RBCDH Revista Brasileira de CINEANTROPOMETRIA e Desempenho Humano

DOI: http://dx.doi.org/10.5007/1980-0037.2014v16n4p406

original article

Prevalence of and factors associated with overweight among university students from Rio Branco, Acre – Brazil

Prevalência e fatores associados ao excesso de peso em universitários do município de Rio Branco, Acre - Brasil

Gustavo de Souza Moretti[1]
Pascoal Torres Muniz[1]
Carlos Mendes Tavares[2]
Gisela Soares Brunken[3]
José Cazuza de Farias Júnior[4]
Edson dos Santos Farias[1]

Abstract – The aim of this study was to determine the prevalence of and factors associated with overweight among university students from the city of Rio Branco, Acre, Brazil. A cross-sectional study was conducted on 1,104 students (mean age: 24 years) from Rio Branco, Acre. Overweight was used as the dependent variable. The following independent variables were studied: socioeconomic variables (gender, age, teaching institution, period of study, marital status, income, household members, living with other people, parent's education level, and working or not); self-reported health and morbidity variables (health perception, hypertension, diabetes, and altered cholesterol); lifestyle variables (physical activity, watching television, computer use, smoking, and alcohol consumption). The nutritional status was classified based on body mass index. Univariate analysis was performed using Pearson's chi-squared test or Fisher's exact test. Variables with a p value < 20% on univariate analysis were included in the multiple Poisson regression model. The prevalence of overweight was 35.6%. In the multiple regression model for male students adjusted for age, overweight was associated with marital status, household income, hypertension, and watching television every day. In the model for female students, the variables that remained associated were self-perceived health status, hypertension, and alcohol consumption in the last month. Overweight is determined by a combination of different factors which differed in the present study between men and women.

Key words: Body mass index; Obesity; Overweight; Prevalence; University students.

Resumo – *O objetivo do presente estudo foi verificar a prevalência e fatores associados ao excesso de peso em Universitários do Município de Rio Branco, Acre. Estudo transversal, com 1104 universitários do município de Rio Branco – Acre, com média de idade de 24 anos. O estudo teve como variável dependente o excesso de peso. As variáveis independentes consideradas foram: socioeconômicas – sexo, idade, instituição de ensino, turno de estudo, estado civil, renda, moradores da casa, mora com, escolaridade dos pais, trabalha; Variáveis de Saúde e morbidade autorreferida – percepção de saúde, hipertensão, diabetes e colesterol; e variáveis de estilo de vida – atividade física, televisão, computador, tabagismo e álcool. O estado nutricional foi classificado pelo Índice de Massa Corporal. A análise univariada foi realizada por meio do teste de qui-quadrado de Pearson ou exato de Fisher. Valores de p< 20%, na análise univariada, foram incluídos no modelo múltiplo de regressão de Poisson. A prevalência de excesso de peso foi de 35,6%. No modelo múltiplo para o sexo masculino ajustado pela faixa etária, o excesso de peso esteve associado a estado civil, renda familiar, hipertensão arterial e televisão todos os dias. No modelo para o sexo feminino, as variáveis que permaneceram associadas foram: percepção de saúde autorreferida, hipertensão arterial e consumo de álcool no último mês. O excesso de peso é determinado pela associação de diferentes fatores que, no presente estudo, mostraram-se distintos para o sexo masculino e feminino.*

Palavras-chave: *Índice de massa corporal; Obesidade; Prevalência; Sobrepeso; Universitários.*

1 Universidade Federal do Acre. Departamento de Ciências da Saúde. Rio Branco, AC. Brasil.

2 Universidade da Integração Internacional da Lusofonia Afro-Brasileira. Instituto de Ciências Sociais Aplicadas. Redenção, CE. Brasil.

3 Universidade Federal de Mato Grosso. Departamento de Saúde Coletiva. Cuiabá, MT. Brasil.

4 Universidade Federal da Paraíba. Departamento de Educação Física. João Pessoa, PB. Brasil.

Received: 18 May 2013
Accepted: 14 February 2014

INTRODUCTION

Several factors are associated with the development of overweight, including genetic, physiological and metabolic factors[1]. However, lifestyle changes such as a reduction in physical activity levels and an increase in the time spent in sedentary behaviors, in the consumption of simple carbohydrates, high-fat foods and soft drinks and in food portion size explain the increasing number of overweight adults[2].

