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Full Length Research Paper

Obesity prevalence among elderly people using different measurement methods: A population-based study

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To estimate obesity prevalence among elderly people using different measurement methods. A cross-sectional population-based study was conducted to assess elderly people from September 2010 to May 2011. Obesity prevalence was assessed using different criteria for body mass index (BMI), as proposed by the World Health Organization (WHO), the National Health and Nutrition Examination Survey III (NHANES III), and by Lipschitz. Central obesity was assessed by using the waist-to-hip ratio (WHR) and waist circumference (WC). Obesity prevalence varied in men and women according to the different criteria: 24.5% and 45.1% (WHO); 31.6% and 54.9% (Lipschitz); 44.5% and 68.4% (NHANES III), respectively. WC measurement showed that 26.8% of men and 70.3% of women suffered from central obesity. WHR showed that the prevalence of central obesity was 50.8% in women and 23.9% in men. Obesity criteria and central obesity were positively associated (p<0.001). The prevalence of obesity was high, especially among women.

Key words: Elderly, obesity, body mass index.

INTRODUCTION

The elderly population is the fastest growing age group in the world. It is estimated to be about two billion worldwide in 2050, most of whom will be concentrated in developing countries (CALDWELL, 2001).

Population aging has changed the demographic profile of the population due to factors such as increased life expectancy and the rapid decline in mortality and fertility rates (CALDWELL, 2001). This demographic transition has important changes in quality of life in this population, given that longevity may be accompanied by non communicable diseases, functional reduction, increased dependence, loss of autonomy, and social isolation, which can bring some consequences, among them, weight gain in the elderly (CHAIMOWICZ, 1997).

Other important factors related to aging are the anthropometric and nutritional aspects (JEE, 2006; MCGEE, 2005). Among the elderly there is a loss of the lean body mass and increased body-fat percentage. Changes may occur such as height loss (PERISSINOTTO, 2005), kyphosis, relaxation of the abdominal muscles and decreased elasticity of the skin, which contributes to the accumulation of central fat (PERISSINOTTO, 2005; ENZI, 1986). Furthermore, physical inactivity tends to increase with aging, which is a major risk factor for non communicable diseases and mortality, especially cardiovascular disease, the leading

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cause of death among the elderly (PATE, 1995; FLEGAL, 2013; CABRERA, 2012).

Obesity increases the risk of developing comorbidities such as diabetes, dyslipidemia and hypertension that limit their quality of life. The objective of this study was to determine the prevalence of obesity in the elderly population sample of a Brazilian city, comparing different definitions of obesity with different cut-off points, since there is no consensus regarding the definition of obesity in that age group (SANTOS, 2005).

MATERIALS AND METHODS

This study was approved the Research Ethics Committee of the University of Southern Santa Catarina.

A cross-sectional population-based epidemiological study was conducted. The sample was drawn from the health study of the elderly population living in Tubarão (known as ESITU - *Estudo de Saúde dos Idosos de Tubarão*), a project carried out between September 2010 and May 2011. The ESITU project aimed to assess the health status and quality of life of elderly people living the municipality of Tubarão, state of Santa Catarina. Participants were recruited from the elderly registered in the Family Health Strategy (FHS) program, which covers more than 90% of the area, totaling 9.009 elderly people. The sample size was calculated considering a 5% margin of error, for a 95% confidence level. For a 48% prevalence of obesity in the elderly (SILVEIRA, 2009) the minimum sample size required was estimated at 369 individuals. To extend the hypothesis testing for the other variables of interest and maintain the statistical power of 80% in case of losses or refusals, a 20% were added to the estimated number of participants, totaling 443 individuals. Simple random sampling was used to select the participants.

The study included people aged 60 years (completed in 2010) and over, residents in the municipality of Tubarão, and who agreed to participate. Individuals who were incapable to respond to inquiries or to decide on their participation, and bedridden elderly unable to get around for anthropometric measurement were excluded from the study.

