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ASSOCIATED FACTORS OF ABDOMINAL OBESITY IN ELDERLY RESIDENTS IN A COMMUNITY

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ABSTRACT

This study has as goal to identify the factors linked to abdominal obesity in the elderly people living in a community. This is an epidemiological cross-sectional population-based study, carried out with all subjects with age ≥ 60 years old residents in an interior city of Bahia. It was performed the Poisson regression with p-value<0.05 for inferential analysis. There were studied 179 elderly people, with age between 60 and 91 years old. The prevalence of inadequate Waist-Hip Ratio was 84.4% and it was associated with the female gender (RP 1.29), high triglycerides (RP 1.15) and overweight (RP 1.14). It is concluded that there is great prevalence of abdominal obesity in the elderly people living in the community, showing association with the female sex, increased triglycerides and overweight.

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INTRODUCTION

Alongside to the population's ageing, it is noticed an even larger number of obese elderly (ESKINAZI *et al.,* 2011). However, it is known that overweight is considered a risk factor for cardiovascular diseases that can have a key impact in the elderly's quality of life (VENTURINI *et al.,* 2013). An important abdominal obesity index used to evaluate the risk of mortality in elderly people is the Waist-Hip Ratio (WHR). This index is got through the assessment of anthropometric measurements of waist and hip circumference and permits the estimation of the presence or absence of cardiovascular risk (CVR) (GRAVINA *et al.,* 2010, CORTEZ, SILVA and CASTRO, 2012). The anthropometric measures arise in the epidemiology scenario as an accessible way of examining two features of nutritional status in population studies. Its simple use, the relative facility of interpretation and the low equipment cost turn this technique as the most applicable in this type of study (GUEDES, 2006). Taking into account the importance of CVD in the country's health field, it is noticed the need to investigate the factors which may predict the risk of its emergence, as an example abdominal obesity that can be easily measured by the WHR index, just as its associated factors. This way this study has as goal to identify the factors associated with abdominal obesity in the community resident elderly people.

MATERIALS AND METHODS

It is a cross-sectional study, performed between the months of January and July of 2015, with all the subjects' residents in the urban area of Aiquara/ba with age ≥ 60 years. The elderly with affected cognitive function, assessed by the Mini-Mental State Examination (MMSE), using the 13 cutoff point (BERTOLUCCI *et al.,* 1994) were excluded of the study. Data collection was carried out in three stages: residence

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questioning with the application of MEEM and of the questionnaire, assessment of anthropometric measures and collection of blood samples. The first one was performed in the elderly's home and the following steps in the city's health department, with the elderly who presented problems of dislocation being assessed at home. The questionnaire used to gather information contained sociodemographic questions adjusted from the *Brazil Old Age Schedule* (BOAS) (VERAS; DUTRA, 2008), personal information and self-reported chronic diseases adapted from the SABE Project (Health, Welfare and Ageing) (LEBRÃO; DUARTE, 2003). To measure the level of physical activity it was used the International Physical Activity Questionnaire (IPAQ), adapted version for elderly people (MAZO; BENEDETTI, 2010).The anthropometric measures of body mass (kg), height (m), waist circumference (cm) and hip perimeter (cm) were measured according to the technique proposed by Petroski (1999). The blood sample was collected in vacuum, and the elderly people were orientated to overnight fasting for 12 hours. The following parameters were assessed: total cholesterol, LDL, HDL, glycemia and triglycerides. This study was approved by the Research Ethics Committee of the University of the Southeast of Bahia under opinion Number. 171,464.

Abdominal obesity (Dependent variable)

Abdominal obesity was detected through the Waist-to-Hip Ratio (WHR), which was assessed using the following anthropometric measures: Waist Circumference and Hip Circumference. For the WHR classification it was used the cutoff points suggested by Pereira, Sichieri and Marins (1999), which characterize the subjects in "adequate WHR" (≤0.95 for men and ≤0.80 for women) and "inadequate WHR "(> 0.95 for men and> 0.80 for women).

Independent variables

Sociodemographic explanatory variables incorporated gender (male and female), age group (60-69, 70-79, ≥ 80), marital status (with partner, without a partner), skin color (white, not white), income (until 1 minimum wage, ≥ 1 minimum wage) and schooling (≤ 4 years of study,> 4 years of study). Life habits variables incorporate alcoholic consume alcohol consumption (yes, no), currently smoking (yes, no) and physical activity level (active ≥150min / week, insufficiently active <150min / week) (WHO, 2010). Health status variables comprised number of self-reported chronic diseases (no disease, one disease, more than one disease), self-reported hypertension (yes, no), total cholesterol (normal <200mg / dl, altered ≥ 200mg / dl) (XAVIER *et al.,* 2013) and fractions (XAVIER *et al.,* 2013) - HDL (normal> 60 mg / dl, altered ≤60 mg / dl) and LDL (normal <130 mg / dl, altered ≥130 mg / dl), Triglycerides (normal <150 mg / dl, altered ≥150 mg / dl) (XAVIER *et al.,* 2013), and glycemia (normal <100 mg / dl, altered ≥ 100 mg / dl) BMI (low weight ≤ 22 kg / m2, eutrophic> 22 and <27 kg / m2, overweight / obesity ≥27 kg / m2) (AAFP, 2002)