Overweight is associated with different chronic diseases such as type 2 diabetes mellitus, cardiovascular diseases, hypertension, dyslipidemia, metabolic syndrome, osteoarthritis, insulin resistance[3], psychosocial problems (stress, depression, anxiety, and low self-esteem), decreased academic and professional performance, and low overall quality of life[4]. In view of the associated health problems and the low success rate of treatment of this important condition, as well as the health expenditures with hospitalizations, medications and surgeries, overweight is now a leading public health problem.

Studies have shown a high and increasing prevalence of overweight among university students[5,6]. National surveys on overweight among adults indicate that this prevalence has more than doubled over 35 years[7]. Similar results have been reported for adults from other countries where this increase is even greater[8,9].

College life is a critical period in terms of overweight since it is generally accompanied by a reduction in physical activity levels, increased stress, and the adoption of unhealthy eating habits such as increased consumption of soft drinks, sweets, fried and processed foods and skipping meals, factors that favor an increase in the amount of body fat[10]. Therefore, assessment of the nutritional status of university students has been recommended in order to identify subgroups that are at risk of being overweight and factors associated with this outcome. In this respect, the objective of the present study was to evaluate the prevalence of and factors associated with overweight among university students from Rio Branco, Acre, Brazil.

METHODOLOGICAL PROCEDURES

A cross-sectional study was conducted in the city of Rio Branco, Acre, Brazil, between May and September 2011, which involved university students of both genders from three higher education institutions of the city, including one public and two private institutions.

For calculation of the sample size, a prevalence of overweight of 46.9%[11], an estimated maximum sampling error of 3% and a 95% confidence interval were adopted, resulting in a sample of 986 students. The sample size was increased by 14% to account for possible losses and refusals. The final sample consisted of 1,125 university students.

Two-stage cluster sampling was used in this study. In the first stage, 38 courses at the three institutions were randomly selected. In the second stage,

one class per course was randomly selected at each institution participating in the study. Finally, all students of the selected classes who were present on the day of application of the questionnaire were invited to participate in the study. Students younger than 18 years, subjects with some disability impairing the measurement, and pregnant students were excluded.

The data were collected by a trained team consisting of teachers from the physiotherapy, physical education, nutrition and medicine courses using the protocol for anthropometric measurement of the Food and Nutritional Surveillance System (Sistema de Vigilância Alimentar e Nutricional – SISVAN)[12]. After receiving detailed information about the objectives of the study and signing the free informed consent form, the students received the questionnaire and instructions on how to fill it out. Next, the body weight and height of the participants were measured.

The instrument used in this study was an individual self-completion questionnaire elaborated based on the Telephone-based Surveillance of Risk and Protective Factors for Chronic Diseases (Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por Inquérito Telefônico - VIGITEL)[13] and the International Physical Activity Questionnaire (IPAQ)[14]. The questionnaire was divided into modules containing the following sections: socioeconomic data; evaluation of individual health status; lifestyle assessment, and evaluation of nutritional status.

Body weight and height were measured in duplicate by the same examiner and the mean of the two measurements was used for analysis. Body weight was measured with a Tanita UM080 electronic scale (capacity of 130 kg) to the nearest 100 g, and height was measured in millimeter with a Seca portable stadiometer. A body mass index (BMI) ≥ 25 kg/m² was defined as overweight according to World Health Organization recommendations[15].

The following socioeconomic variables were studied: gender (male or female), age (divided into three strata: < 20 years, 20 to 29 years, or ≥ 30 years), institution (public or private), period of study (morning, afternoon, night, or full-time), marital status (single, stable union or married, or widowed, separated or divorced), household income in minimal wages (MW) (< 3 MW, 3 to 10 MW, or > 10 MW), household members (1 person, 2 to 5 persons, or 6 or more persons), with whom the respondent lives (father, mother or both, spouse, or alone/others), parent's education level (stratified into the following categories: 0 to 8 years of schooling, 9 to 11 years, or 12 or more years), and whether the respondent works (yes or no).

For health status assessment, the participants were asked about health perception (very good or good, regular, and poor or very poor), hypertension (yes or no), diabetes (yes or no), and altered cholesterol (yes or no).

