

Factors related to overweight among university students

Fatores associados ao excesso de peso de universitários

ABSTRACT

Objective: To identify the prevalence of overweight and its associated factors among university students of the area of health. **Methods:** The sample comprised 344 students. Body Mass Index (BMI) and associated factors were assessed from a self-report questionnaire. Students who presented BMI ≥ 25 kg/m² were rated overweight. Statistical analysis was performed using the chi-square test and associations were estimated by odds ratio with 95% (95% CI). The prevalence of overweight students was 23.8% overall. **Results:** Factors associated with overweight were as follows: male (OR=3.773: CI=2.152-6.614); not living in the city where one studies (OR=1.830: CI=1.104-3.034); attending the final years of an undergraduate course (OR =1.758: CI=1.066-2.897); attending night classes (OR=1.654: CI=1.004-2.726); alcohol consumption (OR=1.676: CI=1.014-2.769); smoking (OR=3.914: CI=1.458-10.506); and working (OR=2.029: CI=1.222-3.366). **Conclusion:** The groups with the highest risk of overweight were male students who live in other cities, attend the final years, study at night, consume alcohol and tobacco, and work.

Keywords: Prevalence. Overweight. Students.

RESUMO

Objetivo: Identificar a prevalência de excesso de peso e os fatores associados em universitários da área da Saúde. **Métodos:** A amostra foi constituída por 344 acadêmicos. Índice de Massa Corpórea (IMC) e fatores associados foram avaliados a partir de um questionário de autorrelato. Foi classificado com excesso de peso aquele estudante que tivesse IMC ≥ 25 kg/m². A análise estatística foi realizada por meio do teste qui-quadrado e as associações foram calculadas pelo *odds ratio* 95% (IC95%). **Resultados:** A prevalência de excesso de peso geral foi de 23,8%. Os fatores associados ao excesso de peso foram: ser do sexo masculino (OR = 3,773; IC = 2,152-6,614); não morar na cidade em que estuda (OR = 1,830; IC = 1,104-3,034); estar cursando as séries finais do curso de graduação (OR = 1,758; IC = 1,066-2,897), estudar no período noturno (OR = 1,654; IC = 1,004-2,726), consumir bebidas alcoólicas (OR = 1,676; IC = 1,014-2,769), fumar (OR = 3,914; IC = 1,458-10,506) e trabalhar (OR = 2,029; IC = 1,222-3,366). **Conclusão:** Os grupos com maior risco de excesso de peso foram estudantes do sexo masculino, que vivem em outras cidades, participam de séries de estudo finais, à noite, consomem álcool, usam tabaco e trabalham.

Palavras-chave: Prevalência. Excesso de peso. Universitários.

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INTRODUCTION

Increased dramatically in recent decades the prevalence of overweight and obesity in the adult population, regardless of gender, socio-economic status and level of education.¹⁻⁴ Also increasing the number of deaths from cardiovascular disease in adults. Data reveal that six of the nine cardiovascular risk factors in adults may be modifiable and among them eating has a close connection with five of them.⁵⁻⁷

Some studies suggest that habits acquired to adolescence tend to perpetuate themselves in adulthood especially in relation to food habits and the practice of physical activity.⁸ In Brazil, for most students, the transition from adolescence to adulthood coincides with the years of graduation at an institution of higher education, when the university student increases its affairs and responsibilities^{9,10} generating a high level of stress, changing eating habits and decreasing his daily physical activity.¹¹ Thus, he becomes a potential element for cardiovascular disease development.

Performing diagnostic outcome with the university students as having excess body weight is justified by the transition and social behavior, and it can help in health promotion campaigns to university during this period of consolidation of habits and lifestyle. The aim of this study was to identify risk factors associated with excess weight in university students from the health sector.

METHODS

We conducted a cross-sectional study in a sample of students from a private college in Maringá city in the first half of 2011 in order to assess the lifestyle concerning to health. According to the information provided by the institution secretary the population of students enrolled in Pharmacy, Physiotherapy, Nutrition and Dentistry of 2210 students. To ensure representativeness, the sampling process was conducted in multiple stages: a. Identification of the proportion of pupils according to academic area b. Random selection of courses within each area in order to obtain the estimated number of students, respecting the proportionality of each area c. Selection of all students entering the courses drawn.