Statistical procedure

Primarily it was performed the variables descriptive analysis. The relations between abdominal obesity and explanatory variables were tested through gross and adjusted analysis, assessing the prevalence ratio (PR) and the confidence intervals of 95% using the Poisson Regression. In the gross analysis, it was calculated the predominance of abdominal obesity for each category of explanatory variables. The variables that showed statistical significance in the gross analysis ($p \leq 0.20$) continuer in the model for the adjusted analysis. The significance level chosen for the study was 5% ($p \leq 0.05$). Figure 1 presents the hierarchical model used to define the results. In this model, the upper-level variables interact and define the lower-level variables. The effect of each explanatory variable over the results was controlled by the variables of the same level and higher levels in the model. The data were tabulated and analyzed using IBM SPSS *Statistics for Windows* software (IBM SPSS 21.0, 2012, Armonk, NY: IBM Corp.).

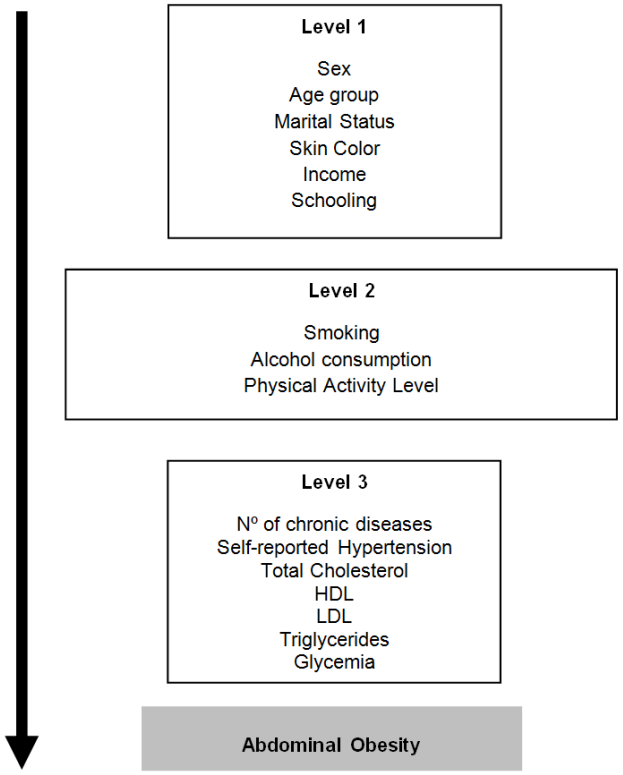

Figure 1. Conceptual Model of the outcome determination used for multiple analysis

RESULTS

There were identified 379 elderly people residents of the urban area of the city.. Of these, 09 were excluded 72 had affected cognitive function, 34 were not found in the city and 20 refused to participate. Of the 244 elderly that responded the questionnaire, 65 did not attend to the assessment of anthropometric measures, thus resulting in a population of 179 elderly people. The elderly were between 60 and 91 years old, with a mean of 70.6 ± 7.2 years. According to what is observed in Table 1, female elderly prevailed, with ages between 60-69 years, with a partner, that declared themselves as non-whites, with ≤ 4 years of study, non-smokers, non-alcoholic, physically active and with at least one self-reported chronic disease. The prevalence of inadequate Waist-to-Hip ratio (WHR) was more than 80%. The data displayed in Table 2 show the prevalence of inadequate Hip Waist Ratio, in compliance with the explanatory variables of the study. Inadequate WHR was meaningfully more prevalent in the elderly women, with two or more diseases, hypertension, triglycerides and glycemia altered, low weight and overweight / obesity.