Interview

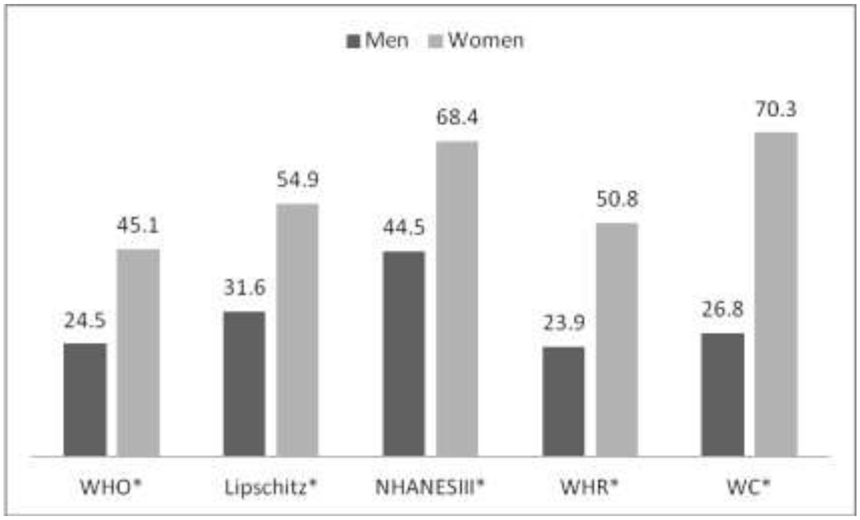
The sampled subjects were invited to participate in the study through community health workers and asked to sign the consent form. Then, they were interviewed and asked to answer a questionnaire containing socio-demographic and socioeconomic data (age, gender, skin color, marital status, employment status and education), behavioral data (physical activity, alcohol consumption and tobacco use), and medical condition (medication use and family history of obesity). At the end of the interview, they were scheduled an appointment at the Basic Health Unit for anthropometric measurement.

Smokers were defined as those who had smoked at least 100 cigarettes during their lifetime (REICHERT, 2008). The CAGE questionnaire was administered to the elderly who said they consume or had consumed alcohol. The CAGE (cut-annoyed-guilty-eye) is an internationally assessment instrument consisting of four questions; two or more positive responses indicate problems with alcohol consumption (MAYFIELD, 1974).

Physically active individuals were considered those who performed at least 30 minutes of physical activity, five days a week or more, resulting in a cut-off point of 150 or more minutes per week of physical activity as recommended (SOFI, 2008). Sampled subjects were asked about current or past year use of weight loss drugs. Body weight was measured in kilograms (Kg) with accuracy of 100 grams, while individuals were wearing light clothing and no shoes. The measurement of the height was performed in centimeters to the nearest 0.1 cm, with patients standing erect, with feet together and looking straight ahead. These measures were used to calculate body mass index (BMI) expressed as kg/m^2. A Wiso W721 measuring scale was used to measure weight and height. In addition, waist and hip circumference was measured using a metric tape and expressed in centimeters.

Abdominal circumference was measured at the level of an imaginary horizontal line located midway between the lowest rib margin and the iliac crest, and hip circumference was measured at the maximum posterior extension of the buttocks. Wiso T87 anthropometric tapes were used to measure both hip and waist circumference and calculate the waist-to-hip ratio. All measurements were performed by a single health professional, technically trained, to avoid bias.

BMI cut-off points defined for each of the following criteria were used to determine the prevalence of obesity in this sample. Subsequently, a comparison between the obesity prevalence rates was made, according to the different measurement methods. Different BMI cut-off points are defined by the World Health Organization (WHO, 1997), Lipschitz (LIPSCHITZ, 1994) and the National Health and Nutrition Examination Survey (NHANES III) (CDC, 1991) to characterize obesity in the elderly. The (WHO, 1997) proposes that individuals with BMI greater than or equal to 30 kg/m^2 are considered obese at any age. Lipschitz (LIPSCHITZ, 1994) proposes a classification that takes the elderly body composition changes into account and sets a BMI between 24 and 29 kg/m^2 as the acceptable limit for that age group , and therefore, considers obese elderly people with BMI> 29 kg/m^2, whereas the NHANES III (CDC, 1991) considers that



*Chi-square test (95% CI); P<0.001.

