ISSN: 2230-9926

Available online at http://www.journalijdr.com

IJDR

International Journal of Development Research
Vol. 08, Issue, 05, pp.20576-20581, May, 2018

ORIGINAL RESEARCH ARTICLE OPEN ACCESS

ASSOCIATION BETWEEN THE NUTRITIONAL PROFILE OF MACRONUTRIENTS AND THEIR RELATIONSHIP WITH HYPERTENSION, DIABETES AND OBESITY IN THE ELDERLY

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ARTICLE INFO

Article History:
Received 22nd February, 2018
Received in revised form
14th March, 2018
Accepted 03rd April, 2018
Published online 31st May, 2018

Key Words:
Elderly, Obesity,
Diabetes, Hypertension.

ABSTRACT

Many functional and metabolic disorders found in elderly population are resulting from poor eating habits and, therefore, they are considered a group of risk and vulnerability as it concerns the nutritional aspects. Thus, this study aimed to evaluate the correlation of hypertension, diabetes and obesity against the consumption of macronutrients in a population sample of elderly in a Brazilian city. This is an exploratory research, qualitative and quantitative approach, carried out in an interior of the municipality of Bahia, with 795 elderly individuals. The following questionnaires were used: a) Food Frequency Questionnaire (FFQ);b) pre-existing diseases of Abuel; c) Evaluation of the Body Mass Index (BMI); d) Data Social Class parameters according the Brazilian Institute of Geography and Statistics (IBGE). Statistical analysis was obtained by applying the Chi-Square test and Pearson correlation. It was found that: (1) hypertensive individuals consume high carbohydrate levels ($p < 0.009$) and low protein content ($p < 0.002$) and lipids ($p < 0.010$); (2) diabetics tend to consume carbohydrates and lipids in the same way that do not have the disease, but ingest low protein content ($p < 0.002$); (3) obesity have proved consume carbohydrates in the same way eutrophic, however, they showed a high fat diet ($p < 0.010$) and protein levels ($p < 0.000$). Forward to the facts it is concluded that food tends to influence the worsening of metabolic diseases in elderly such as systemic hypertension, diabetes mellitus and obesity.

Citation: Beatriz Rocha Sousa, Matheus Lemos Silva., Vitoria Dias Soares, Beatriz Meira Ramos, *et al.*, 2018. "Association between the nutritional profile of macronutrients and their relationship with hypertension, diabetes and obesity in the elderly", *International Journal of Development Research*, 8, (05), 20576-20581.

INTRODUCTION

In recent times there has been number changes in population age structure resulting from the decrease in mortality and birth rates, phenomenon that has come to be called the Demographic Transition (DT) (Cervellati *et al*., 2015). Thus, there was an expansion of the elderly population and decrease of young people, raising in a population aging (PABLOS-MENDEZ *et*

al., 2015). To the World Health Organization (WHO), old is one who according their chronological age reached 60 years of age, in underdeveloped or developing countries, and 65 years in developed countries (Paz; Fazzio; Santos, 2012). However, because of this increasing life expectancy, WHO has sought alert the public about healthy aging, as many morbidities become lodged in individuals in this stage of life (WHO, 2015). The elderly are considered a risk group in terms of nutrition, as many morphological, functional and biochemical changes occurring in this audience are consequential or causing nutritional problems (Martin; Nebuloni; Najas, 2012). A proper diet can contribute positively between individuals this age group, for example aiming minimize the cases of malnutrition, dysfunction also considered common to that phase (Leslie; Hankey, 2015). This food shortage is often driven by the emergence of chronic diseases, depressive disorders and other functional losses, such as disturbances in taste perception that hinder chewing, swallowing and, consequently, the metabolism of minerals and vitamins (Azevedo *et al*., 2015). However One cannot fail to mention the increasing willingness of obesity among older adults, since the metabolism of these subjects is changed and the energy expenditure is lower due to disabling diseases that are housed in the same over the years (Mathus-vliegen, 2012). Moreover, it is not uncommon for elderly people diagnosed with high blood pressure (hypertension) and / or diabetes mellitus (DM), common anomalies associated with cardiovascular disease (SONG *et al*., 2016). Both are also often related to feeding, since studies suggest the harm caused by excess sodium and sugar for hypertension and diabetes, respectively (FREIRE *et al*., 2012). In these long lived patients are not manifested only shortage of nutrients such as carbohydrate, protein and lipid, but also of micronutrients, as well as the reduction of food intake, the individual in old age tends to have difficulty in swallowing food (Rémond *et al*., 2015). Facing the facts stated and considering the negative repercussions resulting from nutritional deficiencies in elderly, this study aims to evaluate the correlation of hypertension, diabetes and obesity against the consumption of macronutrients in a population sample of elderly in a Brazilian city.