We interviewed 344 students with an average age of 22.46 ± 4.83 years, with 274 female

university students. Data were collected through questionnaires consisting of 39 questions self-applied. The academic students respondents were educated and informed on the issues. The average time of the questionnaire application in the classroom was 25 minutes. The questionnaires were anonymous and participants signed an informed consent form.

For data collection was conducted primarily a training for the participants of the study group, lasting 30 days, and it took place in April of 2010. Data collection lasted four months, from May to September.

The independent variables were: gender, city, grade level, graduation course, shift, level of physical activity, marital status, alcohol consumption, tobacco use, occupation and socio-economic status. All these independent variables were evaluated in a binomial and defined in categories of reference and contrast (Chart 1).

The variable body mass index was considered as a dependent variable in this study and for analysis of possible associations with other variables the body mass index was dichotomized (0 - overweight and 1 - normal weight). Body mass (kg) and height (m) were used to calculate BMI (kg/m^2), which are obtained through self-report as well the use of tobacco, alcohol consumption, city, grade level, shift, marital status and occupation which was a validated procedure for Brazilian adults¹² and used extensively in the population at the university.¹³ For the classification of overweight and obesity, we used the cutoff points established by the World health Organization.¹⁴ So that the classification of overweight and obesity formed a category named Overweight.

To assess the levels of physical activity we used the International Physical Activity Questionnaire (IPAQ), in its short version. It was elaborated a physical activity score, calculated by multiplying the weekly frequency (days) by the average duration (minutes) of the practice of walking, other moderate and vigorous physical activities. The cutoff for the individual to be classified as a physically active was ≥ 150 minutes / week of leisure-time activities and / or displacement activities.

Socioeconomic status was assessed by Economic Classification Criterion Brazil¹⁵, based on the survey of consumer goods, education of household head and the presence of a maid.

Chart 1. Independent variables, definition, setting benchmarks and contrast.

| Name | Definition | Benchmark | Contrast |
|-------------------------|--|-----------------------------------|---|
| Gender | University students Biological feature | Female | Male |
| City | City where the student lives | Maringá | Other cities |
| Grade level | The academic year that is attending at college | Initial series (1° e 2°) | Final series (3°, 4° and/or the last year of college) |
| Shift | Time of day in which the academic studies | Full time (morning and afternoon) | Evening |
| Physical Activity Level | Habitual practice of physical activity | Active | Irregularly active |
| Marital Status | Academic marital status | Single | Married |
| Alcohol consumption | Alcohol consumption at least twice a week | No | Yes |
| Tobacco Use | Use of tobacco reported by the academic | No | Yes |
| Occupation | Daily tasks outside school | Only Study | Work (at least a period per day) |
| Socio-economic Status | Academic socio-economic classification according to a Brazilian Association of Business Research | High (A, B,) | Low (C, D, E) |

The study was approved by the Research Ethics Committee of the Faculty Inga 022/2009.

The statistical treatment of all information was obtained through the computerized package SPSS 15. Initially, we analyzed the percentage of overweight students according to each of the independent variables. To analyze differences between the percentage of indicators lifestyle and sociodemographic variables to the nutritional status of the university, it was used chi-square test, with Fisher's correction when necessary. The odds ratios were calculated as an indication of possible associations and considered a confidence interval of 95% (CI_{95%}). For joint assessment of possible associations of independent variables with the dependent variable, it was used the binomial logistic regression and the outcome variable (Overweight), taking classes zero and one.

RESULTS

The sample comprised 79.65% of female academics, 64.53% residents in the city of Maringa, 58.14% of the students attending the final series,

54.65% in fulltime, 88.66% single. Reported alcohol consumption 38.08% and 4.94% use tobacco, 52.33% of the students reported having exclusively dedicated to the study and 78.20 belonged to a high socioeconomic class.

Table 1 presents the prevalence of overweight according to the independent variables. The results indicate an overall prevalence of 23.8% of excess weight. Regarding the independent variables, the male students, who live in other cities, attend the final grade, studying at night, consume alcohol, use tobacco and work, had a higher prevalence of overweight than their peers ($p \leq 0.05$). Variables course, physical activity level, marital status and socioeconomic status were not statistically significant.

