

Frequency of consumption of fruits, vegetables and soft drinks: a comparative study among adolescents in urban and rural areas

Frequência de consumo de frutas, hortaliças e refrigerantes: estudo comparativo entre adolescentes residentes em área urbana e rural

Iza Cristina de Vasconcelos Martins Xavier^I, Carla Menêses Hardman^{II},
Maria Laura Siqueira de Souza Andrade^{III}, Mauro Virgilio Gomes de Barros^{I,III}

ABSTRACT: *Objective:* To compare the frequency of consumption of fruits, vegetables and soft drinks among adolescents living in urban and rural areas of Pernambuco State. *Methods:* A cross-sectional study based on secondary analysis of data from a representative sample of high school students in Pernambuco (n = 4,207, 14 – 19 years) was conducted. Data were collected through a previously validated questionnaire. Adolescents who reported a daily consumption of soft drinks and occasional consumption of fruits, juices and vegetables were classified as exposed to inadequate standard of consumption of these foods. The independent variable was the place of residence (urban/rural). Data were analyzed by frequency distribution, χ^2 test and binary logistic regression. *Results:* It was observed that students residing in rural areas had a higher prevalence of occasional consumption of natural fruit juices (37.6%; 95%CI 36.1 – 39.0) than those living in urban areas (32.1%; 95%CI 30.7 – 33.6). The proportion of students exposed to daily consumption of soft drinks was higher among those who reported they lived in urban areas (65.0%; 95%CI 63.5 – 66.4) compared to those who reported living in rural areas (55.3%; 95%CI 53.8 – 56.9). *Conclusion:* Adolescent students living in rural areas had a higher prevalence of low consumption of natural fruit juices while those residing in urban areas had a higher prevalence of daily consumption of soda drinks.

Keywords: Food consumption. Adolescent. Urban population. Rural population. Epidemiology. Brazil.

^IPostgraduation Program of Hebiatria of the *Universidade de Pernambuco* – Camaragibe (PE), Brazil.

^{II}Postgraduation Program in Physical Education of the *Universidade Federal de Santa Catarina* – Florianópolis (SC), Brazil.

^{III}Associated Program to the Postgraduation Program of Physical Education of the *Universidade de Pernambuco/Universidade Federal da Paraíba* – Recife (PE), Brazil.

Corresponding author: Carla Menêses Hardman. Campus Hospital Universitário Oswaldo Cruz/Escola Superior de Educação Física. Rua Amóbio Marques, 310, Santo Amaro, CEP: 50100-130, Recife, PE, Brazil. E-mail: carlinhams@gmail.com

Conflict of interests: nothing to declare – **Financing source:** This study was supported by the CNPq for financial aid the research project (process 486023/2006-0) and productivity scholarship research (process 307415/2010-4). FACEPE and CAPES for grants study resources and costing for the project development.

RESUMO: *Objetivo:* Comparar a frequência de consumo de frutas, hortaliças e refrigerantes entre adolescentes residentes na área urbana e rural do Estado de Pernambuco. *Métodos:* Estudo transversal baseado na análise secundária de dados de uma amostra representativa dos estudantes do ensino médio em Pernambuco (n = 4.207, 14 – 19 anos). Os dados foram coletados através de um questionário previamente validado. Os adolescentes que relataram um consumo diário de refrigerantes e consumo ocasional de frutas, sucos naturais de frutas e hortaliças foram classificados como expostos a um padrão inadequado de consumo desses alimentos. A variável independente foi o local de residência (urbana/rural). Os dados foram analisados através de distribuição de frequências, Teste do χ^2 e regressão logística binária. *Resultados:* Observou-se que os estudantes residentes em área rural (37,6%; IC95% 36,1 – 39,0) apresentaram uma maior prevalência de consumo ocasional de suco de frutas em comparação aos residentes em urbana (32,1%; IC95% 30,7 – 33,6). A proporção de estudantes expostos ao consumo diário de refrigerantes foi maior entre aqueles que residiam na área urbana (65,0%; IC95% 63,5 – 66,4) em comparação aos da área rural (55,3%; IC95% 53,8 – 56,9). *Conclusão:* Estudantes adolescentes residentes em área rural apresentaram maior prevalência de exposição a baixo consumo de sucos de frutas, enquanto aqueles residentes em área urbana apresentaram maior prevalência de exposição a consumo diário de refrigerantes.

Palavras-chave: Consumo de alimentos. Adolescente. População urbana. População rural. Epidemiologia. Brasil.

INTRODUCTION

The frequency of food consumption is associated with several socioeconomic, demographic, personal and environmental factors, such as gender, age, economic status, place of residence, nutritional knowledge, attitudes, self-efficacy, perceived barriers, family size and structure^{1,2}. Daily consumption of healthy food such as fruit and vegetables, is related to the availability, accessibility, cost, and quality of the food³⁻⁵.

International and national studies suggest that dietary patterns may differ between populations in urban and rural areas due, greatly, to the particular phenomena of each region⁶⁻⁹, such as, for example, the fact that the population residing in rural areas have lower level of education and income^{1,8}. Furthermore, people residing in rural areas may face some challenges that impact on health, such as social isolation and limited access to transportation, installations and health services¹⁰. Moreover, the dietary habits of the urban population present a considerable reduction in household consumption of food which require longer preparation time, such as rice, beans and roasted potatoes⁶.

Changes in the eating habits of the urban and rural population have been observed in national and international surveys which focus on population in general^{6,8}. In the Household Budget Survey (HBS) 2008 – 2009⁶, it was observed, in the urban area, a tendency to decreasing intake of fruit and vegetables and an increase in the daily consumption of food with high sugar and fat quantities, such as soft drinks, bread, beer, pizza and filled cookies, while in

rural population there was a tendency to increasing the intake of grains and fish. A study carried out in Cameroon (Africa) by Dapi et al.⁸, with teenagers (12 – 15 years of age), identified that the frequency of meat, vegetables, cereals, milk and food with low nutritional value consumption was significantly higher among those living in urban areas than in adolescents living in rural areas.

