around 75 years old) than men (plateau around 65 years old) declining thereafter[5,24].

In the study by Pereira Machado and Santa Cruz Coelho[25], also held in Brazil, education was associated to the nutritional status. In the work above, most investigated subjects had few education, as observed in this study. This result may be related to low socioeconomic status and poor access to information. Barreto *et al*.[21] also suggests that low education is a risk factor for low weight, explained by lower income in old age[26].

The study performed by Wu *et al*.[27], in Taiwan, with 111 institutionalized individuals, despite its methodological differences, found an association between cognitive capacity and nutritional status, as well as in the

Table II
Socio-demographic characteristics and nutritional status of the institutionalized elderly in Salvador, Bahia, 2014

	Total N	*MNA*		*p-value**
		Malnourished and at risk N(%)	*Well nourished N(%)*	
Gender				
Male	359	75 (31.5)	23 (19.0)	0.012
Female		163 (68.5)	98 (81.0)	
Age				
60 to 79 years	359	109 (45.8)	54 (44,6)	0.833
80 years or more		129 (54.2)	67 (55.4)	
Education				
Up to complete primary education	286	131 (75.7)	73 (64.6)	0.042
From the incomplete secondary education		42 (24.3)	40 (35.4)	

MNA: Mini Nutritional Assessment; * p-value according to MNA by the Chi-squared test.

Table III
Characteristics of health according to the nutritional status of institutionalized elderly in Salvador, Bahia, 2014

	Total N	*MNA*		*p-value**
		Malnourished and at risk N(%)	*Well nourished N(%)*	
Use of medications				
Less than 3 per day	350	97 (41.6)	41 (35.0)	0.234
Three or more per day		136 (58.4)	76 (65.0)	
Hypertension				
Yes	338	124 (54.9)	64 (57.1)	0.692
No		102 (45.1)	48 (42.9)	
Diabetes				
Yes	332	39 (17.6)	21 (19.1)	
No		183 (82.4)	89 (80.9)	0.734
Dyslipidemia				
Yes	329	30 (13.6)	25 (23.1)	0.029
No		191 (86.4)	83 (76.9)	
Cognitive ability				
Cognitive decline	253	96 (63.6)	47 (46.1)	0.006
Without cognitive decline		55 (36.4)	55 (53.9)	
Depression				
Suspected depression	256	64 (41.6)	30 (29.4)	0.048
Without suspected depression		90 (58.4)	72 (70.6)	
Functional ability to ADL				
Dependent and partially dependent	328	114 (52.1)	13 (11.9)	<0.0001
Independent		105 (47.9)	96 (88.1)	

MNA: Mini Nutritional Assessment; ADL: Activity of daily living. * p-value according to MNA by the Chi-squared test.

present study. These observations confirm the relevance of this variable in the nutritional status of elderly living in Nursing Homes[28], since the decline of cognitive capacity can lead to anorexia, decrease of food intake and weight loss, increasing the risk of morbidity and mortality[29].

Regarding the functional ability to perform ADLs, in this study associations between this variable and nutritional status have been observed, as was observed by Wu *et al*.[25]. This association was also verified in an Italian study performed with 718 elderly, 316 of which lived in institutions[17]. In that study the authors concluded that this association was more pronounced among those living in institutions compared to those living in the community.

In this work it has been observed that dependent or partially dependent individuals for performing ADLs are approximately 1.6 times more malnourished or at risk of malnutrition than independent individuals. In an analysis by Azevedo *et al*.[20], with hospitalized elderly, those that had mobility loss had 5.27 times more chances of being malnourished or being at nutritional risk. This may have been observed because the research has been performed with hospitalized elderly, whose health conditions differ from the ones of institutionalized individuals.

The impaired functional capacity may be the cause or the consequence of the nutritional status of institutionalized elderly. It is possible that nutritional status is an important factor in maintaining functional capacity, due to some aspects such as the lowest level of physical activity and muscle atrophy[30,31].

Different methods have been used in the specific evaluation of nutritional status, however, there is no agreement about the most appropriate. It has been noted, however, that many are the studies using MNA as a tool for nutritional assessment of the elderly population[16,18,6,26,19,32].

MNA, the main tool for assessment of nutritional status of elderly in the present study, is widely recommended and used worldwide[33], by promoting the detection of malnutrition risk, enabling rapid interventions that benefit the nutritional status and reducing the consequences of inadequate intake. Moreover, MNA has been

Table IV
Prevalence ratio of crude and adjusted association and confidence intervals at 95% of the variables composing the model. Institutionalized elderly in Salvador, Bahia, 2014

	PR	*IC 95%*	*PR adjusted*	*IC 95%*
Gender				
Male	1.225	1.061-1.416	1.220	0.826-1.803
Female	1.0	-	1.0	-
Education				
Up to complete primary education	1.254	0.991-1.585	1.068	0.692-1.646
From the incomplete secondary education	1.0	-	1.0	-
Dyslipidemia				
Yes	0.782	0.607-1.008	0.848	0.509-1.412
No	1.0	-	1.0	-
Cognitive ability				
Cognitive decline	1.343	1.078-1.672	1.179	0.804-1.728
Without cognitive decline	1.0	-	1.0	-
Depression				
Suspected depression	1.226	1.008-1.490	1.138	0.780-1.660
Without suspected depression	1.0	-	1.0	-
Functional ability to ADL				
Dependent and partially dependent	1.718	1.487-1.986	1.590	1.072-2.359*
Independent	1.0	-	1.0	-

ADL: Activities of daily living; PR: Prevalence ratio, CI: Confidence interval; *IC95% statistically significant.

recommended for both the evaluation as well as for the monitoring of this population. However, its application is limited in debilitated individuals, and prevents the identification of obese or overweight individuals[6,16,34].

Thus, the nutritional status assessment presented itself as a fundamental aspect in Nursing Homes' context and the results of researches conducted around the world, as well as the results found in this study, corroborate with the hypothesis that factors such as depression, functional and cognitive capacity may be associated with nutritional status of the elderly living in institutions.

Conclusion

From these results, it is possible to conclude that malnutrition and malnutrition risk were conditions of remarkable importance, with almost two-thirds of the elderly in this situation. This fact points to the need of a proper nutritional approach for providing assistance to institutionalized individuals.

Variables such as gender, education, dyslipidemia, cognitive ability, suspected depression and, especially, ADLs functional capacity must be monitored, given their close relationship with the nutritional status of the elderly.

Finally, according to the association between nutritional status and variables of different dimensions, an interdisciplinary approach in the context of institutionalization is needed, in order to improve the health and quality of life of the elderly.

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