For lifestyle evaluation, the students were asked about leisure-time physical activities performed for at least 10 minutes during the week prior to data collection (IPAQ, short version). The participants were classified as inactive or irregularly active (< 150 minutes per week) and active or very active (≥ 150 minutes per week). The participants were also asked about the use of television and computer on each day of the week (yes or no),

smoking (Do you smoke? Response options: yes; yes, occasionally, and no), and alcohol consumption (Do you usually drink alcoholic beverages? Response options: yes or no).

Proportions were calculated for descriptive analysis. Differences in proportions between the overweight and non-overweight groups were compared individually for each factor using Pearson's chi-squared test or Fisher's exact test.

Variables presenting a p value < 20% on univariate analysis were included in the Poisson multiple regression model adjusted by robust estimation of variance. During this phase, the data were analyzed hierarchically: behavioral or lifestyle variables at the proximal level (physical activity, television, computer, smoking, and alcohol), health-related variables at the intermediate level (health perception, hypertension, diabetes, and altered cholesterol), and socioeconomic variables at the distal level (gender, age, institution, period of study, marital status, income, household member, with whom the respondent lives, father's and mother's education level, and working or not). The exhibiting variables that presented a p value < 5% or adjusted the prevalence ratios by at least 10% were maintained in the multiple models. Thus, the exhibiting variable was considered to be associated with the outcome when it remained in the final multiple model at a level of significance of 5% by the Wald test. The Microsoft Office Access 2007 program was used for construction of the database and the STATA/SE 11.0 program for data analysis.

The participants received detailed information about the risks and benefits of the study and provided free informed consent before the beginning of the study. The methodological procedures were approved by the Research Ethics Committee of the Federal University of Acre (Permit No. 23107.004753/2011-62).

RESULTS

The final sample consisted of 1,104 students, with losses accounting for 1.5% of cases (pregnant women, students with disabilities, incorrect response to the questionnaire, and lack of weight and height measurements). The mean age was 24 years (± 7.2); 42.6% of the students were men and 57.4% were women.

Most students were in the age group of 20 to 29 years, were enrolled in a private institution, studied at night, were single, had a household income of 3 to 10 MW, and lived with 2 to 5 household members and with the parents who had up to 8 years of schooling. The health perception of the students was good or very good and none of them reported hypertension, diabetes or altered cholesterol. The students were active or very active, watched television every day, used the computer every day, did not smoke, and had not consumed alcohol in the last month.

The overall prevalence of overweight was 35.6%. There was a significant difference in the prevalence of overweight between male and female students (p < 0.001), which was 43.6% among men and 29.7% among women.

Table 1. Distribution of university students according to overweight (BMI), gender and possible associated variables (Rio Branco - Acre, Brazil, 2011).

	Overweight					
Variables	Men (n=205)			Women (n=188)		
	n	%	p	n	%	p
Socioeconomic						
Age group			< 0.001°			< 0.001°
< 20 years	36	28.6		25	15.9	
20 to 29 years	101	39.8		83	24.6	
≥ 30 years	68	75.6		80	57.6	
Institution			0.102			0.134
Public	82	39.4		66	26.3	
Private	123	46.9		122	31.9	
Period of study			0.058			0.101
Morning	8	24.2		6	24.0	
Afternoon	44	39.3		34	23.8	
Night	122	47.3		107	34.1	
Full-time	31	46.3		41	27.0	
Marital status			< 0.001°			< 0.001°
Single	124	35.6		100	23.5	
Stable union/married	70	64.2		79	42.0	
Widowed/separated/divorced	11	84.6		9	42.9	
Household income *			0.024°			---
Up to 3 MW	42	33.6		---	---	
3 to 10 MW	101	48.8		---	---	
10 or more MW	62	44.9		---	---	
Living with			< 0.001°			< 0.001°
Father/mother/both	86	37.7		66	23.5	
Spouse	62	63.9		64	43.2	
Alone/others	57	39.3		58	28.3	
Father's education (years of schooling)			---			0.002°
0 – 8	---	---		111	36.2	
9 – 11	---	---		41	23.4	
≥ 12	---	---		36	23.7	
Mother's education (years of schooling)			---			0.019°
0 – 8	---	---		89	35.7	
9 – 11	---	---		56	27.5	
≥ 12	---	---		43	23.8	
Working			0.008°			< 0.001°
Yes	139	48.4		122	37.2	
No	66	36.1		66	21.6	
Self-perceived health status			0.075			< 0.001°
Very good/good	146	42.0		105	25.0	
Regular	46	44.7		69	35.9	
Poor/very poor	13	68.4		14	63.6	
Hypertension			< 0.001°			< 0.001°
Yes	37	92.5		21	58.3	
No	168	39.1		167	27.9	
Diabetes			---			0.013°
Yes	---	---		7	63.6	
No	---	---		181	29.1	
Altered cholesterol			< 0.001°			0.001°
Yes	34	81.0		29	49.2	
No	171	40.0		159	27.7	

Continues....

