ABDOMINAL OBESITY AND ASSOCIATED FACTORS AMONG ADULTS ATTENDING A UNIVERSITY HEALTH CENTER

Obesidade abdominal e fatores associados em adultos atendidos em uma clínica escola

Obesidad abdominal y factores asociados en adultos asistidos en una clínica escuela

Original Article

ABSTRACT

Objective: To determine the prevalence of abdominal obesity and identify the association between socioeconomic factors and lifestyle among adults attending a university health center. **Methods**: Retrospective and cross-sectional study conducted between March and April 2015 with 1,022 medical records of adults of both genders attending a university health center in the last five years. We collected sociodemographic data (gender, age, marital status, household income and education), anthropometric data (current weight, height, BMI and WC) and information on lifestyle (smoking, drinking and physical activity). The dependent variable was abdominal obesity, defined by the waist-height ratio (WHtR). Multivariate analysis was performed using the logistic regression method. **Results**: The prevalence of abdominal obesity was 79.8% according to WHtR and, according to BMI, excessive weight accounted for 77.1%. It was found that the ages 30-59 years were a risk factor for abdominal obesity for both genders, and for women when stratified. However, with regard to men, only the age group 50-59 years constituted a risk factor (OR=5.76; CI=1.13-29.35; p=0.035). Living with a partner (OR=1.53; CI=1.07-2.18; p=0.017) and drinking (OR=1.62; CI=1.09-2.40; p=0.015) constituted risk factors for both genders and also for men (OR=2.46; CI=1.02-5.95; p=0.045). **Conclusion**: There was a high prevalence of abdominal obesity and it was associated with the age groups 30-59 years for women and 50-59 years for men, and living with a partner and drinking for both genders.

Descriptors: Abdominal Obesity; Waist-to-Height Ratio; Adults.

RESUMO

Objetivo: *Determinar a prevalência de obesidade abdominal e identificar associação entre fatores socioeconômicos e estilo de vida em adultos atendidos numa clínica escola em São Luís, Brasil.* **Métodos:** *Estudo retrospectivo e transversal, realizado entre março e abril de 2015, com 1.022 prontuários de adultos de ambos os sexos, atendidos numa clínica escola, nos últimos cinco anos. Foram coletadas informações sobre dados socioeconômicos (sexo, idade, estado civil, renda familiar e escolaridade), antropométricos (peso atual, altura, IMC e CC) e estilo de vida (tabagismo, ingestão de álcool e atividade física). A variável dependente foi a obesidade abdominal, definida pela razão cintura/estatura (RCest). Realizou-se análise multivariada pelo método regressão logística.* **Resultados:** *A prevalência de obesidade abdominal foi de 79,8%, de acordo com a RCest e, segundo IMC, o excesso de peso correspondeu a 77,1%. Verificou-se que as idades de 30 a 59 anos foram fator de risco para obesidade abdominal para ambos os sexos e, quando estratificada, para o sexo feminino. Porém, com relação ao sexo masculino, somente a faixa etária de 50 a 59 anos foi fator de risco (OR=5,76; IC=1,13-29,35; p=0,035). Viver com companheiro (OR=1,53; IC=1,07-2,18; p=0,017) e consumir álcool (OR=1,62; IC=1,09-2,40; p=0,015) apresentaram risco para ambos os sexos, sendo este também fator de risco para o sexo masculino (OR=2,46; IC=1,02-5,95; p=0,045).* **Conclusão:** *Observou-se alta prevalência de obesidade abdominal, que se mostrou associada à faixa etária de 30 a 59 para mulheres e 50 a 59 anos para homens, à convivência com o companheiro e ao consumo de álcool para ambos os sexos.*

Descritores: *Obesidade Abdominal; Razão Cintura-Estatura; Adulto.*

Rafaella Santos Sabóia[1]
Allanne Pereira Araújo[2]
Janaina Maiana Abreu Barbosa[2]
Carlos Eduardo Pires Galvão[2]
Juliana Moreira da Silva Cruvel[2]
Suzanne Carolyne do Nascimento Ferreira[3]

1) Ana Paula Pujol Institute (*Instituto Ana Paula Pujol - IAPP*) - Camburiú (SC) - Brazil
2) Federal University of Maranhão (*Universidade Federal do Maranhão - UFMA*) - São Luís (MA) - Brazil

