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RELATIONSHIP BETWEEN ANTHROPOMETRIC VARIABLES AND MNA BETWEEN INSTITUTIONALIZED ELDERLY

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ABSTRACT

A cross-sectional study of the descriptive type carried out in a Long Stay Institution for the Elderly located in the south of. Aiming to evaluate the nutritional status of institutionalized elderly and to correlate the anthropometric variables with the Mini Nutritional Assessment. The mean age of the sample was 79.5 years, with a predominance of females, with more than 1 year of institutionalization and singles. Greater values of Body Mass Index, arm girth, triceps skin fold thickness, and waist circumference were found among men and women in the younger age group. The prevalence of risk of malnutrition in the elderly was observed, independently of the time of institutionalization. There was a positive and significant correlation between the anthropometric variables with Mini Nutritional Assessment Short-form and Mini Nutritional Assessment. More studies are needed with the use of these variables and others, with instruments that have cutoff points directed to the elderly population, such as waist circumference, to better evaluate the institutionalized elderly, and to implement promotion measures of health.

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INTRODUCTION

The aging of the population causes a greater demand for health services and other forms of care for the elderly, such as the Long Stay Institutions (LSI) (Ramos, 2012). The impairment of the elderly's functional capacity has implications for the family, the community, the health system and the elderly's own life, since incapacity causes greater vulnerability and dependence in old age, decreasing well-being and quality of life (Alves *et al*., 2007). The reduction of physical autonomy and economic instability are factors that can make the elderly more and more dependent. Therefore, it is necessary for a person to take care of this elderly person. When this option is not possible in the family nucleus, institutionalization appears as an option (SOUZA *et al*., 2013). In the institutionalized elderly, undernourished is a matter of great importance in the health area (Volpini and Frangella, 2013). The assessment of nutritional status is fundamental at this stage of life, since the presence of risk of malnutrition is high, indicating the need for a systematic follow-up in geriatric institutions by efficient and easy-to-perform instruments (Félix; Souza, 2009).

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Anthropometric indicators are fundamental to assist in assessing the nutritional status of the elderly. Early diagnosis can be obtained through objective and subjective methods (Paz; Fazzio; Santos, 2012). The need for and difficulty in defining nutritional diagnosis in the elderly indicates that the use of several anthropometric parameters is necessary for greater reliability in the results obtained, as long as they are evaluated together and with caution (Volpini; Frangella, 2013). The objective of this study was to evaluate the nutritional status of institutionalized elderly people in a Long Stay Institution for the Elderly (LSIE) in the south of São Paulo and to relate the anthropometric variables to the Mini Nutritional Assessment (MNA).

MATERIALS AND METHODS

This is a cross-sectional descriptive study, performed in an LSIE located in the southern zone of Sao Paulo, in April 2015. All the institutionalized elderly were invited (55), but the 42 elderly people who signed the Informed Consent Form (ICF) and/or the legal guardian of those who had some cognitive impairment participated in the study. Thirteen elderly were excluded from the sample because they did not have autonomy or legal responsibility. For the autonomous and non-literate elderly, the digital fingerprint was collected in the ICF. A structured questionnaire was used, containing information on socio demographic data and variables for the evaluation of subjective and objective nutritional status. All data were collected by the researcher in order to minimize variations in the final diagnosis. The socio demographic variables were age (years), sex (female or male), institutionalization time (years) and marital status (single, married, separated or widowed). For the subjective evaluation of nutritional status, the MNA was used to evaluate healthy and sick individuals, being able to identify elderly people who are at risk of malnutrition or malnourished (Guigoz; Vellas; Garry, 1994). With the MNA filling, a total score is obtained, which allows to classify the nutritional status of the elderly:> 24 points "adequate nutritional status", from 17 to 23.5 points "risk of malnutrition" and <17 points "undernourished" (Guigoz; Vellas; Garry, 1994). The variables related to the objective evaluation of the nutritional status were: weight, height, Body Mass Index (BMI), calf circumference (CC), arm girth(AG), triceps skinfold thickness (TST) and waist circumference (WC). Weight, height, and BMI determination followed the guidelines for data collection and BMI calculations according to the World Health Organization (WHO, 1995). In order to classify the nutritional status of the elderly according to BMI, the cutoff points were: <22kg/m^2, leanness, 22 – 27 kg/m^2, eutrophy and >27 kg/m^2 overweight(NSI, 1994). For the elderly who presented difficulties to stand and the wheelchair users, we used estimation formulas for weight and height (Chumlea; Roche; Steinbach, 1985). The AG and the TST were verified according to the recommendations of Frisancho (1984). The CC was considered a marker of undernourished and a sensitive measure of muscle mass in the elderly. Data collection followed recommendations of the World Health Organization (WHO, 1995). A marker of undernourished was considered when CC values were less than 31 cm (Chumlea *et al*., 1995). The WC was measured and classified according to the recommendations of the World Health Organization (WHO, 2000) where they were considered an increased risk for metabolic disease, when WC was equal to or greater than 94 cm (men) and 80 cm (women); and increased risk substantially for WC equal to or greater than 102 cm (men) and 88 cm (women). For WC and CC, the sample had 30 elderly, since in the studied group, 12 individuals were wheelchair users. The time of institutionalization was measured in months and, grouped in≤ 1 year; > 1-5 years; > 5 years. The data were organized in Excel spreadsheet. The results were expressed as mean, standard deviation, minimum and maximum values, simple and relative frequency. The Spearman correlation test between the Mini Nutritional Assessment Short-form (MNA-SF) and the MNA and the anthropometric variables, the age and the time of institutionalization were carried out using the Graph Pad Prism 6.0 package with a significance level of 5%. This research was approved by the Research Ethics Committee of the Adventist University Centre of São Paulo (UNASP) under CAAE nº 39380914.0.0000.5377, on March 15, 2015 and by the Municipal Education Department.

