Dietary patterns of the elderly: characteristics and association with socioeconomic aspects

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Abstract

Objective: To investigate the association between dietary patterns and the socioeconomic aspects of elderly patients registered with the Family Health Strategy in Viçosa, Minas Gerais. Method: A cross-sectional study with a probabilistic sample was employed. To identify dietary patterns, dietary intake was assessed through a Food Frequency Questionnaire (FFQ) adapted for an elderly population. From the FFQ dietary patterns were identified by factor analysis. After the identification of the dietary patterns, logistic regression was performed considering each different dietary pattern and the related socioeconomic variables. Results: The consumption of a Fat and sugar pattern was greater among women and lower in elderly persons who considered themselves as mixed race. The consumption of the Balanced pattern was also lower among mixed race, married individuals, with one to four years of schooling and from the CDE economic classes. The Fruit and fish pattern was less consumed by elderly persons with 1-4 years of schooling, while the opposite was observed among those with five years or more of study. But the consumption of a Leafy vegetables pattern was lower among those with five or more years of schooling. Conclusion: The evaluation of the consumption of dietary patterns and the establishment of a relationship with the socioeconomic aspects of the elderly helps to achieve a better understanding of risk and protective factors for health.

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INTRODUCTION

Understanding the implications and consequences of the growth of the elderly population in Brazil is a major challenge for public health[1,2]. The health profile of this population group is characterized by the replacement of acute or fatal illnesses with an increase in the number of individuals affected by chronic noncommunicable diseases (CND) and their complications, which have a direct relationship with dietary intake[3-7]. A better understanding of the reality of the diet of the elderly is possible through the development and use of dietary patterns that establish different relationships between nutrition and health processes[8-10].

Evaluating the dietary patterns of the elderly and their association with the social and economic environment in which they are inserted is important to establish a better representation of the reality of the Brazilian elderly with regard to food and health determinants[5,11,12]. Therefore, the present study aimed to investigate the association between dietary patterns and the socioeconomic aspects of the elderly population registered with the Family Health Strategy (FHS) in the municipality of Viçosa, Minas Gerais.

METHOD

An epidemiological cross-sectional study with a random sample was performed of elderly persons of both genders receiving care at all the FHS units in Viçosa, Minas Gerais, from August 2011 to June 2012. The sample size calculation considered a confidence level of 95%, a 65% prevalence of metabolic syndrome and a variability of 5%. The sample therefore contained 331 elderly persons, to which was added 20% to cover potential losses, giving a total of 398 elderly persons. The final sample comprised 402 elderly individuals.

The data was collected through visits to units of the FHS, where a structured and standardized questionnaire, which had been pre-tested in a pilot study, was applied. The socioeconomic and self-reported and demographic variables analyzed were gender, age, skin color/ethnicity, marital status, education (years of study) and economic class. Economic class was assessed and categorized according to the Critério de Classificação Econômica da Associação Brasileira de Empresas de Pesquisa (the Economic Classification Criteria of the Brazilian Association of Research Companies)[13].

To assess food patterns, the Food Frequency Questionnaire (FFQ), a qualitative tool validated for the elderly, was used[14]. This includes a list of foods containing 93 items and the frequency of intake (daily, weekly, monthly, rarely or never). In order to minimize errors in the study, the name of each food on the FFQ and its frequency was read aloud, and it was emphasized that consumption over the previous year was being discussed. No feelings or opinions regarding the responses of the elderly about the consumption of certain foods were expressed.

From the FFQ variables, the dietary patterns of the population were identified. The validity of the construction of food patterns was investigated by exploratory factor analysis to test the relationship between the different foods. The Kaiser-Meyer-Olkin (KMO) coefficient was calculated and Bartlett's sphericity test was applied to assess the applicability and appropriateness of correlations between the variables.

Principal component analysis of the FFQ was carried out, followed by an orthogonal rotation (varimax) to examine the exploratory factor structure, improving the interpretation of the data. The number of factors was defined as the variance graph of the number of components (screen plot), where the steepest points indicate the appropriate number of components to be retained. Foods with a consumption equal to or less than 25% were excluded from the FFQ. Foods that contributed to the characterization of each pattern exhibited factorial loads with values equal to or greater than 0.2, as per Schulze et al.[15]. From this analysis, we identified four patterns of consumption, namely Fat and sugar, Balanced, Fruit and fish and Leafy vegetables. The names of the patterns were created to represent the main components found.

After the extraction of each food pattern, four logistic regressions were performed, considering in each a different food pattern as the dependent variable and the socioeconomic variables as the independent variables. These models were adjusted considering $p < 0.05$.

The study fully complied with the guidelines for research involving human beings, in accordance with Resolution n0 196/96 of the National Health Council.