The results in Table 2 reveal association of college males (OR = 3.773: CI = 2.152 to 6.614), residents in other cities (OR = 1.830: CI = 1.104 to 3.034), attending the final series (OR = 1.758: IC = 1.066 to 2.897), students at night (OR = 1.654: CI = 1.004 to 2.726), alcohol drinkers (OR = 1.676: CI = 1.014 to 2.769), smokers (OR = 3.914: CI = 1.458 to 10.506) and working

Table 1. Prevalence (%) of overweight according to the independent variables studied at the university college.

| Variable | n (%) | Overweight | | P |
|--------------------------------|-------------|------------|------|--------------------|
| | | F | % | |
| Gender | | | | 0.000 ^a |
| Male | 70 (20.35) | 32 | 45.7 | |
| Female | 274 (79.65) | 50 | 18.2 | |
| City | | | | 0.018 ^a |
| Others | 122 (35.47) | 38 | 31.1 | |
| Maringá | 222 (64.53) | 44 | 19.8 | |
| Grade | | | | 0.026 ^a |
| Finals | 144 (41.86) | 43 | 29.9 | |
| Initials | 200 (58.14) | 39 | 19.5 | |
| Course | | | | 0.676 |
| Physiotherapy | 126 (36.63) | 27 | 21.4 | |
| Pharmacy | 125 (36.34) | 34 | 27.2 | |
| Nutrition | 31 (9.01) | 8 | 25.8 | |
| Odontology | 62(18.02) | 13 | 21.0 | |
| Round | | | | 0.047 ^a |
| Full | 188 (54.65) | 37 | 19.7 | |
| Night | 156 (45.35) | 45 | 28.8 | |
| Physical Activity Level | | | | 0.845 |
| Irregular active | 192 (55.81) | 45 | 24.3 | |
| Active | 152 (44.19) | 37 | 23.4 | |
| Marital Status | | | | 0.779 |
| Married | 39 (11.34) | 10 | 25.6 | |
| Single | 305 (88.66) | 72 | 23.6 | |
| Álcohol | | | | 0.043 ^a |
| Yes | 131 (38.08) | 39 | 29.8 | |
| No | 213(61.92) | 43 | 20.2 | |
| Smoking | | | | 0.004 ^a |
| Yes | 17 (4.94) | 9 | 52.9 | |
| No | 327(95.06) | 73 | 22.3 | |
| Occupation | | | | 0.006 ^a |
| Work | 164 (47.67) | 50 | 30.5 | |
| Study | 180(52.33) | 32 | 21.6 | |
| Socioeconomic level | | | | 0.378 |
| Low | 75 (21.80) | 15 | 20.0 | |
| High | 269 (78.20) | 67 | 24.9 | |

^aP<0.05.

Table 2. Odds ratio with a confidence interval of 95% (IC_{95%}) of college students according to the independent variables surveyed.

| Variables | Overweight | | p | OR (IC _{95%}) |
|--------------------------------|------------|------|--------------------|-------------------------|
| | F | % | | |
| Gender | | | 0.000 ^a | |
| Male | 32 | 45.7 | | 3.773(2.152 – 6.614) |
| Female | 50 | 18.2 | | |
| City | | | 0.018 ^a | |
| Outthers | 38 | 31.1 | | 1.830(1.104 – 3.034) |
| Maringá | 44 | 19.8 | | |
| Grade | | | 0.026 ^a | |
| Finals | 43 | 29.9 | | 1.758(1.066 – 2.897) |
| Initials | 39 | 19.5 | | |
| Round | | | 0.047 ^a | |
| Full | 45 | 28.8 | | 1.654(1.004 – 2.726) |
| Night | 37 | 19.7 | | |
| Physical Activity Level | | | 0.845 | |
| Irregular active | 45 | 24.3 | | 0.951(0.578 – 1.567) |
| Active | 37 | 23.4 | | |
| Marital Status | | | 0.779 | |
| Married | 10 | 25.6 | | 1.116(0.519 – 2.400) |
| Single | 72 | 23.6 | | |
| Álcohol | | | 0.043 ^a | |
| Yes | 39 | 29.8 | | 1.676(1.014 – 2.769) |
| No | 43 | 20.2 | | |
| Smoking | | | 0.004 ^a | |
| Yes | 9 | 52.9 | | 3.914(1.458 – 10.506) |
| No | 73 | 22.3 | | |
| Occupation | | | 0.006 ^a | |
| Work | 50 | 30.5 | | 2.029(1.222 – 3.366) |
| Study | 32 | 21.6 | | |
| Socioeconomic level | | | 0.378 | |
| Low | 15 | 20.0 | | 0.754(0.402 – 1.415) |
| High | 67 | 24.9 | | |

^aP<0.05.