3) Santa Terezinha College (*Faculdade Santa Terezinha (CEST*) - São Luís (MA) - Brazil

Received on: *12/09/2015*
Revised on: *03/30/2016*
Accepted on: *05/13/2016*

RESUMEN

Objetivo: *Determinar la prevalencia de obesidad abdominal e identificar su asociación con los factores socioeconómicos y estilo de vida de adultos asistidos en una clínica escuela de São Luís, Brasil.* **Métodos:** *Estudio retrospectivo y transversal realizado entre marzo y abril de 2015 en 1.022 historiales clínicos de adultos de ambos los sexos, asistidos en una clínica escuela en los últimos cinco años. Se recogieron informaciones de datos socioeconómicos (el sexo, la edad, el estado civil, la renta familiar y la escolaridad), antropométricos (el peso actual, la altura, el IMC y la CC) y estilo de vida (el tabaquismo, la ingesta de alcohol y la actividad física). La variable dependiente fue la obesidad abdominal que fue definida por la razón cintura/estatura (RCest). Se realizó un análisis multivariado por el método de regresión logística.* **Resultados:** *La prevalencia de la obesidad abdominal fue del 79,8%, según la RCest y según el IMC, el exceso de peso correspondió al 77,1%. Se verificó que las edades entre 30 y 59 años fueron factor de riesgo para la obesidad abdominal para ambos los sexos y, al estratificar, para el sexo femenino. Sin embargo, respecto al sexo masculino solamente la franja de edad entre 50 y 59 años fue factor de riesgo (OR=5,76; IC=1,13-29,35; p=0,035). Vivir con un compañero (OR=1,53; IC=1,07-2,18; p=0,017) y consumir alcohol (OR=1,62; IC=1,09-2,40; p=0,015) fueron identificados como riesgo para ambos los sexos y este último ha sido también un factor de riesgo para el sexo masculino (OR=2,46; IC=1,02-5,95; p=0,045).* **Conclusión:** *Se observó alta prevalencia de obesidad abdominal que estuvo asociada a la franja de edad entre 30 y 50 años para las mujeres y 50 y 59 años para los hombres, a la convivencia con el compañero y al consumo de alcohol para ambos los sexos.*

Descriptores: *Obesidad Abdominal; Relación Cintura-Estatura; Adulto.*

INTRODUCTION

Obesity is a non-communicable chronic disease regarded one of the major public health problems of our time and is associated with various diseases triggered by excess body fat[1]. It occurs due to a prolonged imbalance between food intake and energy expenditure[2-4] and is diagnosed when the body mass index (BMI) is greater than or equal to 30 kg/m²[5].

Studies show that obesity affects almost 18% of the population and 52.5% of Brazilians are overweight[6]. In developing countries, the number of overweight adults has quadrupled in the past three decades. Diversely, in developed countries like the USA, the prevalence of obesity is 34% among males and 55% among females, in the age range from 20 to 64 years[7].

The distribution of adipose tissue in the body draws attention because the abdominal obesity, also called central or android, or the concentration of fat in the abdominal region, represents a higher susceptibility to diseases and health disorders at the metabolic and cardiovascular level[8].

Among the tools for evaluation of body fat, stand the computed tomography, the nuclear magnetic resonance and anthropometric measurements, which stand out as more applicable, rapid and low-cost methods, also with simple interpretation. Studies corroborate the claim that these indicators are related to a number of diseases and to the distribution of body fat in adults[8,9].

The BMI and waist circumference (WC) are the most commonly used anthropometric indicators in population studies, because of the practicality of its application. However, other methods have emerged, seeking to better assess the body fat distribution and, among them, is the waist-to-height ratio (WHtR)[9].

The literature recommends the use of BMI combined with other anthropometric parameters because, despite its broad use in clinical practice, it holds limitations (sexual, ethnic) regarding the assessment of adiposity, solely[10].

The WHtR is based on the fact that one's WC measure should not be more than half one's height. In addition to offering good correlation with visceral fat, WHtR holds as advantage a similar cut-off point for both genders, and also among ethnic groups and ages[11,12].

