Excessive weight and sociodemographic vulnerability markers in young adult students

Excesso ponderal e marcadores de vulnerabilidade sociodemográfica em adultos jovens escolares

Raquel Sampaio Florêncio[1]
Jênifa Cavalcante dos Santos Santiago[1]
Thereza Maria Magalhães Moreira[1]
Teresa Cristina de Freitas[1]

Abstract

Objective: To analyze excessive weight (EW) in young adult students from socio-demographic markers of the individual dimension of vulnerability.

Methods: Analytical study, conducted with 560 young adults from 26 schools of a Brazilian northeastern municipality. The questionnaire used for data collection contained EW and sociodemographic variables, analyzed by descriptive measures of association and logistic regression by the method *enter* for model adjustment.

Results: A higher proportion of excessive weight was identified in young people who: were 23-24 years of age, women, skin color other than white, religious, with a partner, with children, without an occupation, with individual and family income more than two minimum wages. The excessive weight was associated with marital status and children, which remained in the final model.

Conclusion: Having a companion and children makes young adults vulnerable to EW. However, this condition is multi-determined and should be understood in a larger context.

Resumo

Objetivo: Analisar o excesso ponderal (EP) em adultos jovens escolares a partir dos marcadores sociodemográficos da dimensão individual da vulnerabilidade.

Métodos: Estudo analítico, realizado com 560 adultos jovens de 26 escolas de um município nordestino brasileiro. O questionário aplicado para coleta de dados continha a variável EP e as sociodemográficas, analisadas por medidas descritivas, de associação e regressão logística pelo método *enter* para ajuste do modelo.

Resultados: Houve maior proporção de excesso ponderal nos jovens de 23 a 24 anos de idade, mulheres, de cor/raça diferente da branca, com religião, com companheiros, com filhos, sem ocupação, com renda individual e familiar maior que dois salários mínimos. O excesso ponderal apresentou associação com situação conjugal e filhos, que permaneceram no modelo final.

Conclusão: Ter companheiro e filhos torna o adulto jovem vulnerável ao EP. No entanto, ratifica-se que o agravo em questão é multideterminado e deve ser compreendido num contexto ampliado.

Corresponding author
Raquel Sampaio Florêncio
Dr. Silas Munguba Avenue, 1700,
60714-903, Fortaleza, CE, Brazil.
raquelsampy@hotmail.com

[1]Universidade Estadual do Ceará, Fortaleza, CE, Brazil.
Conflicts of interest: there are no conflicts of interest to declare.

Introduction

Excessive weight (EW), or overweight, is conceptualized as excessive fat storage in the body associated with health risks, and its relationship with various metabolic complications. It is a worldwide public health problem in developed and developing countries, with increased prevalence and high costs to resolve its complications. In the United States of America (USA), obesity has increased gradually. and is estimated to cost $ 147 billion/year through diseases related to it.[1]

Even though they are exceeded by the North Americans and Chileans in terms of prevalence, the absolute numbers in Brazil are alarming. Until the past decade, EW affected 40% of the adult population, and in this group, obesity reached 11%. [1,2] Regarding the costs in the country, the estimate of expenditures consumes much of the health budget. From 2008 to 2011, there was a significant increase in direct expenses, with obesity and associated diseases, following the increased prevalence of EW in different regions of the country and in various age groups.[3]

At the same time, overweight and obesity have also been intensifying between young people of different ages throughout the industrialized world.[4] The few studies that addressed young adults in the age range (20 - 24 years old) recommended by the Brazilian Ministry of Health and the World Health Organization (WHO), demonstrate that the frequency of excessive weight cases already affects about a third of these young people.[5-7] In addition to this evidence, risk factors and vulnerabilities are already observed to chronic non-communicable diseases (NCDs), requiring necessary attention in these young people who presented peculiar characteristics in this phase of life.

Many young people are in school situation; in school, habits that can influence health are shared between groups. This fact was evident in a study about social networks, which showed that social relationships had positive and negative associations with health behaviors.[8] This fact highlights the need to study the youth in school, since the environment is conducive to the acquisition and spread of new behaviors, and is also fertile ground for health promotion actions.