Continues....

	Overweight					
Variables	Men (n=205)			Women (n=188)		
	n	%	p	n	%	p
Lifestyle						
Physical activity classification			0.058			---
Inactive/irregularly active	92	48.9		---	---	
Active/very active	113	40.1		---	---	
Watching TV every day			0.058			---
Yes	133	47.2		---	---	
No	72	38.3		---	---	
Computer use every day			---			0.158
Yes	---	---		123	28.0	
No	---	---		65	33.5	
Smoking			0.171			0.066
Yes	23	53.5		17	42.5	
No	182	42.6		171	28.8	
Alcohol consumption in the last month			0.079			0.059
Yes	101	48.1		82	34.0	
No	104	40.0		106	27.0	

* Income reported as Brazilian minimum wage (MW) in 2011: R$ 545.00. ° $p < 0.05$ (Pearson's chi-squared test or Fisher's exact test). Covariates that did not show a p value < 0.20 on univariate analysis are not reported in the table. Male students: household members, parent's education level, self-reported diabetes, and computer use every day. Female students: family income, household members, physical activity classification, and watching television every day.

The variables associated with overweight in male students were age, marital status, household income, with whom the respondent lives, working or not, self-reported hypertension, and self-reported altered cholesterol. For female students, the variables associated with overweight were age, marital status, with whom the respondent lives, parent's education level, working or not, self-reported health perception, and self-reported hypertension, diabetes and altered cholesterol.

For male students, the following factors continued to be associated with overweight in the crude multiple model and in the model adjusted for age: being married or in a stable union, being widowed or separated or divorced, having a household income of up to 3 MW, being hypertensive, and watching television every day. A household income of up to 3 MW was negatively associated with overweight. For female students, the variables that continued to be associated with overweight in the crude multiple model and in the age-adjusted model were: having a regular, poor or very poor health perception, being hypertensive, and having consumed alcohol in the last month (Tables 2 and 3).

Table 2. Poisson regression estimates for overweight among male students from the city of Rio Branco, Acre, Brazil (2011).

	Univariate model		Multiple model‡	
Variables	PR (95% CI)	p	RP (95% CI)	p
Socioeconomic				
Institution				
Public	1.0			
Private	1.19 (0.96;1.47)	0.107	- - -	- - -
Period of study				
Morning	1.0			
Afternoon	1.62 (0.84;3.09)	0.143	- - -	- - -
Night	1.95 (1.05;3.61)	0.034	- - -	- - -
Full-time	1.90 (0.98;3.68)	0.054	- - -	- - -
Marital status				
Single	1.0		1.0	
Stable union/married	1.80 (1.47;2.19)	< 0.001	1.28 (1.01;1.62)	0.040
Widowed/separated/divorced	2.37 (1.80;3.11)	< 0.001	1.80 (1.26;2.57)	0.001
Household income				
Up to 3 MW	0.74 (0.54;1.01)	0.065	0.62 (0.47;0.84)	0.002
3 to 10 MW	1.08 (0.86;1.36)	0.485	0.87 (0.70;1.10)	0.265
10 or more MW	1.0		1.0	
Living with				
Father/mother/both	1.0			
Spouse	1.69 (1.35;2.12)	< 0.001	- - -	- - -
Alone/others	1.04 (0.80;1.35)	0.758	- - -	- - -
Working				
Yes	1.34 (1.07;1.68)	0.011	- - -	- - -
No	1.0			
Self-perceived health status				
Very good/good	1.0			
Regular	1.06 (0.83;1.36)	0.622	- - -	- - -
Poor/very poor	1.63 (1.17;2.26)	0.004	- - -	- - -
Self-reported hypertension				
Yes	2.36 (2.04;2.74)	< 0.001	1.89 (1.58;2.27)	<0.001
No	1.0		1.0	
Self-reported altered cholesterol				
Yes	2.02 (1.68;2.44)	< 0.001	- - -	- - -
No	1.0			
Lifestyle				
Physical activity classification				
Inactive/irregularly active	0.81 (0.66;1.00)	0.055	- - -	- - -
Active/very active	1.0			
Watching TV every day				
Yes	1.23 (0.98;1.53)	0.063	1.35 (1.10;1.66)	0.004
No	1.0		1.0	
Smoking				
Yes	1.25 (0.92;1.69)	0.138	- - -	- - -
No	1.0			
Alcohol consumption in the last month				
Yes	1.20 (0.97;1.47)	0.078	- - -	- - -
No	1.0			