(OR = 2.029; CI = 1.222 to 3.366), students were more likely to present with excess weight. However being overweight was not associated with physical inactivity, low socioeconomic class and married marital status.

DISCUSSION

An alarming increase in the prevalence and incidence of overweight has been shown in the reports of the World Health Organization, it is estimated that obesity is the 10th major disease burden worldwide, overcoming some contagious infectious epidemics.⁴ And it is directly related to hypertension, high cholesterol level, metabolic syndrome and cardiovascular disease.^{16,17}

Among the academic who participated in the research, 23.8% were overweight body. It was considered a lower prevalence compared with the Brazilian population and other countries.¹⁸⁻²⁰ But, this prevalence is similar when compared with college students.^{9,21,22}

Among the students surveyed it was identified that males had 3.77 times more chances to be overweight than their female peers. Odds ratios close to those reported by studies in other countries.^{21,23,24}

The lowest rate of female overweight may be linked to the desire to be thinner due to her preoccupation with body image during adolescence.²⁵ It was found in this study that the students of final grades have 1.758 times more chances to be overweight than the academics of the initial series. The data corroborate the findings of other studies which found an increase in body weight often related to stress and especially to the age.^{26,27} In Brazil, it is necessary foresight studies to see how this variable changes during the academic years.

The fact of living in another city and having to move to college, working for one or two periods of the day and study at night corresponded to higher

chances of being overweight (1.830, 2.029 and 1.654 respectively). These characteristics may be related to decreased sleep, decreased leisure time and inadequate nutrition, whose factors are associated with overweight.²⁸⁻³¹

The consumption of alcoholic beverages and smoking was also significantly related to overweight, with an odds ratio of 1.676 for the consumption of alcoholic beverages and 3.914 for the smoking habit. These findings corroborate other studies which claim that the consumption of alcoholic beverages and tobacco favor the development of obesity.³²⁻³⁴

The cross-sectional design of the study did not allow to identify temporal and causal relationships between excess weight and some variables, such as, physical inactivity, however, in view of the scarcity of studies that checked that factors associated with excess weight with the university population especially from private education institutions, this study contributed to advancing the knowledge on the subject widely discussed in the international literature.

CONCLUSION

One can conclude that the high prevalence of overweight found in university students of private education institution follows the trend of public education institutions as well as students from other countries. What serves as a warning by the large number of higher education institutions we have in Brazil and mainly because it is related to young people. The groups with the highest risk of overweight were male students, who live in other cities, attend the final series, study at night, consume alcohol, tobacco use and work. It is suggested that institutions of higher education perform interventions through health promotion programs aimed at reducing the academic overweight among college students.

REFERENCES

1. Manson JE, Skerrett PJ, Greenland P, VanItallie TB. The escalating pandemics of obesity and sedentary lifestyle. A call to action for clinicians. *Arch Intern Med.* 2004;164(3):249-58. <http://dx.doi.org/10.1001/archinte.164.3.249>. PMID:14769621.
2. World Health organization - WHO. Obesity: controlling the global epidemic [Internet]. Geneva; 2003 [cited 2014 Mar 17]. Available from: <https://apps.who.int/nut/obs.htm>.
3. Anderson P. Reducing overweight and obesity: closing the gap between primary care and public health. *Fam*