MATERIALS AND METHODS

This is a qualitative and quantitative research, observational and cross-sectional nature, in a city the interior of Bahia (latitude : 14 51 '58 "S, longitude: 40 ° 50' 22" W). The same is a fraction of a project entitled "Epidemiological profile of chronic diseases in Baiano Southwest."Data were collected andetween July 2016 and September 2017, using the stratified random approach method. The sample consisted of 795 elderly, i.e., ages above 60 years. The analysis was carried out considering a significance level of $p < 0.05$, with the aid of SPSS 25.0 statistical program, by applying the Chi-Square test and Pearson correlation. The result was obtained by applying: the questionnaires a) food frequency questionnaire (FFQ), which expresses how is the supply voltage of the subjects;b) Pre-Existing Disease Abuel, which aims toprovide an assessment of the health status of the person examined, which was used questions about "diagnosis of hypertension and diabetes";c) Evaluation of Body Mass Index (BMI), carried out following the guidelines of WHO (1995) in elderly individuals are classified as "low weight" if have BMI <22 kg / m^2"eutrophic" the condition BMI> 22 and <27 kg / $m^2$and "overweight" BMI> 27 kg / m^2;d) Data Social Class parameters according the Brazilian Institute of Geography and Statistics (IBGE). Participants were informed about the methods to be used to collect according to Resolution 466/12 (National Health Council), which constitutes international research documents involving humans. It is noteworthy that the project fhi approved by the Research Ethics Committee of the Faculty Northeast Independent (Opinion No. 1,670,007).

RESULTS

To analyze the association between dietary profile, with three major metabolic diseases commonly found in elderly could be observed that diabetes mellitus (DM) is correlated to decreased protein intake compared to those who were not diagnosed with the condition represented by $p < 0.002$ (Table 1). As for carbohydrates and lipids, it is evident that diabetics tend to consume them in the same way as the other subjects, showing no significant difference between the values - $p < 0.418$ and 0.462 respectively. Regarding the energetic value it was found that describe the two groups, and they diabetic or not, showed consumption amount of total calories within the normal range. If treating obesity, it was found that obese subjects ingest higher protein and fat content than those with the adjustment Body Mass Index (BMI) with significance level of $p < 0.000$ and 0.010 in due order. However, much carbohydrate consumption among those with increased adiposity, as eutrophic was considered the higher ($p < 0.015$).

Table 1. Correlation between the studied variables

	Hypertension			Diabetes			Obesity			
	Yes	No		Yes	No		Low weight	Eutrophic	Overweight	
Energy consumption	n (%)	n (%)	p	n (%)	n (%)	p	n (%)	n (%)	n (%)	p
Deficient	201 (72,8)	75 (27,2)		228 (82,6)	48 (17,4)		141 (51,1)	111 (40,2)	24 (8,7)	
Normal	75 (67,6)	36 (32,4)	0,009	93 (83,8)	18 (16,2)	0,292	63 (56,8)	36 (32,4)	12 (10,8)	0,005
Excessive	213 (61,2)	135 (38,8)		273 (78,4)	75 (21,6)		228 (65,5)	93 (26,7)	27 (7,8)	
CHO*										
Deficient	42 (8,1)	24 (8,6)	0,009	57 (8,9)	9 (5,9)	0,418	39 (8,6)	18 (6,7)	9 (12,5)	0,015
Normal	75 (14,5)	39 (14)		96 (15)	18 (11,8)		66 (14,5)	33 (12,4)	15 (20,8)	
Excessive	372 (72,1)	183 (65,6)		441 (68,7)	114 (74,5)		327 (71,7)	189 (70,8)	39 (54,2)	
PTN**										
Deficient	417 (80,8)	204 (73,1)	0,002	507 (79)	114 (74,5)	0,002	363 (79,6)	210 (78,7)	49 (66,7)	0,000
Normal	48 (9,3)	21 (7,5)		60 (9,3)	9 (5,9)		45 (9,9)	21 (7,9)	3 (4,2)	
Excessive	24 (4,7)	21 (7,5)		27 (4,2)	18 (11,8)		24 (5,3)	9 (3,4)	12 (16,8)	
LIP***										
Deficient	303 (58,7)	158 (55,9)	0,010	363 (56,5)	96 (62,7)	0,462	270 (59,2)	159 (59,6)	30 (41,7)	0,010
Normal	81 (15,7)	39 (14)		99 (15,4)	24 (13,7)		66 (14,5)	42 (14,6)	15 (20,8)	
Excessive	105 (20,3)	51 (20,3)		132 (20,6)	21 (15,7)		96 (21,1)	39 (15,7)	18 (25,)	

