Central adiposity among elderly women in a gerontology-geriatric unit

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Abstract

Objective: To evaluate central adiposity in elderly women in a gerontology-geriatric care unit of the Universidade Federal de Pernambuco (the Federal University of Pernambuco). *Method:* A cross-sectional study involving a sample of 182 elderly women, aged from 60 to 89 years, who received care from January to July 2011, was performed. The variables analyzed were the socio-economic and demographic conditions, lifestyle, waist circumference (WC) and body mass index (BMI) of the women, as well as the occurrence of hypertension, diabetes mellitus and high total cholesterol levels. Yates' chi-squared test and Fisher's exact test were applied. A significance rate of 5% was adopted for the rejection of the null hypothesis. *Results:* Of the elderly women surveyed 82.4% had a WC signifying a large waist size, 57.2% were over-weight, 78.3% presented hypercholesterolemia, 63.2% had hypertension and 23.6% had diabetes. 61.5% were aged between 60 and 69 years old; 56% received up to two minimum salaries; 63.5% had less than eight years of schooling, 74.7% stated that they did not smoke, 87.9% did not drink alcohol; and 51.4 had sedentary habits. An association was observed between BMI and central adiposity (CA) (p=0.000). CA tended to be present around 1.2 times more frequently in elderly women with excess weight than among those who were not overweight. *Conclusion:* The high frequency of central adiposity and overweight indicates the susceptibility of this population to these factors. While no association with cardiovascular risk factors was observed, there is a clear need for monitoring by a multidisciplinary team, so as to identify and treat this debilitating condition, thereby contributing to the quality of life of this population.

Keywords: Obesity Abdominal. Elderly. Cardiovascular Diseases. Abdominal Circumference. Body Mass Index.

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INTRODUCTION

Chronic non-communicable diseases include a wide spectrum of illnesses, including systemic arterial hypertension (SAH), type 2 diabetes mellitus (DM2), cardiovascular disease (CVD), respiratory, musculoskeletal and neuropsychiatric conditions and certain types of cancer. These, in turn, are directly related to functional disability among the elderly and a reduced quality of life.[1]

Obesity is a chronic disease characterized by excess adipose tissue and is related to several of the comorbidities listed above. In addition, overweight and obesity alter metabolism and biochemistry in all age groups, including the elderly, and affect both genders.[2]

The accumulation of adipose tissue in the abdominal region, also known as Central Adiposity (CA) or android obesity, is considered an independent risk factor for many morbidities, representing a more significant risk than other forms of body fat distribution.[3] Various methods can be used to determine visceral adipose tissue, such as: a) Computed Tomography (CT) which, despite traditionally being considered the most efficient and accurate method, is impractical for routine use due to its high cost and the fact it subjects individuals to radiation; b) magnetic resonance imaging, which provides similar results to CT, but is even more prohibitively expensive for use in clinical practice and research and; c) Ultrasonography, which is a noninvasive method with good reproducibility that is fast, easy to use and a low cost option, and appears to be effective and have good applicability for the measurement of visceral fat, although specific equipment and a trained examiner are required.[4] Given the lack of more precise methods, a more affordable alternative would be to measure Waist Circumference (WC) which indirectly determines visceral fat.[5] This is often evaluated in clinical practice and is a simple and low cost measurement and an important signaler of metabolic complications and evaluator of cardiovascular risk,[6-8] which suggests a frequent requirement for this assessment in the clinical and nutritional assessment of patients.[11]

The increase in the elderly population stimulates the need for studies to investigate the accumulation of abdominal fat in relation to the risk of metabolic complications. Therefore, the present study aimed to evaluate central adiposity among elderly persons receiving care in a gerontology-geriatric unit.

METHOD

A cross-sectional study was conducted using a database that forms part of a project currently in progress at the Núcleo de Atenção ao Idoso (Elderly Health Center) (NAI), which is an outpatient unit linked to the Programa do Idoso (Elderly Program) (PROIDOSO) of the Pró-Reitoria de Extensão (Office of the Dean for Extension Studies) of the Universidade Federal de Pernambuco (Pernambuco Federal University) (UFPE). The NAI is aimed at the individual and group care of elderly patients aged 60 or over, with the premise of promoting and encouraging actions to improve the health status of patients, considering the resources available and through work in multidisciplinary teams.

The sample consisted of 182 elderly persons, selected by convenience, who were residents of the city of Recife and received healthcare at the NAI nutrition clinic from January to July 2011.

Amputees, elderly patients with catabolic conditions such as hyperthyroidism, acquired immunodeficiency syndrome or cancer, and users of drugs such as corticosteroids, immunosuppressants and hormone therapy, as well as individuals with the presence of edema or ascites, were excluded from the study.