Excessive weight is presented as a trigger of several other NCDs, such as cardiovascular diseases (CVD), osteoarthritis, reproductive and sleep disorders, as well as some cancers and reduced lung function, so it necessary to study EW among students from the perspective of epidemiological discussions and policies.[9] It is a multifactorial grievance that requires interdisciplinary discussions to minimize complications and prevent the increase in cases. Within this multifactorial context, sociodemographic questions permeate the universe of causes related to EW and reinforce the need for significant interventions in different social and cultural arrangements among the school youth.[7]

A debate on potential socio-demographic vulnerability markers associated with EW for the group of young adults is essential to recognize that other aspects, not clinicians directly, are involved in the etiology of this complex chronic condition, in order to provide support for health promotion, mediated by more effective intersectoral actions. According to the paradigm, we ask: What socio-demographic vulnerability markers are related to EW in young student adults?

Answering this question is relevant, because the increase of the magnitude of EW among young people from different regions of the world is a reality. The recognition of the complexity of its determinants and the mobilization of various sectors of society to formulate actions that promote health and prevent this health problem is one of the current challenges on the agenda of global public health. Thus, the aim was to analyze the excessive weight of young adult student from demographic markers of the individual dimension of vulnerability.

Methods

This was an analytical, quantitative study conducted in the city of Fortaleza (CE), Brazil, more specifically in schools under the responsibility of the State Department of Education of Ceará (SEDUC).

For this study, the sample was composed by young adult students of Fortaleza-Ceara, i.e., those aged between 20 and 24 years, enrolled into any regular educational institution or Youth and Adult Education of Ceará, more specifically from Fortaleza. The choice by school units was based on considerations of the association between social relationships and health behaviors,[8] because young people spend much of their time in the school environment, and produce or share health-related habits.

Considering that, the number of young students was unknown, because the list with the total number of students was not provided in a timely manner, for data collection the sample was based on the calculation for infinite populations. However, for purposes of calculation, a pilot study was performed with 30 young adult students (not included in the final sample) to determine the prevalence of the phenomenon: excessive weight. After such analysis, the prevalence of phenomenon was 37%, a value which was incorporated into the calculation of the sample, which was defined according to the following formula: $n = (z_{5\%}^2 \times P \times Q)/e^2$, where: n is the sample; z is the distribution value to the significance level of 5% (1.96); P is the prevalence of the phenomenon (37%); Q (63%) is the complementary percentage of P (Q=100-P); and the sampling error (considered here to be 4%). Based on the result of calculation, the value was established to be 560 young adult students.

Pregnant women were excluded from the sample (parameters for overweight identification are different) and those who used wheelchairs for mobility (there was no mechanism available to perform anthropometric measurements for this group). After the required agreement of the necessary number of students for the study, the sampling plan was organized in sampling units (SU).

In the primary sampling unit, six of the seven administrative regional secretariats (SR) of the city were considered, except for the regional center, as SEDUC considers only six for school regionalization purposes.

A raffle of 15% of the 175 schools eligible for the study, considered as secondary units, was conducted to obtain 26 schools. The percentage was established after the understanding that the viable number of schools to visit within one week would be two institutions, and the weeks available were the first half of 2014, considering holidays and bimonthly assessments. In total, 13 weeks and consequently 26 schools were included in the study, or 15% of all schools. The time for data collection was based on the first semester of the 2014 school year, because the study was part of a set of graduate academic activities of one of the researchers.

Since the lack of previous data with the distribution of students in schools prevented a stratified sampling strategy, we proceeded to undertake a raffle of the 26 schools. Four schools in each region were selected, plus a school in region five and one in the region six, that were those with a higher number of schools (27 schools were in SR1, 26 in SR2, 27 in SR3, 26 in SR4, 38 in SR5, and 31 in SR6).

The planned sample (n = 560) was averaged across the 26 schools; 21 was the number of students per school (560/26 = 21). The selection of the young people in the schools occurred by convenience sampling, with 84 students in SR1, SR2, SR3 and SR4 (4 schools and 21 students in each), 119 in SR5 (5 schools and 21 school in each; 14 more students were added to reach the total of 560, since dividing 560 by 21 does not result in an exact number, and this regional had more schools), and 105 in the SR6 (5 schools and 21 school in each).