Exclusion of all covariates with p > 20% in Table 1 (household members, parent's education level, computer use every day, and self-reported diabetes). ‡ Model adjusted for age. PR: prevalence ratio; 95% CI: 95% confidence interval. The dotted line indicates variables that did not remain in the multiple model.

Table 3. Poisson regression estimates for overweight among female students from the city of Rio Branco, Acre, Brazil (2011).

	Univariate model		Multiple model‡	
Variables	PR (95% CI)	p	PR (95% CI)	p
Socioeconomic				
Institution				
Public	1.0			
Private	1.21 (0.93;1.56)	0.139	- - -	- - -
Period of study				
Morning	1.0			
Afternoon	0.99 (0.46;2.11)	0.981	- - -	- - -
Night	1.41 (0.69;2.90)	0.337	- - -	- - -
Full-time	1.12 (0.53;2.36)	0.759	- - -	- - -
Marital status				
Single	1.0			
Stable union/married	1.78 (1.40;2.27)	< 0.001	- - -	- - -
Widowed/separated/divorced	1.82 (1.07;3.07)	0.025	- - -	- - -
Living with				
Father/mother/both	1.0			
Spouse	1.84 (1.39;2.43)	< 0.001	- - -	- - -
Alone/others	1.20 (0.88;1.63)	0.230	- - -	- - -
Father's education (years of schooling				
0 – 8	1.52 (1.10;2.10)	0.010	- - -	- - -
9 – 11	0.98 (0.66;1.46)	0.957	- - -	- - -
12 or more	1.0			
Mother's education (years of schooling				
0 – 8	1.50 (1.10;2.05)	0.010	- - -	- - -
9 – 11	1.15 (0.81;1.62)	0.410	- - -	- - -
12 or more	1.0			
Working				
Yes	1.72 (1.33;2.22)	< 0.001	1.27 (0.98;1.64)	0.064
No	1.0		1.0	
Self-perceived health status				
Very good/good	1.0		1.0	
Regular	1.43 (1.11;1.84)	0.005	1.40 (1.10;1.78)	0.005
Poor/very poor	2.54 (1.78;3.63)	< 0.001	2.23 (1.52;3.27)	<0.001
Self-reported hypertension				
Yes	2.08 (1.53;2.83)	< 0.001	1.37 (1.01;1.85)	0.039
No	1.0		1.0	
Self-reported diabetes				
Yes	2.19 (1.37;3.48)	0.001	- - -	- - -
No	1.0			
Self-reported altered cholesterol				
Yes	1.77 (1.32;2.37)	< 0.001	- - -	- - -
No	1.0			
Lifestyle				
Computer use every day				
Yes	0.83 (0.65;1.07)	0.154	0.90 (0.70;1.14)	0.393
No	1.0		1.0	
Smoking				
Yes	1.47 (1.00;2.16)	0.046	- - -	- - -
No	1.0			
Alcohol consumption in the last month				
Yes	1.26 (0.99;1.60)	0.058	1.30 (1.04;1.63)	0.018
No	1.0		1.0	

Exclusion of all covariates with p > 20% in Table 1 (household income, household members, physical activity classification, and watching TV every day). ‡Model adjusted for age. PR: prevalence ratio; 95% CI: 95% confidence interval. The dotted line indicates variables that did not remain in the multiple model.

DISCUSSION

The present study found a high prevalence of overweight (35.6%) among university students. As reported in other studies[9,10,13], the prevalence of overweight was higher among male students than female students (43.6% versus 29.7%). This higher prevalence of overweight among men might be explained by the greater care of women with body esthetics, valuing a slim and fit body in order to meet beauty standards.