Source: Research Data 2017.
CHO*: Carbohydrate; PTN**: Protein; LIP***: Lipids.

Table 2. Description of search data

Variables	Classification	n	%	~	± SD
Age		795	-	70,73	7,73
Gender	Male	216	27,2	-	-
	Female	579	72,8	-	-
	Deficient	276	37,6	923,04	273,98
Energy consumption	Normal	111	15,1	1349,16	190,07
	Excessive	348	47,3	2746,72	1892,76
CHO*	Deficient	66	9	1150,71****	1137,99
	Normal	114	15,5	1075,76****	620,34
	Excessive	555	75,5	1262,09****	1056,83
LIP**	Deficient	459	62,4	298,48****	274,42
	Normal	120	16,3	569,57****	407,16
	Excessive	156	21,2	728,14****	637,58
PTN***	Deficient	621	78,1	134,95****	146,89
	Normal	69	9,4	439,64****	376,18
	Excessive	45	6,1	627,82****	513,90
Obesity	Low weight	456	57,4	19,02	2,60
	Eutrophic	267	33,6	24,25	1,32
	Overweight	72	9,1	30,83	3,95
Hypertension	Yes	516	64,9	-	-
	No	279	35,1	-	-
Diabetes	Yes	642	80,8	-	-
	No	153	19,2	-	-
Social class	A	0	0	0	0
	B	3	0,4	14055,5	0
	C	54	7,2	4425,22	1394,16
	D	441	59	1875,5	0
	E	249	33,3	937,00	0

Source: Research Data 2017.
CHO*: Carbohydrate, LIP**: Lipids, PTN***: Protein.
****Averages calculated according to energy consumption.