- Pract. 2008;25(Suppl 1):i10-6. <http://dx.doi.org/10.1093/fampra/cmn060>. PMID:18796703.
4. Razak F, Anand SS, Shannon H, Vuksan V, Davis B, Jacobs R, et al. Defining obesity cut points in a multiethnic population. *Circulation*. 2007;115(16):2111-8. <http://dx.doi.org/10.1161/CIRCULATIONAHA.106.635011>. PMID:17420343.
 5. Haskell WL, Lee IM, Pate RR, Powell KE, Blair SN, Franklin BA, et al. Physical activity and public health: updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. *Circulation*. 2007;116(9):1081-93. <http://dx.doi.org/10.1161/CIRCULATIONAHA.107.185649>. PMID:17671237.
 6. Al-Hazzaa HM, Musaiger AO. Physical activity patterns and eating habits of adolescents living in major Arab cities. *Saudi Med J*. 2010;31(2):210-1. PMID:20174744.
 7. Musaiger AO, Al-Hazzaa HM, Al-Qahtani A, Elati J, Ramadan J, Aboulella NA, et al. Strategy to combat obesity and to promote physical activity in Arab countries. *Diabetes Metab Syndr Obes*. 2011;4:89-97.
 8. Azevedo MR, Araújo CL, Silva MC, Hallal PC. Tracking of physical activity from adolescence to adulthood: a population-based study. *Rev Saude Publica*. 2007;41(1):69-75. <http://dx.doi.org/10.1590/S0034-89102007000100010>. PMID:17273636.
 9. Serlachius A, Hamer M, Wardle J. Stress and weight change in university students in the United Kingdom. *Physiol Behav*. 2007;92(4):548-53. <http://dx.doi.org/10.1016/j.physbeh.2007.04.032>. PMID:17537466.
 10. Jung ME, Bray SR, Ginis KAM. Behavior change and the freshman 15: tracking physical activity and dietary patterns in 1st-year university women. *J Am Coll Health*. 2008;56(5):523-30. <http://dx.doi.org/10.3200/JACH.56.5.523-530>. PMID:18400664.
 11. Economos CD, Hildebrandt ML, Hyatt RR. College freshman stress and weight change: differences by gender. *Am J Health Behav*. 2008;32(1):16-25. <http://dx.doi.org/10.5993/AJHB.32.1.2>. PMID:18021030.
 12. Coqueiro RS, Borges LJ, Araújo VC, Pelegrini A, Barbosa AR. Medidas auto-referidas são válidas para avaliação do estado nutricional na população brasileira? *Rev Bras Cineantropometria Desempenho Hum*. 2009;11:113-9.
 13. Racette SB, Deusinger SS, Strube MJ, Highstein GR, Deusinger RH. Changes in weight and health behaviors from freshman through senior year of college. *J Nutr Educ Behav*. 2008;40(1):39-42. <http://dx.doi.org/10.1016/j.jneb.2007.01.001>. PMID:18174103.
 14. World Health organization - WHO. Obesity: preventing and managing the global epidemic. Report of a WHO consultation on obesity. Geneva; 2000.
 15. Associação Brasileira de Empresas de Pesquisa - ABEP. Critério padrão de classificação econômica Brasil. São Paulo; 2008 [cited 2014 mar 17]. Available from: http://www.abep.org/codigosguias/Criterio_Brasil_2008.pdf.
 16. Hajian-Tilaki KO, Heidari B. Prevalence of obesity, central obesity and the associated factors in urban population aged 20-70 years, in the north of Iran: a population-based study and regression approach. *Obes Rev*. 2007;8(1):3-10. <http://dx.doi.org/10.1111/j.1467-789X.2006.00235.x>. PMID:17212790.
 17. Kelly T, Yang W, Chen C-S, Reynolds K, He J. Global burden of obesity in 2005 and projections to 2030. *Int J Obes*. 2008;32(9):1431-7. <http://dx.doi.org/10.1038/ijo.2008.102>. PMID:18607383.
 18. He L, Tang X, Song Y, Li N, Li J, Zhang Z, et al. Prevalence of cardiovascular disease and risk factors in a rural district of Beijing, China: a population-based survey of 58,308 residents. *BMC Public Health*. 2012;12(1):34. <http://dx.doi.org/10.1186/1471-2458-12-34>. PMID:22248490.
 19. Rashidy-Pour A, Malek M, Eskandarian R, Ghorbani R. Obesity in the Iranian population. *Obes Rev*. 2009;10(1):2-6. <http://dx.doi.org/10.1111/j.1467-789X.2008.00536.x>. PMID:19021868.
 20. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Secretaria de Gestão Estratégica e Participativa. *Vigitel Brasil 2011: vigilância de fatores de risco e proteção para doenças crônicas por inquérito telefônico*. Brasília; 2012.
 21. Al-Kilani H, Waly M, Yousef R. Trends of Obesity and Overweight among College Students in Oman: A cross sectional study. *Sultan Qaboos Univ Med J*. 2012;12(1):69-76. <http://dx.doi.org/10.12816/0003090>. PMID:22375261.
 22. Heydari S-T, Ayatollahi S-M-T, Zare N. Diagnostic value of bioelectrical impedance analysis versus body mass index for detection of obesity among students. *Asian J Sports Med*. 2011;2(2):68-74. PMID:22375221.
 23. Yahia N, Achkar A, Abdallah A, Rizk S. Eating habits and obesity among Lebanese university students. *Nutr J*. 2008;7(1):32. <http://dx.doi.org/10.1186/1475-2891-7-32>. PMID:18973661.
 24. Musaiger AO, Lloyd OL, Bener AB, Al-Neyadi SM. Lifestyle factors associated with obesity among male university students in the United Arab Emirates.