Table 1. Characteristics of the study's population, Aiquara, 2015

Variables	% answer	n	%
Sex	**100,0**		
Male		82	45,8
Female		97	54,2
Age group	**100,0**		
60-69		83	46,3
70-79		71	39,7
80 and more		25	14,0
Marital Status	**100,0**		
With a partner		103	57,5
Without a partner		76	42,5
Skin color	**93,8**		
White		18	10,1
Not white		161	89,9
Income	**98,9**		
Until 1 minimum wage		90	50,8
Higher or equal to 1 minimum wage		87	49,2
Schooling	**98,3**		
≤ 4 years of study		153	86,9
> 4 years of study		23	13,1
Alcohol consumption	**100,0**		
Yes		43	24,0
No		136	76,0
Currently smoking	**93,3**		
Yes		18	10,8
No		149	89,2
Physical activity level	**100,0**		
Insufficiently active		72	40,2
Active		107	59,8
Nº of Self-reported diseases	**100,0**		
No disease		35	19,6
One disease		76	42,5
Two or more diseasesq		68	38,0
Self-reported Hypertension	**100,0**		
Yes		114	63,7
No		65	36,3
Total Cholesterol	**97,7**		
Altered		99	56,6
Normal		76	43,4
HDL	**95,0**		
Altered		148	87,1
Normal		22	12,9
LDL	**92,1**		
Altered		83	50,3
Normal		82	49,7
Triglicérides	**97,7**		
Altered		59	33,7
Normal		116	66,3
Glycemia	**98,3**		
Altered		73	41,5
Normal		103	58,5
BMI	**100,0**		
Underweight		37	20,6
Eutrophic		64	35,8
Overweight/obesity		78	43,6
WHR	**100,0**		
Adequate		28	15,6
Inadequate		151	84,4

Nevertheless, inadequate WHR was less prevalent among those with altered HDL. The results revealed that the explanatory variables that have not reached a statistical significance ($p \leq 0.20$) to be comprised in the multiple regression model were: age group, marital status, individual income, schooling, alcohol consumption, currently smoking, physical activity level and LDL. After inter and intra levels adjusting in accordance with the hierarchical model, the variables skin color, diseases' number, hypertension, total cholesterol and glycemia did not stay in the final model, because a significance criterion was not found ($p \leq 0.20$). Inadequate WHR was positively linked to female gender, overweight / obesity, and increased triglycerides. Although the HDL variable remained in the model for adjustment, this was not linked to the inadequate WHR (Table 3).

Table 2. Gross analysis of data by Poisson regression, Aiquara, 2015

	Variables	WHR			
	Sex	**%**	**PR**	**CI95%**	**P**
	Male	69,5	1		
	Female	96,9	1,39	1,20 – 1,61	<0,001
	Age group				
	60 – 69	83,1	1		
	70 – 79	87,3	1,05	0,92 – 1,19	0,46
	80 and more	80,0	0,96	0,77 – 1,19	0,73
	Marital status				
Level 1	With union	81,6	1		
	Without union	88,2	1,08	0,95 – 1,22	0,21
	Skin color				
	White	94,4	1		
	Not white	83,2	0,88	0,77 – 1,00	0,06
	Individual income				
	<1 minimum wage	82,2	1		
	≥1 minimum wage	86,2	1,04	0,92 – 1,19	0,46
	Schooling				
	≤ 4 years of study	83,7	1		
	> 4 years of study	87,0	1,03	0,87 – 1,23	0,66
	Alcohol consumption				
	Yes	83,7	0,99	0,85 – 1,15	0,89
	No	84,6	1		
	Currently smoking				
Level 2	Yes	77,8	0,90	0,70 – 1,16	0,44
	No	85,9	1		
	Physical activity level				
	Insufficiently active	86,1	1,03	0,91 – 1,17	0,59
	Active	83,2	1		
	Nº of Self-reported diseases				
	Two or more	94,1	1,41	1,14 – 1,76	0,02
	One disease	81,6	1,14	0,89 – 1,46	0,29
	None	71,4	1		
	Self-reported Hypertension				
	Yes	92,1	1,30	1,10 – 1,53	0,02
	No	70,8	1		
	Total Cholesterol				
	Altered	87,9	1,11	0,97 – 1,27	0,12
	Normal	78,9	1		
	HDL				
	Altered	82,4	0,86	0,76 – 0,97	0,01
Level 3	Normal	95,5	1		
	LDL				
	Altered	86,7	1,06	0,93 – 1,21	0,37
	Normal	81,7	1		
	Triglyceride				
	Altered	94,9	1,21	1,08 – 1,35	0,01
	Normal	78,4	1		
	Glycemia				
	Altered	90,4	1,13	1,00 – 1,28	0,04
	Normal	79,6	1		
	BMI				
	Low weight	59,5	1,36	1,02 – 1,82	0,03
	Eutrophic	81,3	1		
	Overweight/obesity	98,7	1,66	1,27 – 2,16	<0,001

p-value: <0,05. %: Outcome prevalence obtained from Pearson chi–square test and Fisher Exact Test; Minimum wage=R$788,00

Table 3. Final model of Poisson regression. Aiquara, 2015.