The prevalence of overweight observed in this study was higher than that reported in a population-based survey conducted in Rio Branco in 2008, in which 23.6% of adults aged 18 to 24 years were overweight[11], and in the 2011 VIGITEL survey comprising 26 Brazilian capitals and the Distrito Federal, in which the prevalence was 27.3% among adults aged 18 to 24 years from the city of Rio Branco, Acre. Differences in the prevalence of overweight between studies can be explained by differences in the composition of the sample (adult population in the population-based survey) and by methodological differences (self-reported measures in the VIGITEL survey). However, the proportion of overweight students was high in the present study. This finding is a matter of concern since excess weight is associated with a variety of health problems, is difficult to reverse (persisting throughout life), and is associated with high treatment costs[16].

The prevalence ratios of overweight were higher among married students or those living in a stable union, as well as among widowed, separated or divorced students, when compared to singles. Similar results have been reported in studies conducted in other countries[17,18]. Silva et al.[2] suggested this finding to be related to the adoption of new lifestyle habits after marriage, such as a reduction in physical activity levels and dietary changes. In addition, this higher prevalence may also be related to age. It is natural that individuals gain weight with increasing age as a result of a decrease in basal metabolic rates and physical activity levels. However, Oliveira et al.[19] found no association between overweight and marital status in an adult population from Salvador.

A household income of up to 3 MW was inversely associated with overweight in male students. A study conducted in Rio Branco demonstrated an increasing linear trend in the percentage of overweight adults with increasing household income[11]. Suleiman et al.[20] found a higher prevalence of overweight among low-income university students compared to high-income students. These data agree with the inverse relationship between overweight and income in developed countries proposed by Ljungvall and Zimmerman[21]. In Brazil, this relationship is different due to the period of transition during which income tends to be a risk factor for an increasing prevalence of overweight, characterized by changes in the patterns of consumption of the population. This pattern has been demonstrated among men, but not among women.

The prevalence of overweight was 64.6% in the population aged 30 years or older, with a prevalence of 75.6% among male students and of 57.6%

among female students. According to Burton et al.[22], overweight tends to increase with age. Economos et al.[23] suggested this increase to be more accelerated in men and slower in women, with the observation of higher prevalences among younger male students and among older female students.

The present study showed that male students watching television every day of the week had a 35% higher chance of being overweight than those who did not. Although the results of cross-sectional studies associating the time spent watching television with indicators of overweight and obesity are controversial, spending excessive time in sedentary behavior may contribute both directly and indirectly to overweight. Directly, the time spent in sedentary behaviors reduces physical activity levels and favors an increase in the consumption of high energy density foods[24,25]. Indirectly, excessive television watching increases the exposure to advertisements that encourage the consumption of high-calorie foods of low nutritional value[25]. Taken together, these factors contribute to increase the positive energy balance and, consequently, body weight.

In the present study, female students with a negative perception of health (regular, poor, very poor) had a higher chance of being overweight. Similar results have been reported in other studies demonstrating a higher frequency of negative health perception among overweight and obese individuals compared to their non-obese or non-overweight peers[11,26]. Self-perceived health status has been used in epidemiological studies for health status assessment of adults and is an important health indicator of populations[27]. Taken together, these results suggest that individuals with excess weight perceive this condition to be affecting their health status.

Overweight university students were more likely to develop arterial hypertension. Similar results have been reported in other studies[23,28] which showed that overweight is associated with systemic arterial hypertension. These results indicate the need for continuous prevention and education programs as well as activities designed to promote a more active lifestyle among university students based on regular physical activity and the adoption of healthy eating habits.

The prevalence ratios of overweight in female students were higher among those reporting the consumption of alcohol in the last month compared to those who did not. Different results have been reported by Mataix et al.[29] who observed a higher prevalence of overweight among women who did not consume alcohol.

The role of alcohol in the mechanism underlying the development of overweight is unclear, mainly because of differences in the methods used to determine the frequency and quantity of alcohol consumed. The responses to alcohol vary depending on individual characteristics and the same trend is observed for weight gain related to alcohol consumption. Furthermore, the method selected for the evaluation of alcohol consumption in the present study (consumption in the last 30 days) is likely to be a limiting factor for analysis of the association with overweight, especially because this definition does not reflect the frequency or quantity of alcohol consumed[30].