RESULTS

We evaluated 42 elderly people, with a mean age of 79.5 ± 10.18 years. There was a predominance of females (n=27) with mean age of 82.6 ± 10.47 years ranging from 63 to 98 years. The mean age of males (n=15) was 74.1 ± 6.8 years, ranging from 66 to 88 years. As to nutritional status, higher values of BMI, AG, DCT and WC were observed among men and women in the younger age group (Table 1). The prevalence of older people with more than 1 year of institutionalization, female and single, is observed. In relation to the nutritional status evaluated by the Triage, 28 patients were at risk of malnutrition, of these, applying MNA, 6 were malnourished and 22 remained at risk of malnutrition. Evaluating all the elderly by MNA, there were 32 individuals at risk of malnutrition, 6 malnourished and only 4 with adequate nutritional status. It is observed a higher prevalence of risk of malnutrition among the elderly regardless of the time of institutionalization (Table 2). Table 3 shows that there was a positive and significant correlation between BMI, AG, TST, CC and WC with a Screening and MNA ($p < 0.05$), but without correlation with the age of institutionalization time.

DISCUSSION

In the present study, there was a predominance of single women with more than one year of institutionalization. The younger age group (men and women) had higher values for BMI, AG, TST and WC. There was no increase in the prevalence of risk of malnutrition and undernourished with the increase in institutionalization time, and the higher the anthropometric variables, the higher the scores in the MNA-SF and the MNA. It is noteworthy that 76% of the sample were at risk of malnutrition when evaluated by MNA. A study with institutionalized elderly people in the city of Uberlandia, Minas Gerais, presented similar results, where the mean age was 79.5 years, with a predominance of females (Sousa *et al*., 2014), coinciding with the mean age of studied elderly. When the mean age by sex was evaluated, the study with institutionalized elderly people in the city of Salvador, Bahia (Pereira *et al*., 2015) found 81.5 years for women and 74.3 years for men, data similar to the found in this study, 82.6 and 74.1 years, respectively. Data from the 2010 demographic census now indicate that in Brazil, the more the population ages, the more female it becomes, the female group currently accounts for 55.5% of the elderly population, 61% of the elderly being over 80 years old (IBGE, 2011).

Table 1. Distribution of anthropometric variables of institutionalized elderly by age group and sex

Anthropometric variables	n	Men Mean ± SD	n	Women Mean ± SD	Total
Height (m) (n=42)					
60-69	6	1,64 ± 0,10	5	1,50 ± 0,03	11
70-79	5	1,66 ± 0,09	4	1,55 ± 0,06	9
80+	4	1,67± 1,68	18	1,49 ± 0,06	22
Weight (Kg) (n=42)					
60-69	6	69,3 ± 20,5	5	73,3 ± 2,9	11
70-79	5	52,8 ± 34,0	4	66,4 ± 16,4	9
80+	4	69,3± 3,2	18	53,0 ± 10,2	22
BMI (Kg/m²) (n=42)					
60-69	6	25,4 ± 5,6	5	32,8 ± 2,1	11
70-79	5	19,7± 13,3	4	28,1 ± 8,7	9
80+	4	25,0± 0,9	18	23,9 ± 3,56	22
AG (cm) (n=42)					
60-69	6	29,6 ± 4,1	5	35,4 ± 4,5	11
70-79	5	28,8 ± 4,9	4	31,3 ± 8,3	9
80+	4	28,1± 1,1	18	27,4 ± 4,6	22
TST (mm) (n=42)					
60-69	6	14,0 ± 8,6	5	19,8 ± 10,2	11
70-79	5	14,2 ± 5,4	4	14 ± 3,4	9
80+	4	11,0± 2,4	18	13,6 ± 4,2	22
WC (cm) (n=30)					
60-69	4	100,9 ± 15,2	3	113,4 ± 3,9	7
70-79	4	99,5 ± 20,9	3	103,8 ± 18,5	7
80+	1	97,0	15	93,9 ± 10,3	16
CC (cm) (n=30)					
60-69	4	36,3 ± 6,2	3	34,3 ± 1,5	7
70-79	4	34,6 ± 4,75	3	33,7 ± 4,2	7
80+	1	41,0	15	30,7 ± 3,4	16