Moreover, studies show that the smoking habit, the consumption of alcohol and excessive amounts of saturated fatty acids, obesity, and physical inactivity are the most relevant risk factors accounting for the majority of deaths from non-communicable diseases (NCDs) and health grievances and for a large part of related diseases, according to the World Health Organization (WHO). Studies also indicate that these factors generally occur simultaneously[13-16], which significantly increases the risk of mortality[17,18].

Given the lack of studies on the abdominal obesity level of patients attending outpatient nutrition clinics in the Brazilian Northeast, especially in the state of Maranhão, this study aimed at determining the prevalence of abdominal obesity and identify association between to socioeconomic factors and lifestyle among adults attending a university health center in São Luís, Brazil.

METHODS

Retrospective, cross-sectional, and analytical study conducted at an outpatient nutrition clinic of a university health center in São Luís, Maranhão. In the period of March and April 2015, 1,022 duly-completed medical records of individuals of both genders, aged between 20 and 59 years, The medical records in which the anthropometric measurements were not indeed performed, but only estimated, and those belonging to patients with some kind of mental deficiency, pregnant and nursing women were excluded from the sample.

Based on a total of 1,051 records of patients treated in the nutrition sector, and on a 26% prevalence of individuals with abdominal obesity[10], it would be necessary to evaluate 234 medical records. Considering the 5% probability of type I error, 95% confidence level and 80% statistical power, 1,022 records that met the inclusion criteria were submited to evaluation.

For data collection, the medical records of patients treated from January 2010 to March 2015 were analyzed, being collected information related to socioeconomic data (gender, age, marital status, family income and education), anthropometric data (current weight, height, BMI and WC) and lifestyle (smoking habit, regular alcohol consumption and physical activity practice).

The independent variables were categorized as follows: gender (male and female), age (20-29, 30-39, 40-49, and 50-59 years), marital status (with or without partner), family income (<1 minimum wage, 1-2 minimum wages, and ≥ 3minimum wages), education (complete and incomplete elementary education, complete and incomplete secondary education, complete and incomplete higher education), smoking (yes or no), regular alcohol consumption, at least once a week (yes or no), and physical activity practice, at least thirty minutes a day, every day of the week (yes or no[19].

The assessment of nutritional status, carried out by means of the BMI (dividing weight (kg) by the square of height (m²)), features as one of the most commonly used indicators in population assessments. BMI was classified as proposed by the WHO[20], BMI <18.5 kg/m² = malnutrition; BMI between 18.5 and 24.9 kg/m² = eutrophic; BMI ≥ 25 kg/m² = overweight; and BMI ≥ 30 kg/m² = obesity, being grouped into two categories: normal weight (BMI ≤ 24.9 kg/m²) and overweight (≥ 25 kg/m²).

Abdominal obesity was the dependent variable, defined by WHtR, obtained by dividing the WC value (cm) by height (cm). The study used 0.52 as cutoff point at for men and 0.53 for women[9].

The data was tabulated and analyzed using the statistical program Stata® 12.0, identifying the normality through the Shapiro-Wilk test. For quantitative variables, the analysis included the observation of minimum and maximum values, median, mean and standard deviation calculation. For qualitative variables, absolute and relative values were used. Multivariate analysis was performed by logistic regression method, including into the multiple model all the variables associated with the event of interest, with statistical significance up to 20%. For acceptance of associations investigated in the final model, *p*-value was set at <0.05.

The study met the criteria of Resolution 466/12 of the National Health Council and its regulations, and was approved by the Research Ethics Committee of Maranhão University Center (CEUMA). This study is part of the project entitled "*Perfil nutricional de pacientes atendidos em um ambulatório de nutrição de uma clínica escola da cidade de São Luís-MA*".

RESULTS

Participated in the survey 1,022 adults, aged 39.3 (± 10.9) years on average. Females (81.5%, n=833), aged 40-49 years (30.3%, n=310), with income less than the minimum wage (45.2%, n=447) prevailed. Regarding marital status, 58.9% (n=601) reported living without a partner, and 53.6% (n=534) had complete or incomplete secondary education. There was a higher frequency of non-smokers (96.7%, n=989), sedentary lifestyle (74.3%, n=758) and, as for regular alcohol consumption, 74.3% (n=760) denied intake (Table I).