Variables	WHR		
Sex	**PR**	**CI95%**	**P**
Male	1		
Female	1,29	1,12 – 1,48	<0,001
HDL			
Normal	1		
Altered	0,84	0,70 – 1,01	0,075
Triglycerides			
Normal	1		
Altered	1,15	1,01 – 1,31	0,045
BMI			
Low weight	0,75	0,56 – 1,01	0,64
Eutrophic	1		
Overweight/obesity	1,14	1,02 – 1,30	0,026

p-value: <0,05.

DISCUSSION

The results show significant aspects about the inadequate Waist-Hip Ratio and its linked factors, with WHR as an indicator of abdominal obesity (ROCHA *et al.,* 2013). In the present study, it was noticed the high upshot prevalence among the elderly people, a scenery that can also be seen in other national studies (CUNHA *et al.,* 2012; MASTROENI *et al.,* 2010; MONTENEGRO NETO *et al.,* 2008; AMER; MARCON; SANTANA, 2011). In a prospective cohort study with elderly women, the authors stated the importance of WHR as a central fat distribution parameter, taking into account that the rise in this measure is a risk factor for total mortality (CABRERA *et al.,* 2005). In this study, there was a connection between sex and inadequate WHR, with women displaying an increased prevalence, agreeing with the studies of Medeiros *et al.* (2014), Chagas *et al.* (2011) and Montenegro Neto *et al.* (2008), who also detected a statistically important difference between the sexes for WHR. Such fact may be explained by the difference in fat redistribution between the sexes and the alterations that happen in the postmenopausal period, like basal metabolism reduction and regular physical activity level, with consequent increase in weight (DUARTE, 2007). Among the life styles proposed by WHO as risk factors for CVD, in this study there were assessed the alcohol consumption, smoking and the physical activity level. Among the elderly people assessed, there was a low frequency of alcohol consumption (24%), though this value is above the national proportion (14.2%). Also a low tobacco consumption (10%) was below the national proportion (13.3%). In relation to the level of physical activity, the percentage of elderly people who performed the recommended physical activity was 4 times greater than the national percentage (13.6%) (IBGE, 2014).

The high prevalence of SH in the present study resembles the one that was found by Jacinto *et al.* (2014) in Minas Gerais. This is one of the main risk factors for several chronic diseases and it is considered as the most significant changeable factor in the emergence of ischemic diseases (SBC, 2010). It is noticed that, even though no significant statistical relation was found in the final regression model between hypertension and inadequate WHR, people with SH have a greater probability (PR = 1.3) of having some cardiovascular event compared to those that do not have the disease. As in this study, regarding triglycerides (TGs), Klein and Oliveira (2012) and Cabral *et al.* (2012) also displayed that most seniors presented outcomes within the advisable. In the studied population, this variable was essentially linked to the outcome just as in Rocha et al (2013). As stated by Jeppesen *et al.* (1997) and Pedroza-Tobias *et al.* (2014) TGs are an independent risk factor for CVD. High TG rates are directly associated to the central accumulation of fat, having an important impact on the emergence and on the blood pressure increase and they may lead to metabolic changes being therefore linked to high cardiovascular mortality in the seniors (ROCHA *et al.,* 2013). Among the elderly assessed, the prevalence of subjects in situation of overweight / obesity supports the study of Oar and Rosado (2010). These authors warn about the need for an educational and health intervention meant for the general population, aiming at the basic prevention of cardiovascular events, since this is a condition that predisposes the subject to numerous diseases such as SH, dyslipidemias, type II Diabetes Melittus, among others. It is worth highlighting that the prevalence of SH and diabetes is three times bigger in people who reach the mark of 20% of overweight (MÁRTIRES; COSTA; SANTOS, 2013). The meaningful association between overweight / obesity and inadequate WHR is emphasized in this study and may be elucidated due to the negative effect that excessive visceral fat plays on risk factors for CVD like blood pressure, blood lipid profile, insulin resistance, among other factors (RYAN *et al.,* 2014; WANG *et al.,* 2015). The study reported as limitations its design, which disallows the determination of a causality among the factors, the reduced size of the sample because of a considerable decrease arising from a low cognitive level and the struggle of comparison between the studies, since there is no consensus concerning the cutoff point of the waist-hip ratio. By contrast, it is highlighted the strength point of this study as the simultaneous use of anthropometric measurements and the lipid's profile analysis, which is rare in the literature when concerning the northeast region and particularly in small cities.

Conclusion

On the basis of the outcomes of this study, it was concluded that the prevalence of abdominal obesity taken from the Waist-Hip Ratio was high (84.4%) and identified as associated factors the female sex, high levels of triglyceride and obesity. Whereas the accumulation of abdominal fat enhances the risk of morbidities and mortality and that the rise of obesity predisposes the subject to cardiovascular diseases, it is realized the importance of following the anthropometric measures in elderly people, since the weight control may be a relevant preventive strategy.

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