Figure 1. Prevalence of obesity among the elderly according to different parameters proposed by WHO, Lipchitz, NHANESIII, WHR, and WC.

Table 1. Gender distribution of the sociodemographic characteristics of the study population (n = 804).

	Total	Men n (%)	Women n (%)	P value[§]
Age (years)				0.46
60-69	495	184 (37.2)	311 (62.8)	
70-79	244	97 (39.8)	147 (60.2)	
≥80	65	29 (44.6)	36 (55.4)	
Skin color				0.21
White	740	290 (39.2)	450 (60.8)	
Non-White	64	20 (31.3)	44 (68.8)	
Schooling (years)*				0.65
≤4	602	230 (38.2)	372 (61.8)	
>4	200	80 (40.0)	120 (60.0)	
Marital status				<0.001
Married	536	272 (50.7)	264 (49.3)	
Single/Widowed	268	38 (14.2)	230 (85.8)	
Retired*				
Yes	627	253 (40.4)	374 (59.6)	<0.001
No	98	8 (8.2)	90 (91.8)	
Alcohol abuse				<0.001
Yes	81	62 (76.5)	19 (23.5)	
No	723	248 (34.3)	475 (65.7)	
Smoking*				<0.001
Yes	326	217 (66.6)	109 (33.4)	
No	474	93 (19.6)	381 (80.4)	
Physical activity*				0.008
Yes	140	68 (48.6)	72 (51.4)	
No	663	242 (36.5)	421 (63.5)	

[§]Chi-square test (95% CI); *missing data.

obesity begins at BMI above 27.3 for women and 27.8 for men .In addition to BMI, waist-to-hip ratio (WHR) and waist circumference (WC) were used to evaluate the presence of central obesity. WHR greater than 0.9 and waist circumference greater than 88 cm in women indicate central obesity, whereas in men WHR must be greater than one (1.0) and waist circumference greater than 102 cm to characterize central obesity (KISSEBAH, 1994; HAN, 1995).

The sample size calculation was performed using the StatCalc version 6, included in the Epi Info version 3.5.1 software (Epi Info, Atlanta, GA, USA, version 2000). The collected data were entered into the EpiData version 3.1, and statistical analysis was performed using the Statistical Package for Social Sciences (SPSS for Windows v 18; Chicago, IL, USA). Quantitative variables were described as measures of central tendency and dispersion, and qualitative variables as absolute numbers and proportions. To examine the degree of correlation between variables, Pearson's chi-square test, Student's t-test and analysis of variance (ANOVA) were used. Modified Poisson regression was performed to control for confounding variables. Prevalence ratios with respective 95% confidence intervals were calculated. The Epidat+ 3.1 software (PAHO, USA) to establish the level of concordance between the prevalence of obesity defined by the different criteria, cut-off points, and kappa index.
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RESULTS

In total, 804 elderly individuals were surveyed, of whom 494 (61.4%) were women. The mean age was 68 years (SD=7). The height ranged from 133 cm to 182 cm, with a mean of 156 cm (SD=8.5), whereas the weight ranged from 34.9 kg to 136.4 kg, with a mean of 70.7 Kg (SD=13.5).

The sociodemographic characteristics of the surveyed population are shown in Table 1.

(Table 1)

Figure 1 - Prevalence of obesity among the elderly according to different parameters proposed by WHO, Lipschitz, NHANESIII, WHR, and WC.

(Figure 1)

Table 2 and Table 3 show a comparison of different criteria for the definition of gender-related obesity.

(Table 2)

(Table 3)

With regard to obesity, 19.5% of subjects had been previously diagnosed as obese according to their BMI, and 2.4% had undergone a drug treatment for obesity.

A comparison between central obesity (waist circumference and waist-hip ratio) and general obesity revealed a positive association ($p < 0.001$), i.e., elderly participants who had central obesity also showed obesity according to the criteria established by WHO, Lipschitz, and NHANES III.

Only 0.9% of the elderly subjects were underweight according to the WHO criteria, 19.7% were considered eutrophic and 37.9% were overweight.