The median anthropometric indicators BMI and WHtR were 28.8 and 0.59, respectively. The prevalence of abdominal obesity in the present study was 79.8% (n=816), considering the WHtR indicator, being 19.2% (n=157) for men and 80.8% (n = 659) for women. According to the IMC, the excess weight corresponded to 77.1% (n=788) of the cases, of which 18.4% (n=145) were male and 81.6% (n=643) were women.

In the stratified analysis, there was no significant difference between male and female, as there was no statistically significant difference between BMI (p=0.653) and WHtR (p=0.221) according to gender (Table II).

Family income (OR=0.96, CI=0.89-1.03; p=0.328) and physical activity practice (OR=0.81, CI=0.57-1.14; p=0.234) did not enter the final model of the association between socioeconomic variables and lifestyle with WHtR indicator (Table III).

It was found that ages from 30 and 59 years were risk factor for abdominal obesity in both sexes. When stratified, the same was observed in women; however, with regard to males, only the group aged 50-59 years (OR=5.76, CI=1.13-29.35, p=0.035) was risk factor. Living with a partner (OR=1.53, CI=1.07-2.18; p=0.017) and regular alcohol consumption (OR=1.62, CI=1.09-2.40; p=0.015) represented a risk for both sexes, but this also proved to be risk for males (OR=2.46, CI=1.02-5.95; p=0.045) (Table IV).

Table I - Characterization of patients seen at an outpatient nutrition clinic. São Luís, MA, 2015.

Variables	n	%
Gender		
Male	189	18.5
Female	833	81.5
Age		
20-29 years	246	24.1
30-39 years	259	25.3
40-49 years	310	30.3
50-59 years	207	20.3
Education level		
Incomplete and complete elementary education	281	28.2
Incomplete and complete secondary education	534	53.6
Incomplete and complete higher education	182	18.2
Marital status		
Living with partner	419	41.1
Not living with partner	601	58.9
Income		
< 1 MW	447	45.2
1-2 MW	318	32.2
≥ 3 MW	224	22.6
Smoking habit		
Yes	33	3.2
No	989	96.8
Regular alcohol consumption		
Yes	262	25.6
No	760	74.4
Physical activity practice		
Yes	260	25.4
No	758	74.6
Total	1022	100

The sum of the data might not reach the total sample because of missing information.

Table II - Anthropometric indicators according to gender in patients seen at an outpatient nutrition clinic. São Luís, MA, 2015.

Anthropometric indicators	Total (n=1.022)		Male (n=189)	Female (n=833)	*p*-value
	Median	Vmin – Vmax	Median	Median	
BMI	28.8	12.3-64.5	29.2	28.8	0.653
WHR	0.59	0.12-0.94	0.59	0.59	0.221

BMI: Body Mass Index. WHR: Waist-to-hip ratio. Vmin: Minimum value. Vmax: Maximum value.

On the education level, having complete or incomplete higher education was a protective factor for abdominal obesity for both sexes (OR=0.55, CI=0.33 to 0.92; p=0.024) and for females (OR=0.48, CI=0.27-.85; p=0.012) (Table IV).

Table III - Univariate logistic regression analysis between abdominal obesity and risk factors according to gender in patients seen at an outpatient nutrition clinic. São Luís, MA, 2015.

Variables	Total			Male			Female		
	OR	CI95	*p-value*	OR	CI95	*p-value*	OR	CI95	*p-value*
Age	1.69	1.45-1.98	0.001*	1.76	1.19-2.62	0.005*	1.69	1.43-2.00	0.001*
Education level	0.60	0.47-0.75	0.001*	0.81	0.44-1.48	0.508	0.55	0.43-0.71	0.001*
Marital status	1.91	1.37-2.67	0.001*	2.92	1.23-6.90	0.014*	1.75	1.22-2.52	0.002*
Family income	0.96	0.89-1.03	0.328	1.01	0.87-1.18	0.803	0.95	0.87-1.03	0.217
Regular alcohol consumption	1.49	1.02-2.17	0.036*	1.90	0.82-4.37	0.130*	1.35	0.88-2.06	0.162*
Smoking habit	1.02	0.87-1.20	0.763	0.79	0.49-1.26	0.335	1.10	0.94-1.29	0.190*
Physical activity practice	0.81	0.57-1.14	0.234	0.59	0.26-1.32	0.202	0.86	0.59-1.26	0.447

CI95: Confidence Interval. OR: Odds Ratio. *p<0.05.