Thus, the school director and/or coordinator were contacted the days data collection was scheduled, according to the institution availability. The visits were performed in all the classrooms; the research was explained and the young people in pre-established ages were invited to participate in the study. If the invitation was accepted, they were sent to a specific room where the research questionnaires were administered and the objective measurements of anthropometric parameters were performed. The undergraduate and graduate students of nursing and physical education courses participated as researchers, after prior training.

Data collection occurred in the months of February to May of 2014, and was performed in three stages: 1) selection and awareness of schools; 2) administration of the data collection instrument relating to vulnerabilities; 3) verification of anthropometric measurements.

The instrument contained items related to school identification, sociodemographic characteristics and physical examination (height and weight). Anthropometric measurements were taken in a standardized manner and registered on the form. The procedures were performed for calculating body mass index (BMI), which resulted in the study outcome variable.

The data, once collected, were entered into the database using specific software. The analysis of excessive weight in the concept of vulnerability involved the assessment of their individual perspective.[10]

The dependent variable was the excessive weight, verified by BMI in kg/m², calculated using the Quetelet index. The result was classified as underweight, normal weight, overweight or obesity I, II or III, and the last four classes were grouped to form the outcome of the study.

The independent variables, corresponding to the individual dimension, were investigated as variables related to sociodemographic markers (age, sex, self-reported skin color, religion, and marital status, children, and occupation, individual and family income). These were selected because it is understood that features in addition to behavior impact the outcome under study, considering the concept of vulnerability.[10]

Initially, the mean and standard deviation of the quantitative variables were calculated and simple frequency and percentage were used for the qualitative variables. Subsequently, bivariate and multivariate analytical statistics were used. In bivariate analysis, the Pearson chi-square test for categorical variables was applied, considering for all tests the level of significance of 5%. To estimate the strength of association of possible markers of excessive weight, the *odds ratio* (OR) was calculated with a 95% confidence interval.

For the multivariate analysis, logistic regression was used for adjustment of the potential effects of confusion. For inclusion in the initial regression model, in order to verify the confounding variables, a p-value <0.20 obtained in the bivariate analysis was adopted.

The criterion established in the analysis stage for the variables to remain in the model was the Wald test, having shown at least one category with statistical significance of p <0.05. Finally, a residual analysis was performed to isolate points where the model showed little adherence, and points that would improperly influence the model. In addition, the data input method in all phases of regression was forced input (*enter*), because there was no previous model found in the literature with the influence of demographic variables on the outcome. The *backward* method was also tested, which showed better adjustment for the model.

The study was registered in *Plataforma Brasil* under *Certificado de Apresentação para Apreciação Ética* (CAAE) 30382314.3.0000.5534.

Results

The adults were, mostly between 20 to 22 years old (79.3%) with a mean age of 21.2 years (+1.4). Regarding sex, a homogeneous distribution was identified, with a slight increased proportion for females (53.9%). Most self-reported non-white skin color (86.2%), almost all had some kind of religion (92.5%), and the majority did not have a partner (77.7%), and had no children (77.9%). In terms of the level of education of the father and mother of these young people, slightly more than half of the father (53.9%) and most part of the mothers (62.1%) had up to eight years of study, respectively. With regard to employment and income, the majority reported studying and working/having an internship (64.1%) and the most part (94.1%) and almost half (48.8%) had individual and family income of up to two minimum wages, respectively.

Based on the dysfunctional nutritional status of the young adult students, the bivariate analysis of sociodemographic characteristics was performed. The results showed a higher proportion of excessive weight in young people of 23 to 24 years of age, women, those with a skin color other than white, religious, with partner, with children, without an occupation, individual and family income more than two minimum wages, as demonstrated in table 1.

However, statistically significant association was presented with excessive weight and certain groups (p <0.05): marital status and children, in which a higher proportion of the problem was identified among young people with a companion and children (Table 1). To be included in the adjustment stage of the logistic regression model, the variables need to present association p <0.20. Thus, only marital status and children remained in the multivariate analysis (Table 2).