The variables with $p < 0.20$ in the univariate analysis were included in the multivariate modified Poisson regression to control for confounding variables, in addition to adjustment for age and gender. The results that were statistically significant and were considered factors independently associated with obesity, according to the criterion used, are shown in Table 4.

(**Table 4**)

Table 5 shows the degree of concordance between the different criteria used to define obesity and central obesity.

(Table 5)

According to Table 5, there was a high concordance between the WHO criteria and the Lipschitz criterion relating to the BMI of the elderly, a good agreement between the Lipschitz criterion and the NHANES criterion regarding waist circumference, as well as between NHANES and waist circumference. There was moderate or poor agreement between the other criteria.

DISCUSSION

The prevalence of obesity has been increasing significantly in all age groups, posing a health risk to the general population around the world. The World Health Organization refers to obesity as an epidemic, included on the list of top 10 risks to human health (WHO, 2001).

Currently, BMI defined by WHO is the most frequently used measure to characterize individuals as obese, regardless of their age. In this study, the prevalence of obesity was assessed according to different criteria and cut-off points in view of the lack of consensus for obesity definition in the elderly population (SANTOS, 2005).

The highest prevalence of obesity was found among women, which was also observed in other studies (KISSEBAH, 1994; TAVARES, 1999). This can be explained by the fact that women store more fat in the

Table 2. Comparison of different criteria for the measurement of obesity in men.

	Total	Obesity BMI n(%)			Central obesity n(%)	
		WHO	Lipschitz	NHANESIII	WHR	WC
Age (years)						
60-69	184	47 (25.5)	61 (33.2)	83 (45.1)	40 (21.9)	48 (26.1)
70-79	97	24 (24.7)	29 (29.9)	42 (43.3)	24 (24.7)	25 (25.8)
≥80	29	5 (17.2)	8 (27.6)	13 (44.8)	10 (34.5)	10 (34.5)
P-value*		0.626	0.759	0.958	0.326	0.615
Schooling						
0-3	230	49 (21.3)	70 (30.4)	97 (42.4)	51 (22.3)	59 (25.7)
≥4	80	27 (33.8)	28 (35.0)	41 (51.3)	23 (28.8)	24 (30.0)
P-value*		0.026	0.449	0.159	0.242	0.449
Physical activity						
Yes	68	12 (17.6)	20 (29.4)	30 (44.1)	13 (19.4)	14 (20.6)
No	242	64 (26.4)	78 (32.2)	108 (44.6)	61 (25.2)	69 (28.5)
P-value*		0.136	0.659	0.940	0.325	0.192
Smoking						
Yes	217	53 (24.4)	68 (31.3)	92 (42.7)	49 (22.7)	59 (27.2)
No	93	23 (24.7)	30 (32.3)	46 (49.5)	25 (26.9)	24 (25.8)
P-value*		0.954	0.873	0.251	0.428	0.801
Drinking						
Yes	62	11 (17.7)	17 (27.4)	29 (46.8)	17 (27.4)	16 (25.8)
No	248	65 (26.2)	81 (32.7)	109 (44.0)	57 (23.1)	67 (27.0)
P-value*		0.166	0.427	0.689	0.474	0.847
Medicines						
Yes	6	4 (66.7)	5 (83.3)	6 (100.0)	3 (50.0)	6 (100.0)
No	304	72 (23.7)	93 (30.6)	132 (43.3)	71 (23.4)	77 (25.3)
P-value**		0.034	0.013	0.007	0.151	<0.001
Obese parents						
Yes	50	13 (26.0)	18 (36.0)	27 (54.0)	17 (34.0)	17 (34.0)
No	260	63 (24.2)	80 (30.8)	111 (42.7)	57 (22.0)	66 (25.4)
P-value*		0.790	0.466	0.141	0.069	0.208

BMI: Body mass index; WHO: BMI defined by the World Health Organization; Lipschitz: BMI defined by the Lipschitz; NHANESIII: BMI defined by the National Health and Nutrition Examination Survey; WHR: waist-hip ratio; WC: waist circumference
*Chi-square test (95% CI); **Fisher's Exact Test

postprandial period, even if they consume fewer calories (O'SULLIVAN, 2009). In contrast, women tend to metabolize a higher percentage of fat during physical activity than men (TARNOPOLSKY, 2008).