Table IV - Multivariate logistic regression analysis between abdominal obesity adjusted for age, education level, marital status, smoking habit and alcohol consumption, according to gender in patients seen at an outpatient nutrition clinic. São Luís, MA, 2015.

Variables	Total			Male			Female		
	OR	CI95	*p*-value	OR	CI95	*p*-value	OR	CI95	*p*-value
Age									
20-29 years	1	-	1	1	-	1	1	-	1
30-39 years	2.09	(1.36-3.20)	0.001*	2.14	(0.75-6.04)	0.151	2.14	(1.34-3.42)	0.001*
40-49 years	3.08	(1.96-4.82)	0.001*	2.64	(0.96-7.23)	0.059	3.37	(2.04-5.56)	0.001*
50-59 years	3.33	(1.97-5.64)	0.001*	5.76	(1.13-29.35)	0.035*	3.10	(1.78-5.39)	0.001*
Education level									
Elementary school #	1	-	1	-	-	-	1	-	1
Secondary school #	0.69	(0.45-1.04)	0.082	-	-	-	0. 93	(0.89-1.01)	0.071
Higher education#	0.55	(0.33-0.92)	0.024*	-	-	-	0.48	(0.27-0.85)	0.012*
Marital status									
Without partner	1	-	1	1	-	1	1	-	1
With partner	1.53	(1.07-2.18)	0.017*	2.21	(0.88 -5.51)	0.088	1.39	(0.94-2.03)	0.092
Smoking habit									
No	-	-	-	-	-	-	1	-	1
Yes	-	-	-	-	-	-	1.87	(0.51-6.79)	0.340
Regular alcohol consumption									
No	1	-	1	1	-	1	1	-	1
Yes	1.62	(1.09-2.40)	0.015*	2.46	(1.02-5.95)	0.045*	1.37	(0.87-2.13)	0.165

OR: Odds Ratio. CI95: Confidence Interval. # Complete and incomplete. *p<0.05.

DISCUSSION

In this study, it was observed a predominance of females compared to males. It is known that, in general, women tend to worry about health more than men and, therefore, seek the services offered by this sector more frequently, which would be a possible explanation for this result.

Similar data was found in a study whose objective was to characterize the nutritional and social profile of adults. Such investigation was conducted in an outpatient nutrition service of a public university in São Paulo, from 2004 to 2012, with 1,410 patients. Women represented 74.7% of the total number of surveyed patients, which were aged 44.8 years on average. Of these, 56.5% were married, 33.1% had incomplete elementary education, 53.7% were smokers and 86.1% were cases of overweight and obesity[21].

Several publications[10,22-28] point to increasing abdominal obesity with age and in females, thus confirming that age is a risk factor for this type of obesity.

The predominant age group was found between 40 and 49 years, contrasting with other studies, according to which the relationship between age and obesity is directly proportional, because the aging process causes changes in body composition - hormonal changes in basal metabolic rate, the metabolism rate, and level of physical activity - which end up favoring the accumulation of fat, regardless of sedentary lifestyles and increased consumption of high-calorie foods. Having income below the minimum wage was the most observed situation, given that the clientele analyzed corresponds to users of the Unified Health System (SUS)[2,29].

An assessment of abdominal obesity by means of WHtR, comprising 1,720 adults aged 20 to 59 years in Florianópolis, showed a prevalence of this picture in 50.5% of men and 38.9% of women. The highest abdominal obesity prevalence rates were observed in individuals aged 50 to 59 years and among those living with a partner, whereas the lowest prevalence was observed in women with higher education level (≥12 years) and income, and in men who had lower income. The authors emphasize that the knowledge of the factors associated with abdominal obesity can guide the interventions aimed at the prevention of this major public health problem[30].