Data relating to socioeconomic and demographic conditions was collected through interviews with the patient using the Associação Brasileira de Estudos Populacionais (Brazilian Association for Populational Studies) (ABEP) questionnaire.[9] This instrument was constructed with the use of statistical techniques to define large classes segmented by purchasing power and was directly applied with the patients during outpatient visits.

Waist circumference was measured with the patient standing, using a non-extensible tape with a 0-150 cm scale and resolution of 0.1cm. The tape circled the individual at the midpoint between the last rib and the iliac crest and the reading was taken at the moment of exhalation.[10]

Weight and height measurements were taken in duality according to the technique proposed by Lohman.[11] The participants were weighed using a Filizola® platform type digital electronic scale, with a maximum capacity of 150 kg and precision of 100 g. Height was measured with the patient barefoot, in the Frankfurt position, with a stadiometer attached to a platform scale with a capacity of 1.90 m and an accuracy of 1 mm. For data consistency, measurements with differences greater than 100g for weight, 0.5 cm for height and 0.1 cm for waist circumference were repeated.[12]

For assessment of the risk of metabolic complications cutoff points for CA in Caucasian women of <80 cm (no risk); ≥80 cm (increased risk) and ≥88 cm (substantially increased risk) were used.[13] The Body Mass Index (BMI) for the elderly was used to evaluate nutritional status in accordance with Lipschitz,[14] whose classification values are defined as low weight: <22 kg/m² eutrophic: 22 to 27kg/m², overweight: >27kg/m².

Data on life habits (alcohol consumption, tobacco use and physical activity) was collected through interviews with the patient. A questionnaire specifically designed for the research subject was used. Smoking and alcohol consumption was defined according to the use of both, irrespective of frequency. Physical activity was defined based on the time criterion for the definition of a sedentary condition, with elderly persons who practiced less than 150 minutes of moderate physical activity per week classified as sedentary.[15] Data on medical condition was also collected: the presence of hypertension, a systolic blood pressure greater than or equal to 140 mmHg and/or diastolic blood pressure greater than or equal to 90 mmHg in individuals who were not using antihypertensive medication in accordance with guidelines.[16] Elderly women who used antihypertensive medication were also categorized in the hypertensive group. For DM2, the following diagnostic criteria were used: fasting glucose ≥126mg/dL and/or the occurrence of polyuria, polydipsia and weight loss, plus random blood glucose levels above 200 mg/dL.[17] For hypercholesterolemia, lipid profile reference values for adults older than 20 years were used(CT>200 mg/dL).[18]

The database was tabulated in the Microsoft Office Excel 2010 program and statistical analysis was performed using the Epi Info program version 6.04 [WHO/CDC, Atlanta, GE, USA] and SPSS version 13.0 [SPSS INC., Chicago, IL, USA]. Statistical analysis was divided into two steps. Firstly, descriptive analysis (univariate) was carried out to characterize the distribution of the occurrence of events, including the frequency of each study variable and employing a 95% confidence interval, and then bivariate analysis of the relationship between the dependent variable (central adiposity) and the independent variables was performed, allowing the prevalence ratio (PR) and respective 95% confidence interval to be determined for each characteristic studied. The chi-squared test was used to assess the association between variables, and when this was not applicable Fisher's exact test was used. A 5% significance level was adopted for the rejection of the null hypothesis.

The study was duly approved by the Ethics Committee of the Pernambuco Federal University, under CAAE 413/11.

RESULTS

Of the 182 elderly women, 61.5% aged between 60 and 69. The per capita income of 56% of the study population was lower than between 1 and 2 minimum wages. In terms of the consumption of alcohol and smoking, most individuals described not having such habits, representing 87.9% and 74.7%, respectively.

Some losses occurred at the time of data collection for the variables of education, physical

activity and high cholesterol levels, resulting in a final sample of 181 for the first two variables and 180 for hypercholesterolemia. Regarding the educational and physical activity levels of the population studied, 63.5% reported having studied for less than 8 school years and 51.4% said they performed no physical activity.

With respect to the comorbidities associated with aging, 78.3% of respondents in the sample had hypercholesterolemia, 63.2% suffered from hypertension and 23.6% were diagnosed with DM2.

In terms of nutritional status, 57.2% of the women were overweight and 82.4% had a very high waist circumference measurement.

Table 3 shows the association between central adiposity and associated factors, with a significant association found only with overweight.

Table 1. Socioeconomic, demographic and clinical characteristics of elderly women receiving care at the nutrition clinic of the Elderly Care Center. Recife, Pernambuco, 2011.