The variables with p <0.20, were submitted for multivariate analysis with adjustment. Marital status (p = 0.047) and having children (p = 0.036) remained significant when the effect of the variables on excessive weight were analyzed, according to table 2.

Table 1. Bivariate analysis of socio-demographic characteristics associated with weight excess in young adults' students

| Variables | Excessive weight | | grossOR (CI) 95% | p-value |
	Yes f(%)	No f(%)		
Age				
20 - 22 years old	153(34.5)	291(65.5)	0.77(0.51-1.17)	0.225
23 - 24 years old	47(40.5)	69(59.5)	1	
Sex				
Male	89(34.5)	169(65.5)	0.91(0.64-1.28)	0.578
Female	111(36.8)	191(63.2)	1	
Self-reported skin color				
White	30(30.9)	47(61.0)	1.18(0.72-1.93)	0.522
Other	170(35.2)	313(64.8)	1	
Religion				
Yes	186(35.9)	332(64.1)	1.12(0.58-2.18)	0.738
No	14(33.3)	28(66.7)	1	
Marital Status				
With partner	58.0(46.4)	67(53.6)	1.79(1.19-2.68)	0.005
Without partner	142(32.6)	293(67.4)	1	
Children				
Yes	58(46.8)	66(53.2)	1.82(1.21-2.73)	0.004
No	142(32.6)	294(67.4)	1	
Occupation				
No	77(38.7)	122(61.3)	1.21(0.85-1.73)	0.296
Yes	123(34.3)	236(65.7)	1	
Individual income				
Up to 2 MW	189(35.9)	338(64.1)	0.70(0.27-1.80)	0.456
More than 2 MW	8(44.4)	10(55.6)	1	
Family income				
Up to 2 MW	97(35.5)	176(64.5)	0.97(0.65-1.44)	0.877
More than 2 MW	62(36.3)	109(63.7)	1	

f - Frequency; % - percentage; p - *Pearson* Chi-square test significance level; OR - *odds ratio*; CI-confidence interval; MW - minimum wage

Table 2. Multivariate analysis of the sociodemographic markers associated with excessive weight in young adult students

Variables	adjustedOR 95%CI
Marital status	
With partner	1,54(1,01-2,37)
Without partner	1
Children	
Yes	1,58(1,03-2,43)
No	1

OR - *odds ratio*; CI - confidence interval

Discussion

Contextualizing the individual vulnerabilities in this complex scenario requires the attempt to relate possible determinants in order to understand the dimensions supposedly involved in its development. They are dimensions that are changed because of the peculiarities of distinct populations. In the case of young adults, this reflection into the school set-

ting demonstrates a concern in dealing with these individuals in places of frequent presence.

This study established an approach that grouped possible individual vulnerabilities for this health condition in a cluster related to sociodemographic characteristics, shown in Tables 1 and 2. For discussions about the concept of vulnerability, the issues related to marital status and children conform within the family relationships of the individual dimension, as proposed in the analytical framework of the concept of vulnerability.[10]

The discussion of sociodemographic questions showed that marital status and children were associated with excessive weight in the inferential analysis. Such questions corroborate studies in the area and demonstrate that these demographic markers influence the maintenance or exposure to nutritional status.[7]

In this context, the marriage or stable union can positively affect the health, but can also affect it negatively After establishment of a stable relationship, weight gain can be observed, which increases the proportions of men and women with excessive weight.[11]

The marital status, "with partner", identified in this study showed a statistically significant association with excessive weight in both bivariate (OR=1.79;[1.19;2.68];p= 0.005) as well as in the multivariate analysis (OR=1.54;[1.01;2.37];p=0.047). Corroborating these findings, a survey conducted in the metropolitan area of Fortaleza, Ceará, Brazil[7] identified factors for overweight in young adults. It showed that those who were married or in stable relationships had a higher chance of overweight in both the univariate analysis (OR=2.85;[1.79;4.55];p=0.001) as well as in the multivariate analysis (OR=2.95;[1.82;4.78]; p=0.001). Although studies have been conducted in different cities, common outcomes related to marital status was identified.