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The elderly persons participated voluntarily and signed a Free and Informed Consent Form. The present study was approved by the Ethics Research Committee of the Universidade Federal de Viçosa (the Federal University of Viçosa) (record nº 039/2011).

RESULTS

A total of 402 elderly persons participated in the study, the majority of whom were female (60.56%), brown-skinned/mixed race (48.76%) and married (56.72%). Most had an educational level between one and four years (58.21%) and were classified as being of the lowest economic class, CDE (89.3%) (Table 1).

In Table 2 shows the distribution of the factor loads of the food consumption patterns, extracted from the food present in the FFQ of the elderly persons, as well as the type of food that was part of each pattern and its factor load.

The final multiple logistic regression model for each dietary pattern, according to the socioeconomic variables, is described in Table 3. It was noted that women were 14% more likely to have a dietary pattern of Fat and sugar. With regard to ethnicity/skin color, it is noted that describing oneself as brown-skinned/mixed race reduced the probability of consuming this dietary pattern.

The consumption of a Balanced diet was lower in brown-skinned/mixed race individuals. The same relationship was observed among married elderly persons, with one to four years of schooling and from CDE economic class.

The consumption of the Fruit and fish pattern was lower among elderly persons with one to four years of schooling, with the opposite being observed in those with five or more years of study. But the Leafy Vegetables pattern of consumption was lower among those with five or more years of education.

Table 1. Characterization of sample based on socioeconomic and demographic variables. Viçosa, Minas Gerais, 2012.

Variable	Categories	n (%)
Gender	Male	159 (39.55)
	Female	243 (**60.45**)
Skin color/ethnicity	White/Caucasian	109 (27.11)
	Brown/Mixed Race	196 (**48.76**)
	Black/Afro-Brazilian	97 (24.13)
Marital Status	Single	28 (6.97)
	Married	228 (**56.72**)
	Divorced/separated	19 (4.73)
	Widowed	127 (31.59)
Economic class	AB	43 (10.7)
	CDE	359 (**89.3**)
Level of education	Illiterate	111 (27.61)
	1 to 4 years	234 (**58.21**)
	5 or more years	57 (14.18)

Table 2. Distribution of factor loads of food consumption patterns of elderly persons. Viçosa, Minas Gerais, 2012.

Foods	Food patterns			
	Fat and sugar	Balanced	Fruit and fish	Leafy vegetables
French fries	0.2341	-	-	-
Yucca fries	0.2557	-	-	-
Pork	0.2431	-	-	-

to be continued

continued from table 2

Sausage	0.2242	-	-	-
Crackling	0.2335	-	-	-
Sugar	0.2639	-	-	-
Soda	0.2338	-	-	-
Biscuit and salt Water	-	0.2158	-	-
Chicory	-	0.2014	-	-
Pumpkin	-	0.2640	-	-
Chayote	-	0.2317	-	-
Orange	-	0.2909	-	-
Banana	-	0.2165	-	-
Apple	-	0.2685	-	-
Boiled beef	-	0.2105	-	-
Ground beef	-	0.2167	-	-
Broccoli	-	-	0.2514	-
Watermelon	-	-	0.2772	-
Papaya	-	-	0.2026	-
Pear	-	-	0.3227	-
Cauliflower	-	-	0.2203	-
Fish	-	-	0.2130	-
Cabbage	-	-	-	0.2316
Milkweed	-	-	-	0.3436
Mustard	-	-	-	0.3660

Table 3. Analysis of multiple logistic regression for each dietary pattern, according to socioeconomic variables. Viçosa, Minas Gerais, 2012.

Variables	Fat and sugar		Balanced		Fruit and fish		Leafy vegetables	
	OR	p	OR	p	OR	p	OR	p
Gender								
Male	1.0		---		---		---	
Female	1.14	0.001						
Skin color								
White/Caucasian	1.0		1.0		---		---	
Brown/Mixed race	0.82	0.001	0.53	0.04				
Black/Afro-Brazilian	0.36	0.23	0.24	0.42				
Marital status								
Single	---		1.0					
Married			0.93	0.02				
Divorced/separated			0.52	0.39				
Widowed			0.66	0.13				
Level of education								
Illiterate	---		1.0		1.0		1.0	
1 to 4 years			-1.08	0.001	0.49	0.01	0.29	0.12

to be continued

continued from table 3

5 years or more		0.20	0.41	1.62	*0.001*	-0.59	*0.02*
Economic class							
AB	---	1.0		1.0		---	
CDE		0.99	*0.001*	-1.06	*0.001*		

OR: odds ratio.