One limitation of this study is its cross-sectional design which does not permit to determine whether the association found is causal; thus, reverse causality cannot be excluded. The strengths of the study include the small percentage of losses and refusals, the use of a representative and probability sample of university students, and the fact that the students were recruited from public and private institutions.

CONCLUSION

The prevalence of overweight was high, especially among male students older than 30 years, who were married or in a stable union, had a household income of 3 to 10 MW, and worked. Overweight was associated with marital status, household income, hypertension and watching television every day in men, and with health perception, hypertension and alcohol consumption in the last month in women. It can be concluded that overweight is determined by a combination of different factors which differed in the present study between men and women. These results highlight the need of intervention programs for this important public health problem.

Acknowedlegements

We acknowledge the financial support of Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq, Edital Casadinho UFAC-FIOCRUZ, Grant 620024/2008-9) and Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES, Grants PROCAD-NF 1442/2007 and PROCAD-NF 2557/2008).

REFERENCES

1. Simony RS, Gimeno SGA, Ferreira SRG, Franco LJ. Prevalência de sobrepeso e obesidade em nipo-brasileiros: comparação entre sexos e geração. Rev Nutr 2008;21:169-76.
2. Silva DAS, Quadros TMB, Gordia AP, Petroski EL. Association of overweight with socio-demographic variables and lifestyle among Brazilian university students. Ciênc Saúde Colet 2011;16:4473-9.
3. Owen CG, Whincup PH, Cook DG. Breast-feeding and cardiovascular risk factors and outcomes in later life: evidence from epidemiological studies. Proc Nutr Soc 2011;70:478-84.
4. Hopman WM, Berger C, Lawrence J, Barr SI, Gao Y, Prior JC, et al. The association between body mass index and health-related quality of life: data from CaMos, a stratified population study. Qual Life Res 2007;16:1595-603.
5. Silva DAS, Petroski EL. Fatores associados ao nível de participação em atividades físicas em estudantes de uma universidade pública no sul do Brasil. Ciênc Saúde Colet 2011;16:4087-94.
6. Alcala HG, Ramos DC, Tamborero CG, Tamez OH, Valdes PA, Mehta R, Salinas CA. Significant increment in the prevalence of overweight and obesity documented between 1994 and 2008 in Mexican college students. Diabetes Metab Syndr Obes 2010; 3:79-85.
7. Monteiro CA, Conde WL, Popkin BM. Income-specific trends in obesity in Brazil: 1975 – 2003. Am J Public Health 2007;97:1808-12.