The result of this relationship in adults was not different, as marital status also was related with the excessive weight. This fact was also similar in a cross-sectional study with adults in the northern area of Brazil, [12] which found that men who had a partner (p <0.001) had a higher prevalence

rate of EW compared to those who did not have a partner (RP = 1.88 [1.49; 2.37]). In another survey among adults in Teresina, Piauí, Brazil, those who had a stable union showed excessive weight: 44.8% (p=0.014) of women, as well as 54.8% among men (p = 0.0008).[13]

Another marker associated with excessive weight was the variable "children", which showed significant association in the univariate analysis (OR = 1.82; [1.21;2.73];p = 0.004) and multivariate analysis (OR=1.58;[1.03- 2.43]; p <0.036). The association between having children and excessive weight can be explained because, during pregnancy, the women have weight gain and many of them show difficulty losing the kilograms acquired during this period.

This fact was demonstrated in a study that analyzed weight retention after childbirth. It showed that the frequency of women with a level of weight retention considered excessive during the postpartum period was high, reaching 15%, [14] which was also observed in international research. [15] However, as demonstrated in the initial model of this study, gender was not associated with EW, individually. This finding should be investigated more accurately in future studies, forecasting the possible relationship between gender and children.

The change in marital status favors weight gain, but it will ne subject to other individual characteristics related to each person. It appears that the context of marriage and the arrival of children, or the opposite, may influence weight gain due to changes in social behavior linked to self-image, gender and family discussion on the subject, mainly due to marriage at such a young age. This aspect was identified in a study on couples' relationships in New York, which addressed the importance of social differences in the relationship of the body weight of couples, especially regarding the level of satisfaction with weight, and social comparison processes.[16] Another study on teachers of state schools in the municipality of Jequié, Bahia, Brazil, with a prevalence of overweight or obesity, found it to be elevated among those who were married or in a stable relationship.[17]

Despite the evidence that having a partner and having children exposes young adults to EW, the final the model only partially explained the outcome in question. As seen, EW is not limited to the individual, but it is linked to the family and social system as a whole, and therefore needs to be treated as multi-determined condition. It is necessary to expand the discussions to the totality of the person's relationships in EW, also considering the contextual vulnerabilities. Including the family in the treatment of obesity, not as a source of support, but as the primary agent of change, may possibly result in better long-term results.

The markers used herein may be employed by health professionals to improve their actions, directing health education practice. Among these professionals, the nurse stands out as an educator because of his/her formation, and he/she may intervene in a planned and systematic manner on the needs of the people under his/her care. A specific group that deserves attention is the young adult student, who benefits from health promotion practices performed by nurses in the School Health Program. In order to have effectiveness in relation to changing habits in this type of program, it is necessary to use epidemiological data for the action focused on interventions, including referral to other professionals when necessary, and teamwork.

Sociodemographic data related to EW, also provides a warning for a reflection on the family planning performed by nurses, so that this is not restricted to only reproductive issues, but also involves guidance on lifestyle. With marriage and the arrival of children, the reorganization of this new process of life is necessary, which was shown to influence EW. As this may have dysfunction of several types, this condition should be minimized or avoided with health promotion activities at any stage of life.

The limitations of this study include the impossibility of a stratified sampling, and consequently a non-probability sampling was used. The cross-sectional nature of this study also limits the longitudinal inferences. However, the model used in this study confirms the existence of socio-demographic markers related to excessive weight.

Conclusion

Excessive weight is significantly associated with marital status and having children and young adult students who have partners and children are vulnerable to excessive weight. However, the model used here indicates that other markers are also associated with their nutritional status, confirming the health situation as multifactorial and determined/conditioned by different issues, whether individual, social or related to health services. It is believed that the model in question indicates that other markers can lead to EW, and that questions about family dynamics, including markers of these dimensions should be investigated.

Acknowledgements

Collaborations

Florêncio RS, Santiago JCS, Moreira TMM and Freitas TC contributed with study design, analysis, data interpretation, article writing, and relevant critical review of the intellectual content and final approval of the version to be published.