Variables	n	%	$CI_{95\%}$
Age (years)			
≥60 to 69	112	61.5	54.02-68.56
>69	70	38.5	31.44-45.97
Family Income (minimum salary)			
≤2	102	56.0	48.50-63.32
>2	80	44.0	36.67-51.49
Education (study)			
≤8 years	115	63.5	56.02-70.45
>8years	66	36.5	29.54-43.97
Smoker			
Yes	46	25.3	19.27-32.35
No	136	74.7	67.65-80.73
Alcohol Consumption			
Yes	22	12.1	7.90-17.9
No	160	87.9	82.06-92.10
Performs physical activity			
Yes	88	48.6	41.17-56.12
No	93	51.4	43.87-58.82

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Continuation of Table 1

Variables	n	%	$CI_{95\%}$
SAH*			
Yes	115	63.2	55.70-70.11
No	67	36.8	29.89-44.30
DM2**			
Yes	43	23.6	17.79-30.60
No	139	76.4	69.40-82.21
Elevated TC ***			
Yes	141	78.3	71.45-83.97
No	39	21.7	16.02-28.54

*SAH: Systemic Arterial Hypertension (systolic arterial pressure ≥140 mmHg and/or diastolic arterial pressure ≥90 mmHg,); **DM2: Type 2 Diabetes Mellitus (fasting glucose ≥126mg/dL and/or casual glucose >200mg/dL); *** CT: Heightened Total Cholesterol (CT>200 mg/dL).

Table 2. Characterization of nutritional status according to the body mass index and waist circumference of elderly women receiving care at the nutrition clinic of the Elderly Care Center. Recife, Pernambuco, 2011.

Variables	nº	%	$CI_{95\%}$*
WC**(cm			
No risk[1]	16	8.8	5.27-14.13
Increased risk[2]	16	8.8	5.27-14.13
Substantially increased risk[3]	150	82.4	75.93-87.50
BMI*** (kg/m^2)			
Underweight[4]	13	7.1	4.06-12.17
Eutrophic[5]	65	35.7	28.86-43.19
Overweight[6]	104	57.2	49.60-64.38

*$CI_{95\%}$: 95% Confidence Interval; **WC: Waist Circumference; ***BMI: body mass index; No risk[1]: <80 cm; Increased risk[2]: ≥80 cm; Substantially increased risk[3]: ≥88 cm; Underweight[4]: <22kg/m²; Eutrophic[5]: 22 to 27kg/m²; Overweight[6]: >27kg/m².

Table 3. Association between central adiposity and the studied variables of elderly women receiving care at the nutrition clinic of the Elderly Care Center. Recife, Pernambuco, 2011.

Variables	Total	In adequate		Adequate		*p*#	PR	$CI_{95\%}$
	N	N	%	n	%			
Elevated CT***								
Yes	141	127	90.1	14	9.9	0.528	0.95	(0.87-1.04)
No	39	37	94.9	2	5.1			
BMI								
Excess	105	104	99.0	1	1.0	0.000	1.2	(1.1-1.4)
No excess	77	62	80.5	15	19.5			
SAH*								
Yes	115	106	92.2	9	7.8	0.741	1.0	(0.9-1.1)
No	67	60	89.6	7	10.4			
DM2**								
Yes	43	41	95.3	2	4.7	0.366	1.1	(1.0-1.2)
No	139	125	89.9	14	10.1			
Educational Level								
≤8 years	115	104	90.4	11	9.6	0.86	0.98	(0.9-1.1)
>8 years	66	61	92.4	5	7.6			
Income								
Up to 2 salaries	101	95	94.1	6	5.9	0.21	1.1	(1.0-1.2)
2 salaries	81	71	87.7	10	12.3			
Physical Activity								
Yes	88	80	90.9	8	9.1	0.88	1.0	(0.9-1.1)
No	93	85	91.4	8	8.6			

*SAH: Systemic Arterial Hypertension (systolic arterial pressure ≥140 mmHg and/or diastolic arterial pressure ≥90 mmHg,); **DM2: Type 2 Diabetes Mellitus (fasting glucose ≥126mg/dL and/or casual glucose >200mg/dL); *** CT: Elevated Total Cholesterol (CT>200 mg/dL); #$p<0.05$

DISCUSSION

The characterization of health care specifically for the elderly requires an evaluation of the population receiving treatment in order to observe characteristics that are peculiar to the clients in question. In the present study, the fact that the sample was composed only of women reflects their interest in healthcare, which is also seen in primary health care. Such evidence corroborates findings in existing literature which identify greater female demand for health services.[19]

With regard to the age of the study group, the highest frequency of elderly persons in the healthcare unit was in the 60 to 69 year age group, which seems to indicate that this population can still enjoy greater autonomy and independence in this period of life.