8. Flegal KM, Carrol MD, Kit BK, Ogden GL. Prevalence and trends in the distribution of body mass index among US adults, 1999 - 2010. JAMA 2012;307:491-7.
9. Xi B, Liang Y, He T, Reilly KH, Hu Y, Wang Q, Yan Y, Mi J. Secular trends in the prevalence of general and abdominal obesity among Chinese adults, 1993-2009. Obes Rev 2012;13(3):287-96.
10. Ramalho AA, Dalamaria T, Souza OF. Consumo regular de frutas e hortaliças por estudantes universitários em Rio Branco, Acre, Brasil: prevalência e fatores associados. Cad Saúde Pública 2012;28(7):1405-13.
11. Lino MZR, Muniz PT, Siqueira KS. Prevalência e fatores associados ao excesso de peso em adultos: Inquérito populacional em Rio Branco, Acre, Brasil, 2007-2008. Cad Saúde Publica 2011;27:797-810.
12. BRASIL. Ministério da Saúde. Secretaria de Atenção a Saúde. Departamento de Atenção Básica. Orientações para a coleta e análise de dados antropométricos em serviços de saúde: Norma Técnica do Sistema de Vigilância Alimentar e Nutricional – SISVAN / Ministério da Saúde, Secretaria de Atenção à Saúde, Departamento de Atenção Básica. – Brasília: Ministério da Saúde, 2011.
13. Departamento de Análise de Situação de Saúde, Secretaria de Vigilância em Saúde, Ministério da Saúde. Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por Inquérito Telefônico, Vigitel 2009. Brasília: Ministério da Saúde; 2010.
14. Matsudo SM, Araújo TL, Matsudo VKR, Andrade DR, Andrade EL, Oliveira LC, et al. Questionário Internacional de Atividade Física (IPAQ): estudo de validade e reprodutibilidade no Brasil. Rev Bras Ativ Saude 2001;10:5-18.
15. World Health Organization. Diet, Nutrition and the prevention of chronic diseases. Geneva: WHO; 2003.
16. Bahia L, Cotinho ESF, Barufaldi LA, Abreu GA, Malhão TA, Souza CPR, Araujo DV. The costs of overweight and obesity-related diseases in the Brazilian public health system: cross-sectional study. BMC Public Health 2012;12:440.
17. Janghorbani M, Amini M, Rezvanian H, Gouya MM, Delavari A, Alikhani S, Mahdavi A. Association of body mass index and abdominal obesity with marital status in adults. Arch Iran Med 2008; 11:274-81.
18. Sobal J, Hanson KL, Frongill EA. Gender, ethnicity, marital status, and body weight in the United States. Obesity 2009;17:2223-31.
19. Oliveira LPM, Assis AMO, Silva MCM, Santana MLP, Santos NS, Pinheiro SMC, Barreto ML Souza CO. Fatores associados a excesso de peso e concentração de gordura abdominal em adultos na cidade de Salvador, Bahia, Brasil. Cad Saúde Públ 2009; 25:570-82.
20. Suleiman AA, Albogai OK, Yasein N, El Qudah JM, Bataineh MF, Obeidat BA. Prevalence of and factors associated with overweight and obesity among Jordan university students. J Biol Sci 2009;9:738-45.
21. Ljungvall A, Zimmerman FJ. Bigger bodies: long-term trends and disparities in obesity and body-mass index among U.S. adults, 1960-2008. Soc Sci Med 2012; 75:109-19. Soc Sci Med 2012; 75(1):109-19.
22. Burton AM, Agne AA, Lehr SM, Davis NJ, Willett LL, Cherrington AL. Training residents in obesity counseling: incorporating principles of motivational interviewing to enhance patient centeredness. J Grad Med Educ 2011;3:408-11.
23. Economos CD, Hildebrandt ML, Hyatt RR. College freshman stress and weight change: differences by gender. Am J Health Behav 2008;32:16-25.
24. Boulos R, Vikre EK, Oppenheimer S, Chang H, Kanarek RB. Obesity: how television is influencing the obesity epidemic. Physiol Behav 2012;107:146-53.
25. Rodrígues-Martin A, Novalbos Ruiz JP, Martínez Nieto JM, Escobar Jiménes L. Life-style factors associated with overweight and obesity among Spanish adults. Nutr Hosp 2009;24:144-51.
26. Abolfotouh MA, Bassiouni FA, Mounir GM, Fayyad RCh. Health-related lifestyles and risk behaviours among students living in Alexandria University Hostels. East Mediterr Health J 2007;13:376-91.

27. Bezerra PCL, Opitz SP, Koifman RJ Muniz PT. Percepção de saúde e fatores associados em adultos: inquérito populacional em Rio Branco, Acre, Brasil, 2007-2008. Cad Saúde Públ 2011; 27:2441-5.
28. Martins MCC, Ricarte IF, Rocha CHL, Maia RB, Silva VB, Veras AB. Filho MDS. Pressão arterial, excesso de peso e nível de atividade física em estudantes de universidade pública. Arq Bras Cardiol 2010;95:192-9.
29. Mataix J, López Frías M, Martínez-de-Victoria E, López-Jurado M, Aranda P, Llopis J. Factors associated with obesity in an adult Mediterranean population: influence on plasma lipid profile. J Am Coll Nutr 2005;24:456-65.
30. Pinho CPS, Diniz AS, Arruda IKG, Lira PIC Sequeira LAS, Gonçalves FCLSP, Filho MB. Excesso de peso em adultos do Estado de Pernambuco, Brasil: magnitude e fatores associados. Cad Saúde Públ 2011;27:2340-50.

Corresponding author

Gustavo de Souza Moretti
Avenida Recanto Verde, nº 350,
Condomínio Riviera Dei Fiori, Q.04,
Cs.28
Bairro: Conjunto Mariana.
CEP: 69919-182 - Rio Branco - Acre
E-mail: gustmoretti@hotmail.com