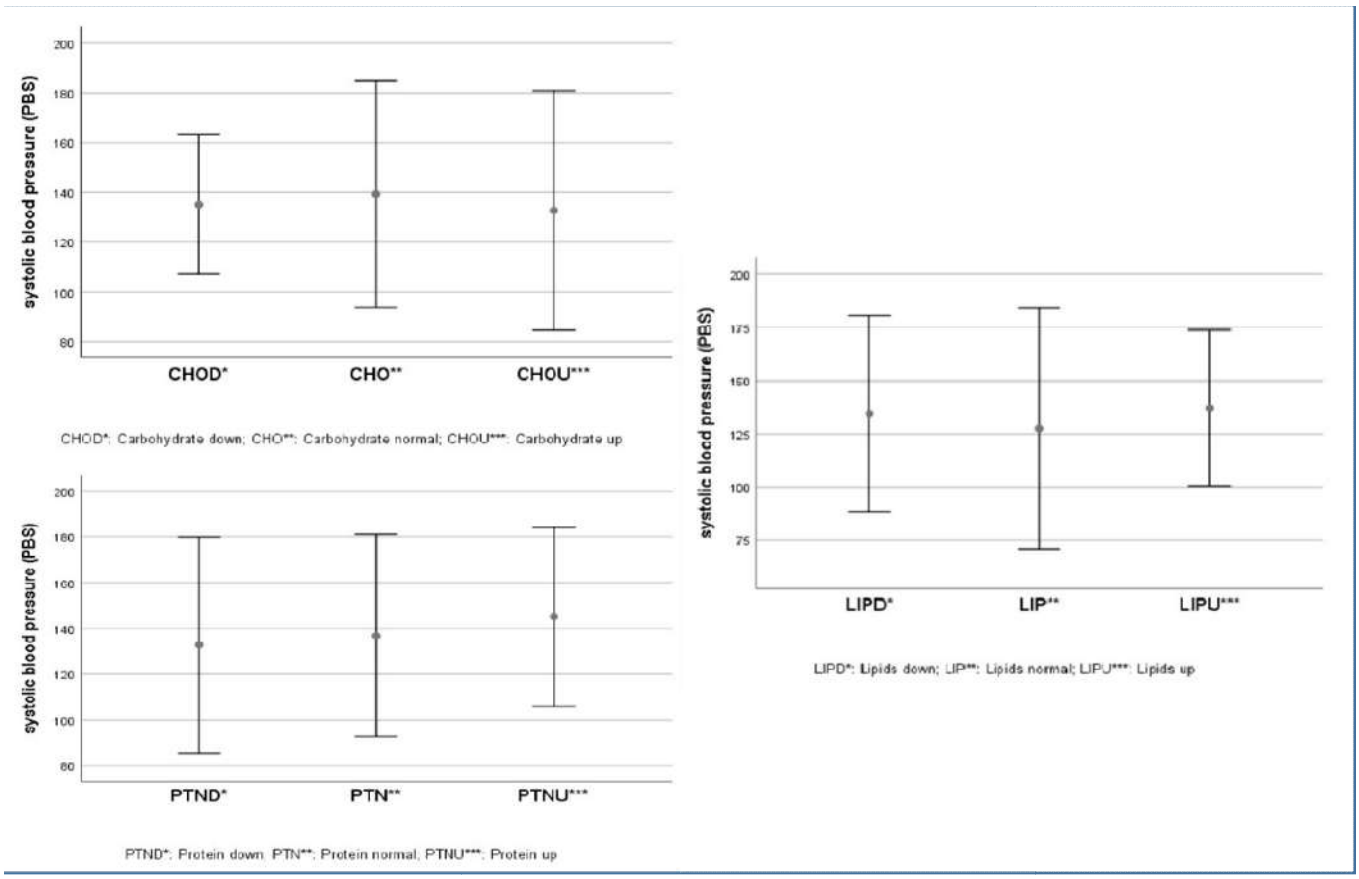

Figure 1.

What differentiated the diet of the same was the total energy consumption, in which obese consumed macronutrients, in general, exaggeratedly and eutrophic consumed only sugars / carbohydrates eminent way.

Already hypertensive subjects had a high-carbohydrate diet compared to normotensive, with a significance level of p <0.009, and devoid of lipids and proteins, p <0.010 and 0.002, that provision.