In the present study, the overall prevalence of obesity was 62.2% (data not shown) among the elderly, considering the presence of at least one criterion. This result was relatively high when compared with a study conducted in Brazil by Tavares et al. (TAVARES, 1999), in which the prevalence of obesity among the elderly was 5.7% in men and 18.2% in women. When the different Brazilian regions were analyzed separately, there was a higher prevalence of obesity in older adults living in the South (TAVARES, 1999) than in the other regions. This fact can be explained by the milder climate and less encouraging for physical activity than in the North (DOBSON, 2008), as well as by the socioeconomic conditions of the region (MCLAREN, 2007).

A reduction was observed in the prevalence of obesity in those aged 80 years or above, compared with elderly people aged between 60 and 79 years. This fact is similar to that shown in other studies (SANTOS, 2005; TADDEI, 1997). One reason for this reduction could be explained by the decrease of population aged 80 years or above. In addition, these older individuals are more often affected by diseases that worsen with age (FLOOD, 2007), and that can lead to weight loss. The present study showed a higher prevalence of obesity when compared to other studies conducted in Brazil and the United States. In a multicenter study

Table 3**.** Comparison of different criteria for the measurement of obesity in women.

	Total	Obesity n(%)		Central obesity n(%)		
		WHO	Lipschitz	NHANESIII	WRC	WC
Age (year)						
60-69	311	143 (46.0)	174 (55.9)	215 (69.1)	153 (49.4)	211 (68.1)
70-79	147	68 (46.3)	81 (55.1)	98 (66.7)	80 (54.4)	110 (74.8)
≥80	36	12 (33.3)	16 (44.4)	25 (69.4)	17 (48.6)	25 (71.4)
P-value		0.335	0.421	0.861	0.577	0.331
Schooling*						
0-3	372	173 (46.5)	207 (55.6)	256 (68.8)	194 (52.3)	264 (71.2)
≥4	120	50 (41.7)	64 (53.3)	81 (67.7)	55 (46.2)	81 (68.1)
P-value		0.355	0.658	0.787	0.249	0.520
Physical activity*						
Yes	72	20 (27.8)	27 (37.5)	41 (56.9)	34 (47.1)	39 (54.2)
No	421	202 (48.0)	243 (57.7)	296 (70.3)	215 (51.3)	306 (73.0)
P-value		0.001	0.001	0.024	0.521	0.001
Smoking*						
Yes	109	46 (42.2)	55 (50.5)	68 (62.4)	62 (56.9)	77 (70.6)
No	381	174 (45.7)	213 (55.9)	267 (70.1)	185 (48.8)	265 (69.9)
P-value		0.521	0.314	0.128	0.138	0.885
Drinking						
Yes	19	7 (36.8)	11 (57.9)	12 (63.2)	12 (63.2)	13 (68.4)
No	475	216 (45.5)	260 (54.7)	326 (68.6)	238 (50.3)	333 (70.4)
P-value		0.458	0.786	0.615	0.272	0.853
Medicines*						
Yes	14	10 (71.4)	11 (78.6)	12 (85.7)	7 (50.0)	12 (85.7)
No	479	212 (44.3)	259 (54.1)	325 (67.8)	242 (50.7)	333 (69.8)
P-value		0.041	0.058	0.128	0.957	0.162
Obese parents*						
Yes	89	55 (61.8)	62 (69.7)	73 (82.0)	53 (59.6)	70 (78.7)
No	403	166 (41.2)	207 (51.4)	263 (65.3)	196 (48.9)	274 (68.3)
P-value		<0.001	0.002	0.002	0.068	0.054

BMI: Body mass index; WHO: BMI defined by the World Health Organization; Lipschitz: BMI defined by the Lipschitz; NHANESIII: BMI defined by the National Health and Nutrition Examination Survey; WHR: waist-hip ratio; WC: waist circumference
Chi-square test (95% CI); *missing data.

conducted in Brazil (TADDEI, 1997) with elderly in an outpatient setting, prevalence of obesity was found to be 22% in men and 36% in women. In a study conducted in the United States (DAVISON, 2002) with 2,917 subjects aged 70 years or above, prevalence of obesity was found to be 17.4% in men and 21.1% in women, using the criterion established by NHANES III. However, more recent studies showed that obesity among Americans occurs in all age groups and is estimated to be around 30% among the elderly population (ZAMBONI, 2012).