DISCUSSION

It is observed that food intake among the elderly is mainly influenced by physiological factors related to appetite reduction, deglutition disorders, and decreased gustatory and olfactory ability, which all contribute to the decreased absorption of vitamins, minerals and other nutrients, causing the depletion of nutritional status and health[5,16,17].

The factorial analysis extracted from the FFQ was performed to identify dietary patterns which represent the food intake patterns of the population of the study. Such a methodology has been used in many studies[10,12,18]. Of the four patterns identified, the first, entitled Fat and sugar was considered harmful to health as it consisted of foods high in fat and sugar. The second pattern was composed of carbohydrate-rich foods, fruits, vegetables and meats, and was entitled Balanced; the third had lots of fruit and was also composed of fish, being referred to as Fish and fruit; and the fourth was comprised of leafy vegetables and tea, and was known as Leafy Vegetables.

The Fat and sugar dietary pattern was more common in females, while being brown-skinned/mixed race reduced the probability of the consumption of this dietary pattern. Different studies report that the food consumption of the elderly is marked by a high intake of foods that are rich in fat and sugars and low in the consumption of fruits and vegetables[19,23]. Data from Vigitel revealed the consumption of fruit and vegetables in Brazil is below 400 g/day, the amount recommended by the World Health Organization (WHO)[24].

The reduced consumption of foods that are a source of vitamins and minerals or the adoption of a monotonous diet by elderly can lead to a depletion in the intake of nutrients that are essential for maintaining health and controlling disease[7,25,26]. It is noteworthy that the process of nutritional transition is marked by the excessive consumption of sugars, fats, soft drinks, and the insufficient consumption of fruits, vegetables and fiber, which contributes to the occurrence of unfavorable consumption patterns[5,20].

Maintaining a balanced food intake with the presence of foods such as fruits, vegetables and the low intake of fried foods and fats minimizes the development of cardiovascular diseases among the elderly[27,28]. Among the nutritional strategies to improve nutrition and health are the control of cardiovascular risk factors that accompany lifestyle change, as different dietary patterns modulate various aspects of atherosclerosis and cardiovascular risk factors, such as plasma lipid levels, systemic insulin resistance and glucose metabolism, blood pressure, oxidative phenomena, endothelial function and vascular inflammation[27].

Increased consumption of food sources of saturated fats and sugars is directly associated with a higher prevalence of cardiovascular diseases and obesity[29], and it has been found that cardiovascular disease is 40% more prevalent in areas with lower socioeconomic levels. Similar findings of inadequate intake and overweight were observed in a study by Nascimento et al[30]. When considering these factors as indicators of inadequate dietary habits, studies relating to household surveys have found a heightened growth of overweight and obesity, especially in social strata of lower income[20,28,31].

The Fruit and fish pattern of food consumption was lower in elderly persons with one to four years of study, a finding which was not observed among those with five or more years of study. Recent national data has revealed that elderly Brazilians have an inadequate diet, with a high prevalence of insufficient intake of vitamins A, C, D, E, thiamine and pyridoxine, and the minerals calcium, magnesium, zinc and copper,

as well as the habitual consumption of excessive sodium31. Proper nutrition, with a high consumption of fruit and fish, brings health benefits, reducing the prevalence of NCDs[32].

It should be noted that the present study was based on non-institutionalized, low-income elderly persons. Other studies have shown that this population has a lower calorie diet than those with a high income. It is known that income is a key factor in diet quality, as, because of insufficient economic resources, elderly persons have an inferior dietary pattern than those with greater purchasing power[3,33,34].

The comparison between dietary patterns and socioeconomic aspects in the present study is limited compared to other scientific studies, as works that consider these factors are scarce. The absence of a gold standard to assess food intake, especially among the elderly, is a major limiting factor. In addition, the cross-sectional design of the study makes it impossible to establish a cause-and-effect relationship between the measures assessed.

CONCLUSION

The findings of this study indicate that the Fat and sugar pattern of food consumption was more prevalent among women and less prevalent among those who considered themselves brown-skinned/ mixed race. The Balanced pattern of consumption was also lower among brown-skinned/mixed race individuals, as well as those who were married, with one to four years of schooling, and those from the CDE economic class. The Fruit and Fish pattern was consumed less by elderly persons with an education level of from one to four years of schooling, while the opposite was observed among those with five or more years of study. The Leafy Vegetables pattern of consumption, however, was lower among those with five or more years of education.

It is important to emphasize the need for constant monitoring of dietary patterns and the encouraging of healthy eating practices. Such actions can mitigate the effects of poor diet on general health and the incidence of morbidities among the elderly. Studies correlating the dietary patterns and socioeconomic aspects of the elderly should also be encouraged, as the results show strong correlations with risk and protective factors for health. They also provide greater knowledge of the subject and broaden the discussion about the different factors associated with the food consumption of the elderly.

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