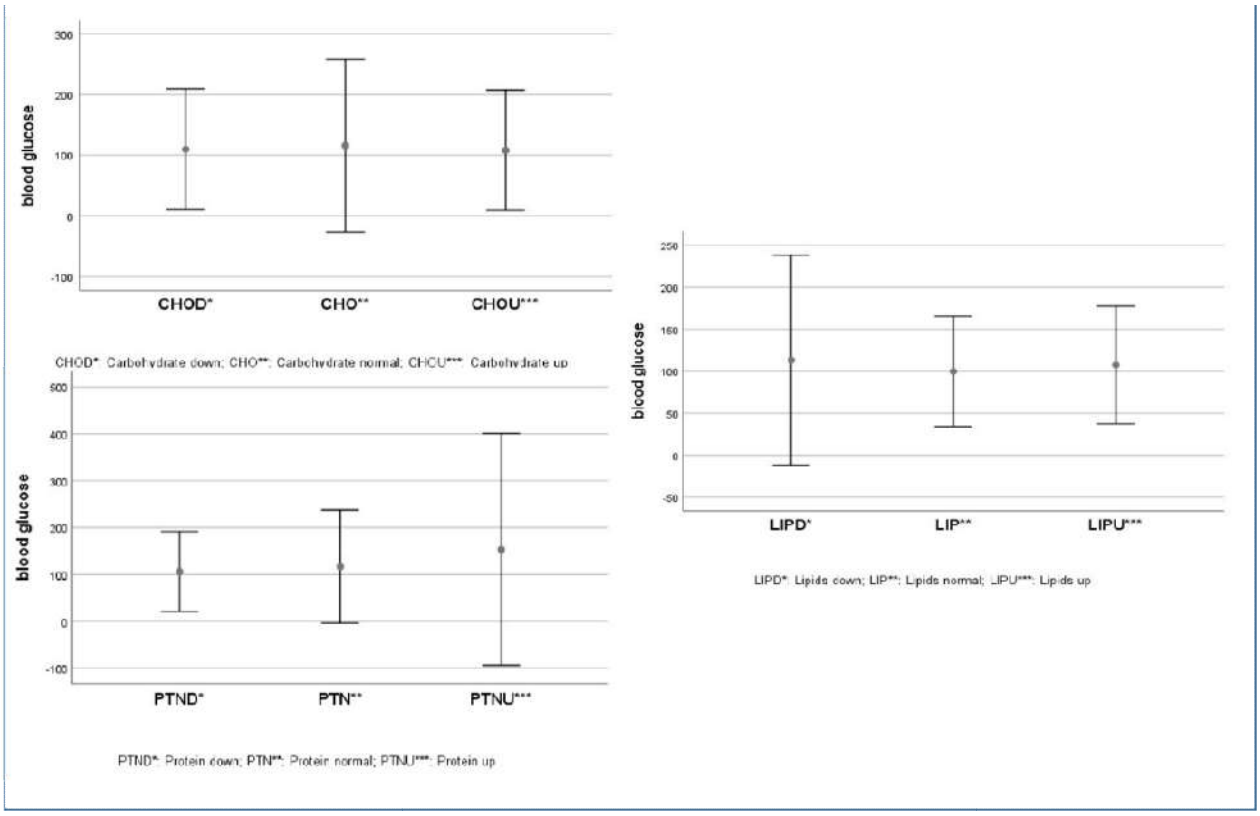

Figure 2

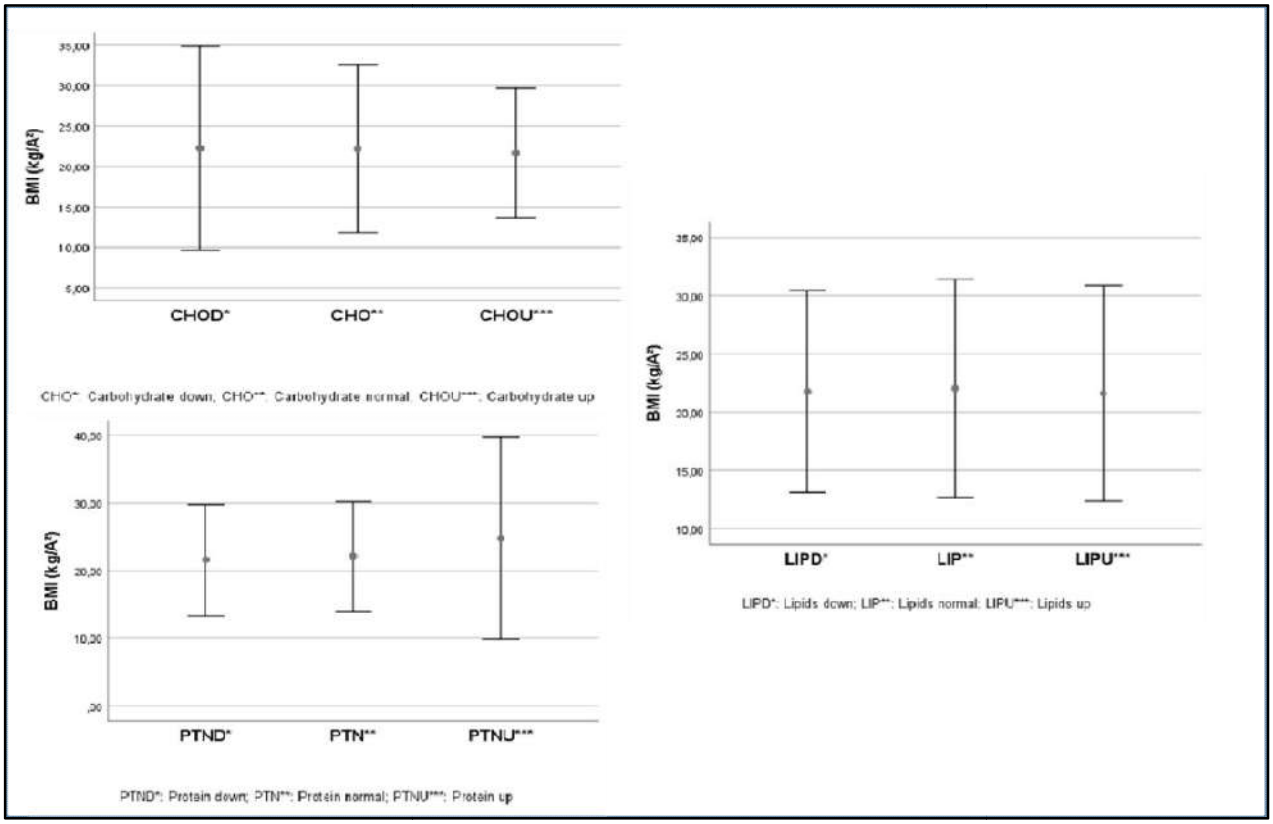

Figure 3

However, in analyzing the power consumption of those with hypertension, it can be seen they have a calorie intake; it may be justified by the excess of carbohydrate. It is emphasized that to obtain the results it was taken into account (Table 2): a) age at which the sample was composed of long lived individuals with mean age of 70.73 years; b) class showing that 795 of elderly in the sample, 441 belong to class D and E class 249, which means that more than 90% of the sample not exhibit low purchasing power.

DISCUSSION

On the results obtained, it can be observed that individuals with and without Diabetes Mellitus, showed values of the energy level of the feed in the normal range. However, protein intake was limited among diabetics, carbohydrates, and lipids similar to that of non-diabetics. Consequently the figures presented, see the need to analyze the consumption of macronutrients in a generalized way in which, when evaluated the global distribution of the diet, it was observed that the carbohydrates protrude strictly due to reduced protein intake. Between obese and non-obese no observed differences in the consumption of carbohydrates, as both groups consumed a high carbohydrate diet. However those who had higher Body Mass Index also ingested excess lipids and proteins, which typifies a high calorie food, therefore justify this disorder involving accumulation of body fat (COZER; PISCIOLARO, 2012). A probable grounds to support such circumstances would daily stresses experienced by humans, including the elderly vigorously (VASUNILASHORN *et al*., 2013). These signals characterize stress, mental dysfunction that contributes to hormonal imbalances and makes the individual has an eating binge, with consequent high energy diets (PALMISANO; INNAMORATI; VANDERLINDEN, 2016).

In addition the high calorie diet, the fact of the elderly metabolism slow be difficult weight loss thus contributing to the increasing number of elderly overweight or obese (FECHINE; TROMPIERI, 2012). Studies suggest that over time individuals, even those considered normal weight, tend to have leading portions of body fat (KIM *et al*., 2014). In the case of elderly hypertensive patients in the sample, there was a surplus of carbohydrate consumption. This can be clarified by