A study conducted in Pelotas (SILVEIRA, 2009) using the criterion established by Lipschitz (LIPSCHITZ, 1994) showed that 53.9% of women and 40.9% of men were obese. Lipschitz proposed this new cut-off point based on the heterogeneity that accompanies aging and the presence of age-dependent diseases (SILVEIRA, 2009).

In the present study, the majority of women had WHR above the cut-off point of 0.9, and was considered obese, whereas the majority of men had a WHR within the normal range. Importantly, WHR values differ between men and women considering the body-fat distribution for each gender (KISSEBAH, 1994).

It was found that the prevalence of central obesity diagnosed by waist circumference was relatively high among women, being much higher than the prevalence

Table 4. Independent variables associated with obesity according to different criteria.

	Adjusted prevalence ratio*(CI 95%)	p-value
WHO		
Physical activity	0.88 (0,82-0,94)	<0.001
Weight-loss medicines	1.20 (1.05-1.37)	0.006
Obese parents	1.10 (1.03-1.18)	0.05
Women	1.14 (1.08-1.20)	<0.001
Lipschitz		
Physical activity	0.90 (0.84-0.97)	0.005
Weight-loss medicines	1.19 (1.06-1.34)	0.003
Obese parents	1.08 (1.01-1.15)	0.024
Women	1.15 (1.09-1.22)	<0.001
NHANESIII men		
Weight-loss medicines	1.38 (1.30-1.46)	<0.001
NHANESIII women		
Obese parents	1.11 (1.04-1.17)	0.001
WC men		
Weight-loss medicines	1.59 (1.50-1.68)	<0.001
WC women		
Physical activity	0.88 (0.81-0.95)	0.002
Weight-loss medicines	1.07 (1.01-1.14)	0.023
WHR men		
Weight-loss medicines	1.32 (1.02-1.71)	0.037

Modified Poisson regression; CI 95%.

*Adjusted for age, gender, physical activity, use of medications for weight loss, obese parents.

Table 5. Degree of agreement between the different criteria to define obesity.

	Lipschitz	NHANES	WC	WHR
WHO	0.82 (0.78-0.86)	0.58 (0.53-0.63)	0.57 (0.51-0.62)	0.30 (0.23-0.36)
Lipschitz	-	0.74 (0.69-0.78)	0.62 (0.57-0.68)	0.31 (0.25-0.38)
NHANES	-	-	0.65 (0.60-0.70)	0.30 (0.23-0.36)
WC	-	-	-	0.54 (0.48-0.60)

Kappa; CI = 95%.

previously found in other Brazilian cities (OLIVEIRA, 2009; OLINTO, 2006). Among men, the results were similar to those shown in other studies, in spite of a slightly larger central obesity (OLIVEIRA, 2009).

With respect to the oldest-old subjects, when they were assessed by criteria established by NHANES III or waist circumference, the prevalence of obesity persisted. When the criteria established by the WHO, Lipschitz and WHR were used, the prevalence of obesity decreases over the years, which suggests that aging contributes to a decrease in weight and height, and therefore, changes in BMI. This also indicates that the proposed criterion should be more specific to the elderly population.

Although BMI is the anthropometric measure most often used to diagnose obesity, waist circumference has been gaining ground, especially after the European Prospective Investigation into Cancer and Nutrition has shown that this measure has a higher correlation with mortality than BMI (PISCHON, 2008). In this study, the available criteria to diagnose obesity were used, revealing a positive association ($p<0.001$) between central obesity and obesity diagnosed by BMI.