Obesity, particularly the abdominal one, has a strong association with respiratory events, cardiovascular disease, dyslipidemia, type II diabetes mellitus, insulin resistance, among a series of metabolic disorders. Furthermmore, this type of obesity is associated with physical inactivity, regular alcohol consumption, smoking habit, age over 40, living in a stable and low-income union, and is related to increased morbidity and mortality resulting from the consequences of such comorbidities, according to literature data[4,10,25,31,32].

Population-based study of 1,580 adults from urban and rural areas of the Pernambuco state, in 2006, estimated the prevalence of abdominal obesity, assessing its associated factors. The results showed a 51.9% prevalence of this type of obesity in adults living in Pernambuco, being higher in females ($p < 0.001$). They also observed a median of 33 years old, predominance in females (58%), low education level (54.3% with less than 5 complete years of studies), a total of 22.3% of smokers and 28.5 % of insufficiently active individuals, differing from the reality found in the current study[2].

In a survey conducted in the city of Pelotas, Rio Grande do Sul, with 1,035 people aged 20 to 69 years, the prevalence of obesity and associated factors were assessed. Obese individuals amounted 21%, being 25% of women and 15% of men. The association between socioeconomic variables and obesity was inversely proportional in women and directly proportional in men. The results showed that obesity determinant factors differ between genders, occurring mostly among women and with increasing age[33].

The results of another study in the same city in southern Brazil, with 1,968 individuals of both sexes, between 20 and 69 years old, were compared to the results of the above-cited study. There was a trend toward reducing the prevalence of obesity, but without statistical significance. This trend has proved common in more developed regions[34].

A point to be emphasized is that people generally tend to seek health services when they already present overweight and/or associated comorbidities, aiming at weight loss, which can be explained by the high prevalence of individuals with excess weight found in this research.

As for he association between the use of health services and obesity in adults, a study held in 100 municipalities in 23 Brazilian states confirmed that being overweight increased the demand for medical consultations in the Primary Health Care Units and urgency and emergency services[35]. Excess weight was the main reason for medical referral, in addition to other associated comorbidities, amounting 39.5% of cases[21].

The WHtR indicator has been regarded by many researchers a good discriminator of abdominal obesity and cardiovascular risk factors, especially high coronary risk (HCR), as it adjusts the WC value (an abdominal obesity indicator) by height, thus minimizing erroneous estimates of health risk in adults with different statures, still used in population studies and similar ones. The choice of WHtR as the best predictor of this type of obesity is seen as a methodological differentiation of this research because its predictive sensitivity to cardiovascular risks is greater than that of the anthropometric indicators usually adopted for this purpose, namely the WC and the conicity index (CI) [9,12,29,30,36].

Several authors have evaluated WHtR together with other anthropometric indicators of obesity (WC, waist circumference/hip ratio, CI, BMI) to discriminate HCR, in different regions of Brazil. A study conducted in Salvador, Bahia, in 2000, with 968 people aged 30-74 years, including 391 men and 577 women, showed that abdominal obesity indicators are more effective in discriminating HCR than BMI, and that WHtR has statistically significant representation, which justifies its use[12].

In a nationally recognized study, the most used abdominal obesity anthropometric indicators were analyzed and compared, in order to verify which of them had greater predictive power in detecting HCR. It was observed that, in population studies, the use of WHtR is well recommend, explaining to the individual that one's waist should be no more than half one's height[8].

Survey conducted in Florianopolis investigated the association between general and abdominal obesity and between sociodemographic and health factors, with blood pressure levels increased by 1,720 among adult men and women aged 20-59 years. The results evidenced that WHtR showed good predictive ability for hypertension, standing among the best indicators[37].

Even though this study has been conducted at a local level, it features as a positive point the high number of respondents, whereas studies in university clinics usually include fewer participants. Additionaly, the presence of several examiners is considered a possible limitation, although previously trained for anthropometric measurements, always in the presence of a faculty supervisor.

CONCLUSION

There was a high prevalence of abdominal obesity, which was associated to age range 30-59 years for women and 50-59 years for men, to living with a partner, and to alcohol consumption for both genders.

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Mailing address:
Rafaella Santos Sabóia
Rua Mil e oitocentos, 12
Bairro: Parque Aurora
CEP: 65051-850 - São Luíz - MA - Brasil
E-mail: rafa_saboia@hotmail.com