Table 2. Sociodemographic characteristics and nutritional status of the elderly by institutionalization time

	Time of institutionalization					
	≤ 1 year		1 - 5 years		> 5 years	
	n	%	n	%	n	%
Total	8	100	18	100	16	100
Sex						
Female	6	80	11	61,1	10	62,5
Male	2	20	7	38,9	6	37,5
Marital status						
Single	2	20	11	61,1	11	68,8
Married	0	0	1	5,6	1	6,2
Divorced	0	0	2	11,1	0	0
Widower	6	80	4	22,2	4	25
MNA-SF						
Risk of malnutrition	7	87,5	11	55,6	10	62,5
Without risk of malnutrition	1	12,5	7	44,4	6	37,5
MNA						
Undernourished	2	25,0	1	5,6	3	18,7
Risk of malnutrition	6	75,0	15	83,3	11	68,8
Adequate nutritional status	0	0	2	11,1	2	12,5

Table 3. Age correlation, institutionalization time and anthropometric variables with the MNA-SF and MNA

	MNA-SF		MNA	
Variables	R	P	R	P
Age	-0,26	0,0945	-0,29	0,0666
Time of institutionalization	-0,028	0,8596	-0,09525	0,5485
BMI	0,58	<0,0001	0,55	0,0002
AG	0,54	0,0003	0,54	0,0003
TST	0,4	0,0092	0,38	0,014
CC	0,62	0,0003	0,68	<0,0001
WC	0,47	0,0084	0,4	0,0269

One study notes that women live on average 8 years longer than men. The higher life expectancy may be related to the fact that violent deaths, such as murders and accidents, occur in 90% of cases with young men and adult men, and continuous medical follow-up among women more than men is related to longer life (Bandeira, Melo, Pinheiro, 2010). Regarding the nutritional status, a study carried out in a LSIE in the Butantã neighborhood of São Paulo identified the mean BMI values of 23.9 kg/m^2 for the female group and 24.6 kg/m^2 for the male group, characterizing a sample as eutrophic (Volpini and Frangella, 2013). In the present study, it is possible to observe that, in both sexes, the majority of the participants with the process as eutrophic when ruling by the mean values of BMI. In the present study, it was observed that the MNA-SF and the MNA correlated positively with the BMI, AG, TST, WC and CC, but without correlation with the age and the time of institutionalization. In a study carried out in the Czech Republic, several nursing homes with 815 elderly patients (Rambousková *et al*., 2013) found a positive correlation in the use of MNA with BMI ($r = 0.57$, $p < 0.001$) and WC ($r = 0.28$, $p < 0.001$). Different data were found in an evaluation of 24 elderly residents of the Lar Francisco de Assis Asylum, in the Federal District, where there was no statistically significant correlation between MNA and anthropometric variables (BMI,

AG and TST) (Paz; Fazzio; Santos, 2012). It was observed that the elderly were equally distributed in the three categories of nutritional status according to BMI (low weight 33.3%, eutrophy 33.3% and overweight 33.3%). The study was carried out with institutionalized elderly people, residing at the Gerontology Institute of Brasília, Brazil, and obtained similar data, presenting equality in the distribution of underweight and overweight (27%) and higher prevalence of eutrophy (45.9%) (Félix; Souza, 2009). Regarding AG, the majority of the analyzed elderly presented eutrophy, being the highest values obtained in the female sex. Similar data were found in a study carried out in Turkey, where 554 elderly people from 25 institutions in 19 cities were analyzed, showing that older women presented better nutritional status based on AG, compared to men (Ongan; Rakicioglu, 2015). In a study conducted at an LSIE, in Sao Paulo (Volpini and Frangella, 2013), the mean values of TST in men were 12.6 mm and in women of 16.5 mm, data similar to those found in the present study 13.2mm and 14.8mm, respectively, confirming that the women presented greater fat reserve. A study carried out in the city of Porto Alegre, RS, analyzed the risk indicator for the development of diseases such as cardiovascular diseases, hyperlipidemias, arterial hypertension and type II diabetes using the WC, the values obtained showed that institutionalized elderly presented 75.3% prevalence of obesity (Ramos, 2012). In the present study, there was also a high prevalence of elderly people with an increased risk for metabolic disease (85.7%), according to WC, of these 14 (33.3%) were overweight according to BMI and 26 (61, 9%) are at risk of malnutrition by MNA.