- Nutr Food Sci. 2003;33(4):145-7. <http://dx.doi.org/10.1108/00346650310488480>.
25. Field AE, Cheung L, Wolf AM, Herzog DB, Gortmaker SL, Colditz GA. Exposure to the mass media and weight concerns among girls. *Pediatrics*. 1999;103(3):E36. <http://dx.doi.org/10.1542/peds.103.3.e36>. PMID:10049992.
26. Delinsky SS, Wilson GT. Weight gain, dietary restraint, and disordered eating in the freshman year of college. *Eat Behav*. 2008;9(1):82-90. <http://dx.doi.org/10.1016/j.eatbeh.2007.06.001>. PMID:18167326.
27. Sibai AM, Hwalla N, Adra N, Rahal B. Prevalence and covariates of obesity in Lebanon: findings from the first epidemiological study. *Obes Res*. 2003;11(11):1353-61. <http://dx.doi.org/10.1038/oby.2003.183>. PMID:14627756.
28. Silva DA, Quadros TM, Gordia AP, Petroski EL. Associação do sobrepeso com variáveis sócio-demográficas e estilo de vida em universitários. *Cien Saude Colet*. 2011;16(11):4473-9. PMID:22124828.
29. Yiengprugsawan V, Banwell C, Seubsman S-A, Sleigh AC. Short sleep and obesity in a large national cohort of Thai adults. *BMJ Open*. 2012;2(1):e000561. <http://dx.doi.org/10.1136/bmjopen-2011-000561>. PMID:22307100.
30. McArthur LH, Holbert D, Forsythe W. Is field of study or location associated with college students' snacking patterns? *J Obes*. 2012;2012:1-10.
31. Memon AA, Adil SE-E-R, Siddiqui EU, Naeem SS, Ali SA, Mehmood K. Eating disorders in medical students of Karachi, Pakistan-a cross-sectional study. *BMC Res Notes*. BioMed Central Ltd. 2012;5:84.
32. Araújo MS, Costa THM, Schmitz BA, Machado LM, Santos WR. Factors associated with overweight and central adiposity in urban workers covered by the Workers Food Program of the Brazilian Amazon Region. *Rev Bras Epidemiol*. 2010;13(3):425-33. <http://dx.doi.org/10.1590/S1415-790X2010000300006>. PMID:20857029.
33. Feinman L, Lieber C. Nutrition and diet in alcoholism. In: Shils ME, Olson JA, Shike M, Ross AC. *Modern nutrition in health and disease*. 9. ed São Paulo: Manole; 2003. p. 1631-51.
34. Wang L, Yao D, Wu T. Prevalence of overweight and smoking patients with coronary heart disease in rural China. *Aust J Rural Health*. 2004;12(1):17-21. <http://dx.doi.org/10.1111/j.1440-1584.2004.t01-1-00543.x>. PMID:14723776.

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Financing source: Fundação Araucária.

Conflicts of interest: The authors declare no conflict of interest..

Research Ethics Committee approval statement: The study was approved by the Committee Ethics of the Faculty Inga 022/2009.

Received: Aug. 29, 2014

Accepted: Mar. 16, 2015