The criteria with the greatest degree of agreement were those that used the BMI to diagnose obesity. The differences between them are the cut-off point values. However, no good agreement was found between the different obesity criteria and the central obesity criterion, possibly because there were elderly people with high waist circumference who were not considered obese.

As previously mentioned, the use of BMI in the elderly has been criticized, since the various pathologies that affect this population change their weight and height

(WHO, 1995). The normality threshold adopted for the analysis of overweight and obesity is the same for the whole population, and there is no consensus for the elderly population. In a systematic review conducted in 2001 (WHO, 1995) the authors proposed changes in BMI cut-offs for defining overweight in the elderly, expanding the range of normality, based on the fact that most studies showed no association between increased BMI values and increased mortality rate. Moreover, the positive association between BMI and increased mortality rate was significant only when the BMI values were much higher than the normal range (CORNONI-HUNTLEY, 1991; STEVENS, 1998).
It should be noted that obesity impacts mortality by increasing the prevalence of comorbidities, but BMI alone does not correlate with this increase (CORNONI-HUNTLEY, 1991; STEVENS, 1998; DIEHR, 1998).

Some factors were considered significant after multivariate analysis, including the practice of physical activity, considered as a protective factor for obesity when measured by the criteria establish by WHO, Lipschitz and waist circumference. These results are similar to studies showing that high levels of physical activity are associated with normal BMI and a better distribution of the body-fat (DI PIETRO, 1995). Nonetheless, the relationship between physical activity and normal BMI was not observed when the criteria proposed by NHANES III and WHR were taken into consideration, which can be justified because regular physical activity increases muscle mass; and thus, the individual’s weight increases, leading to higher BMI values. In these cases, it would be necessary to assess the individual’s lean body mass and fat body mass by impedance measurement to prove the benefits of physical activity in this population (MARUCCI, 2001).
Another factor evaluated was the fact that having obese parents was statistically significant for obesity, which can be explained by genetic predisposition, and the environmental factor. In 2006, the National Institute of Health (NIH) (NIH, 2006) demonstrated a relevant relationship between obesity and genetic inheritance.
A limitation to this study includes the lack of determination of food consumption patterns of elderly people to determine the influence of diet, physical activity or genetic predispositions in the high prevalence of obesity in this population. However, the relevance of this study should be emphasized, since it is a population-based study with adequate sample size to evaluate the outcomes studied.

CONCLUSION

It can be concluded that the majority of the elderly people in this study are obese, with predominance in women.
With regard to the different BMI criteria, the cut-off point suggested by the WHO had the lowest obesity rates, whereas the one proposed by NHANES III had the highest prevalence rate.
In relation to central obesity criteria analyzed, WHR and WC showed no significant differences between the obesity rates in men. However, obesity rates in women diagnosed by WC were higher than those diagnosed by WHR.
Finally, this study showed that obesity can be evaluated by several criteria. Many studies that aim to determine the cut-off points for obesity in the elderly are based on mortality risk, which in this population may not be the best criterion. It should be highlighted that mortality rates can also increase among underweight elderly. In addition, old people with normal BMI may accumulate abdominal fat, increasing the mortality rates among this population.
Therefore, caution should be exercised when choosing the BMI cut-off points or methods to assess obesity, especially those that do not take the age into account.
The most important thing is to make a diagnosis of obesity at an early stage so that the associated comorbidities can be reduced. Moreover, because there is a correlation with morbidity and mortality rates, the BMI is a good indicator of the nutritional status of the elderly. However, as there are specific cut-off points for this population, it is important to conduct a thorough assessment of the elderly. The evaluation by bioimpedance analysis could be considered, but high cost hinders its use for the general population.
Thus, while there is no standard method for the assessment of obesity in the elderly, we suggest the use of cut-off points defined by Lipschitz (LIPSCHITZ, 1994) since it takes into account the changes in body composition with aging.

In addition, frequent monitoring, with longitudinal assessments and obesity prevention is of utmost importance to avoid comorbidities, reduce activity limitations and improve the quality of life of elderly people.

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