In the study by Pereira *et al*. (2015), it was possible to observe that the majority of the institutionalized elderly evaluated in the LSIE of Salvador were underweight according to BMI and at risk of malnutrition or undernourished according to MNA. In another study with 100 elderly institutionalized in Italy, using BMI and MNA as methods for assessing nutritional status, it was found that most residents were at risk of malnutrition in both methods (Donini *et al*., 2013). In the elderly evaluated at the Institution of this study, divergent results were found between the BMI and MNA, for the first indicator the majority of the elderly were eutrophic and for the second one at risk of malnutritin. The MNA is a nutritional assessment tool that classifies individuals in undernourished, risk of malnutrition and adequate nutritional status. The total score does not evaluate individuals for situations of overweight or obesity. With advancing age, body modifications may alter the nutritional status of the elderly. There is a decrease in muscle mass and changes in the distribution of adipose tissue, with a tendency to reduce peripheral deposits, arms and legs, and increase in the central region, reflecting abdominal adiposity (Forster;Gariballa, 2005; Sánchez-García *et al*., 2007). Muscle mass is replaced by adipose tissue, without altering body weight (Teixeira; Filippin; Xavier, 2012). These notes may reflect the divergences observed in the comparison between the anthropometric variables and the MNA, highlighting the importance of the use of several indicators to better assess the nutritional status in the elderly. Pereira *et al*. (2015), mentions that the risk of malnutrition or undernourished is of great importance, pointing to the need for an adequate nutritional approach in order to serve the institutionalized elderly. It was observed that the time of institutionalization not increased risk of malnutrition or undernourished in the elderly analyzed. Freitas *et al*. (2015), showed that the institutionalized elderly present a higher prevalence of undernourished than those living in the community. In a study carried out with institutionalized elderly in Spain using MNA-SF, it was found a higher prevalence (57.9%) of the risk of malnutrition in the elderly, increasing in elderly individuals aged 75 and over, in both sexes (De Luis *et al*., 2011). A study conducted in the Czech Republic with 815 elderly people using the MNA questionnaire showed that 39.4% of the participants were at risk of malnutrition (Rambousková *et al*., 2013). The majority of the elderly in this study, regardless of gender and institutionalization time, presented a risk of malnutrition by MNA-SF (66.6%) and by MNA (76.1%). More studies are needed to verify if institutionalization is directly related to the risk of malnutrition in the elderly. The institution must have adequate structure to meet the individual needs of each one. Other factors should be considered in order to verify reasons for nutritional risk, such as: dietary habits, illnesses, number of medication consumed per day, social and psychological issues, care of the multidisciplinary team and caregivers, as well as the participation of family members. At the present institution, social actions are carried out, valuing life, food, leisure, psychological accompaniment, events for integration of the elderly with various age groups, periodic meetings with residents and relatives, reinforcing the importance of family ties in everyday life contributing to health and quality of life of the elderly.

From the results obtained in the present study, the nutritional evaluation of the elderly with various parameters to implement an individualized diet plan and reassessment of the behaviors at the multidisciplinary meetings will be carried out in the Institution with determined periodicity. This study can be used in the work of nutritionists and other professionals working in LSIE, aiming at the prevention or recovery of nutritional status as well as to ensure the quality of life of the elderly. The same methods can be repeated in other assessments to determine individuals at risk of malnutrition or malnutrition by using various indicators to consider various aspects of aging. The nutritional assessment should be frequent and systematic, identifying the nutritional diagnosis in a timely manner for interventions to have effective results. The present study presented some limitations, among them, the difficulty of access to the legal responsible of the dependent elderly for signing the ICF, which influenced the quantity of the sample obtained; lack of qualified professionals to assist in data collection and absence of adequate equipment in place to check skinfolds, indicating that this type of evaluation was not performed in the routine of nutritional care provided.

Conclusion

With the results of the present study it was concluded that there were differences in the classification of nutritional status by the anthropometric variables, Triagem and MNA, although the prevalence of malnutrition risk was very high due to the use of a specific instrument for this population. Further studies are needed with the use of these variables and others, with instruments that have cutoff points directed to the elderly population, such as waist circumference, to better evaluate the institutionalized elderly, and to implement promotion measures of health.

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