References

1. Pêgo-Fernandes PM, Bibas BJ, Deboni M. Obesity: the greatest epidemic of the 21st century? Sao Paulo Med J. 2011; 129(5):283-4.

2. Oliveira LC, West LE, Araújo EA, Brito JS, Nascimento Sobrinho CL. Prevalência de adiposidade abdominal em adultos de São Francisco do Conde, Bahia, Brasil, 2010. Epidemiol Serv Saúde. 2015; 24(1):135-44.

3. Mazzoccante RP, Moraes JF, Campbell CS. Gastos públicos diretos com a obesidade e doenças associadas no Brasil. Rev Ciênc Med. 2012; 21(1/6):25-34.

4. Dias AM, Ornelas C, Akiba T. As causas e as causas das causas da obesidade. Arq Ciênc Saúde 2010; 17(3):154-60.

5. Carvalho IS, Moreira TM, Silva DB, Florêncio RS, Rodrigues MT, Santiago JC. Prevenção de cronicidades: análise do risco cardiovascular em escolares adultos jovens de um município do Nordeste brasileiro. In: Gomes IL, Pinto FJ, Figueiredo SV. Temáticas de dissertações no âmbito da Saúde Pública: concepção de orientadores e estudantes , organizadores. Fortaleza: Eduece; 2014. cap.16. p. 309-32.

6. Gomes EB, Moreira TM, Pereira HC, Sales IB, Lima FE, Freitas CH, et al. Fatores de risco cardiovascular em adultos jovens de um município do Nordeste brasileiro. Rev Bras Enferm. 2012; 65(4):597-600.

7. Santiago JC, Moreira TM, Florêncio RS. Associação entre excesso de peso e características de adultos jovens escolares: subsídio ao cuidado de enfermagem. Rev Lat Am Enfermagem. 2015; 23(2):250-8.

8. Tamers SL, Okechukwu C, Allen J, Yang M, Stoddard A, Tucker-Seeley R, Sorensen G. Are social relationships a healthy influence on obesogenic behaviors among racially/ethnically diverse and socio-economically disadvantaged residents? Prevent Med. 2013; 56(1):70-4.

9. Oliveira GM, Martins WA. O preço da obesidade. Rev Bras Cardiol. 2013; 26(4):238-40.

10. Ayres JR, Calazans GJ, Saletti Filho HC, França-Junior I. Risco, vulnerabilidade e práticas de prevenção e promoção da saúde. In: Campos, GWS. et al. organizador. Tratado de saúde coletiva. 2a ed. São Paulo: Hucitec, 2012. cap. 12. p.375-417.

11. Soares DA, Barreto SM. Sobrepeso e obesidade abdominal em adultos quilombolas, Bahia, Brasil. Cad Saúde Pública. 2014; 30(2):341-54.

12. Lino MZ, 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 Pública. 2011; 27(4):797-810.

13. Holanda LG, Carvalho e Martins MC, Souza Filho MD, Carvalho CM, Assis RC, Leal LM, et al. Excesso de peso e adiposidade central em adultos de Teresina-PI. Rev Assoc Med Bras. 2011; 57(1):50-5.

14. Vasconcelos CM, Costa FS, Almeida PC, Araújo Júnior E, Sampaio HA. Fatores de risco associados à retenção de peso seis meses após o parto. Rev Bras Ginecol Obstet. 2014; 36(5):222-27.

15. Althuizen E, van Poppel MN, de Vries JH, Siedell JC, van Mechelen W. Postpartum behaviour as predictor of weight change from before pregnancy to one year postpartum. BMC Public Health. 2011; 11:165.

16. Bove CF, Sobal J. Body weight relationships in early marriage. Weight relevance, weight comparisons, and weight talk. Appetite. 2011; 57(3):729-42.

17. Rocha SV, Cardoso JP, Santos CA, Munaro HL, Vasconcelos LR, Petroski EL. Overweight/obesity in teachers: prevalence and associated factors. Rev Bras Cineantropom Desempenho Hum. 2015; 17(4):450-9.