It was found that half of the sample of the present study did not practice physical activity, which contributes to increased health risks. Siqueira et al.[20] found a prevalence of a sedentary lifestyle of around 58% for elderly persons, similar to the values found in the present study. With regard to limiting factors for the practice of physical activity by elderly women, Fuchs et al.[21] concluded that cognitive capacity, frailty resulting from reduced anabolic hormonal activity and a chronic inflammatory state culminate in a self-sustained energy reduction cycle, weight loss, inactivity, low food intake and sarcopenia. Physical inactivity, according to literature, is one of the risk factors that most triggers the onset of chronic diseases, when associated with poor diet and tobacco use.[20]

Smoking and alcohol consumption were observed in lower proportions in the sample analyzed. This may suggest an increased care and concern for health in this elderly group. Similar findings were observed in the study by Ferreira et al.[22] who analyzed cardiovascular risk factors in 418 elderly users of the Sistema Único de Saúde (the Unified Health System) and found that a minority smoked or consumed alcohol. Such bad living habits are important cardiovascular risk factors and feature in 7 of the 14 leading causes of death among the elderly, constituting a major public health problem today.[1]-

The anthropometric variables featured in the present study revealed that more than half of the analyzed sample was overweight and over 80% had a greatly increased risk of metabolic complications, according to the assessment of BMI and WC, respectively, corroborating results described by other authors.[8,23,24]

The findings of the present study showed a significant association between overweight and central adiposity (PR=1.2). A study by Santos & Sichieri[3] found that there was a strong correlation between WC and BMI in the group of age of older between 60 to 70 years (r=0.76; p=0.003). Previato et al.,[25] who evaluated the same anthropometric variables, found that BMI was significantly associated with WC (r=0.87; $p<0.001$).

Castro[26] reported that the aging process is an important influence on the increase of adipose tissue in the abdominal region, as the elderly undergo changes in body composition as a natural factor of senescence and/or due to the occurrence of metabolic disorders. Changes in body composition lead to the redistribution of body fat from the limbs to the torso, or in other words, becoming more central, resulting in increased visceral adiposity in elderly persons in general, with this process being more significant in women than in men. From these body changes, the summation of cardiovascular risk factors can lead to death.

The lack of an association between central adiposity and the cardiovascular risk factors found in this study was an unexpected finding, since several studies[2,27-33] have described opposite results. This finding may be explained by the size of the sample assessed in the present study. The Diabetes Epidemiology: Collaborative analysis of Diagnostic criteria in Europe (DECODE) study found that most anthropometric measurements (WC, WHR and waist-height ration) that identify abdominal obesity were more effective than BMI in predicting cardiovascular mortality.[34]

Warren Andersen et al.[27], in a cohort study conducted in China with the aim of examining the relationship between central adiposity and waist-hip ratio (WHR) and risk of death, found that both men and women with a WHR in the bottom quintile had a 1.5 times greater risk of death than those in the first quintile, highlighting the damaging association between high central adiposity and death. This positive association is observed regardless of age, comorbidity, or smoking among men.

Cabrera and Jacob[2] evaluated 847 elderly persons in an outpatient clinic and found an association for BMI and WHR with DM, SAH, hypercholesterolemia, low cholesterol (HDL-C), hypertriglyceridemia, social class, physical activity and smoking. Jansen and Katzmarzyk[30] found that central adiposity is a major risk factor for the development of cardiovascular diseases, dyslipidemias, diabetes, metabolic syndrome and some forms of cancer, indicating a significant risk in relation to other measures of body fat distribution.

The possible mechanism for this relationship between central adiposity and cardiovascular risk factors can be justified by the fact that intra-abdominal adipocytes are likely to release their free fatty acids directly into the portal vein, exposing the liver to high concentrations of such fatty acids, which can lead to hyperinsulinemia, dyslipidemia and hypertension. In addition, adipose tissue, especially abdominal, secrets substances (adipokines) that can promote the development of chronic diseases.[28]

Insulin, hypertriglyceridemia and cholesterol fractions were not analyzed in the present study due to the use of a database which did not include such information. This may be considered a limitation, as this data could further enrich the results.

Although increased cardiovascular mortality can only be demonstrated in longitudinal studies, the findings of this study suggest that the diagnosis of overweight based on BMI and the evaluation of central adiposity can help define an increased risk subgroup among the elderly in a simple and effective manner, which may support local interventions with lower operating costs that contribute to the prevention of CVD through effective actions involving multidisciplinary teams.

CONCLUSION

The high frequency of increased central adiposity and overweight among the elderly found in this study indicates the susceptibility of this population. The aging process causes functional disorders such as the reduction of muscle mass and increased fat tissue, which are also influenced by poor eating habits and a sedentary lifestyle, common characteristics related to the industrialization and modernization of society. Despite the lack of an association, it is known that overweight and an excess of centralized fat are cardiovascular risk factors, highlighting the importance of the use of multidisciplinary teams in the gerontology-geriatric unit in question, with the implementation of programs that prevent and control excessive weight gain. Therefore, further studies are needed to elucidate the association between central adiposity and cardiovascular risk factors among the elderly.

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