the fact that they may be ingesting large amount of simple carbohydrates, which includes industrial products such as crackers, cookies, artificial juices and soft drinks, items that contain high sodium content (HENDRIKSEN *et al*., 2015). Although certain of these foods contain a sweet taste, they have considerable amounts of sodium, since this gives palatability or sodium citrate, food usual additive for stabilizing group (GOH, 2015; SARNO *et al*., 2013). Mineral described when too much, deregulate the mechanism of the sodium-potassium pump, where the cell starts to work to remove it from the inside and by osmosis enters a greater volume of water in the bloodstream, increasing the throughput consequently cardiac and blood pressure (FARQUHAR *et al*., 2015).

Contrary to what one could imagine, the carriers of Hypertension (SAH) were not so consuming inordinate lipids and proteins. The meat is poultry, cattle or swine tend to be saltier, so I imagined that the salt consumed by these subjects would these protein sources, however, the consumption of them expressed their diminished. This fact allows us to state that hypertensive individuals tend to consume sodium indirectly, as found in carbohydrates. Another factor that must be taken into account across the analysis of food profile is prevalent social class between in the sample, since socioeconomic conditions influence the type and quality of food to be consumed (BERRY *et al*., 2015). If the submitted sample n, prevailed to people with low purchasing power, allowing it be said that the food consumed by them are those of lower cost (SEIDELL, 2015).

Final Considerations: In view of what has been mentioned, this study demonstrated that the power tends to influence the injury of metabolic disorders in elderly as systemic blood pressure (hypertension), diabetes mellitus (DM) and obesity. The intake of macronutrients proved asymmetrical when compared to the standards imposed by the Dietary Reference Intakes (DRIs). For future studies, it is suggested an assessment of the correlation between stress levels and consumption of macronutrients, as described dysfunction prevents emotional control and releases hormones can alter food consumption, as in the tables Food Compulsive Disorder, which may explain the heightened intake of certain food groups.

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