Adopting healthy eating habits in childhood and adolescence is important, considering that these are critical periods of growth and development¹¹. Studies indicate that eating habits acquired and consolidated in these phases tend to be kept throughout adulthood^{12,13}. However, it is noticeable that adolescence is also a period which tends to the development of effective interventions in the promotion of healthier eating habits¹⁴. This makes the increase of consumption of healthy foods in childhood and adolescence an important public health issue¹.

Although dietary patterns are known to vary according to the socioeconomic status and to the geographic region⁶, little is known about the eating behaviors of children and adolescents living in rural and urban areas in the Northeast of Brazil. Assessing the dietary intake by place of residence is an important strategy to better know the nutritional status of the population and to make possible the planning of appropriate intervention programs. Given the above, the present study aimed at comparing the frequency of food consumption among high school teenagers from urban and rural areas of the state of Pernambuco.

METHODOLOGY

This study resulted from a cross-sectional epidemiological survey, school based and statewide, entitled “Lifestyle and health risk behaviors in high school students in the State of Pernambuco”, developed by the Research Group of Lifestyles and Health of the Universidade de Pernambuco. The study protocol was approved, in 2005, by the Ethics Committee of Human Research of the Hospital Agamemnon Magalhães de Recife (PE), Brazil, and all the ethical principles contained in the Declaration of Helsinki were observed throughout the conducting of the study.

The target population was limited to students from state public high school, aged from 14 to 19 years of age. Considering all the administrative regions (federal, state, municipal and private), students enrolled in state public schools represented, at the time of the survey (2006), approximately 80% of all high school students throughout the state. The dimensions of the sample were determined in order to meet the various objectives of the project, covering the determination of the exposure prevalence to various behavioral and biological risk factors to health.

In order to calculate the size of the sample, the following criteria were followed: estimated population around 353 thousand students; 95% confidence interval (95%CI); tolerable sampling error of 3 percentage points; estimated prevalence of 50%; effect of the

sample delineation at 4 times the minimum size of the sample. Based on these parameters, the size of the sample was estimated at 4,217 subjects. Considering the analytical component of this study, it was calculated, afterwards, that the achieved sample size would allow detecting as significant *odds ratios* (OR) of 1.2 or higher, to be examined: prevalence of the outcomes between 32 and 65% in the exposed ones and between 28 and 67% in the unexposed ones; statistical power of 80%; 95%CI.

It was tried to ensure that the selected sample represented the target population, considering its distribution according to geographic region, period of enrollment (day and night) and size of schools (small, with fewer than 200 students; medium, with 200 to 499 students; and large, with 500 students or more). Students enrolled in the morning and afternoon periods were grouped into a single category (daytime students). The regional distribution was observed by the number of existing schools in each of the 17 Regional Offices of Education in the State.

For the selection of the sample, it was used a procedure of cluster sampling in two stages, the "school" and the "class" representing, respectively, the sample units in the first and second stage. All state public schools offering the regular high school course were eligible to be included in the study. In the first stage, it was adopted, as a stratification criterion, the proportional distribution of schools in each micro-region of the state according to their size. In the second stage, it was considered the distribution of classes in the selected schools by period (day and night) as a criterion to draw those in which the questionnaires were to be applied. All students enrolled in the selected classes were invited to participate in the study. The draws were conducted by random number generation using the Epi Info 6.04d software (Centers for Disease Control and Prevention, Atlanta, United States).

The questionnaire used for data collection was an adapted version of the Global School-based Student Health Survey (GSHS), proposed and developed by the World Health Organization (WHO) along with other international institutions (available at <http://www.who.int/chp/GSHS/en/>). The questionnaire was developed as a tool for the assessment of the exposure to health risk behaviors in adolescence and it consists of ten modules: personal information; alcohol and drug consumption; eating habits; hygiene; feelings and relationships; physical activity; behavior in school; sexual behavior; smoking; and violence. In this study, the sociodemographic and behavioral variables were analyzed.

Data collection was conducted, in the period from April to October 2006, by a previously trained team, composed of six graduate students in Hebiatria in the Universidade de Pernambuco, following a standardized protocol for data collection. Initially, a pilot study was conducted in a municipal school of Recife. The data revealed that the instrument has good test-retest consistency of measures and validity of content. The validity of the content was verified by the consulting of three experts (researchers with experience in conducting epidemiologic researches focused on health behaviors), performed during the pilot period. The reproducibility indicators (test-retest consistency of measures) were from moderate to high in most items of the instrument, and the concordance coefficient (kappa coefficient) varied from 0,52 to 1.00.

Self-reported information on the consumption of fruit, natural fruit juice, vegetables and soft drinks were determined by analyzing the frequency of usual food consumption, considering the following answers referring to the last 30 days: did not consume, < once a day, once a day, twice a day, 3 times a day and four times a day or more. Teenagers who reported a daily consumption of soft drinks and occasional consumption (< once a day) of fruit, natural fruit juice and vegetables were classified as exposed to inadequate pattern of consumption of these foods. This dichotomizing strategy was also adopted by Peltzer e Pengpid¹⁵, Cavalcanti et al.¹⁶ and Tassitano et al.¹⁷.

In the same way, the place of residence was self-reported by the teenagers, being this variable classified into two categories (urban or rural). The intervening variables were gender, age (14 – 16 years, 17 – 19 years of age) and maternal education (low: ≤ 8 years; average: 9 – 11 years; and high: ≥ 12 years of education), also used in previous studies^{4,9,18}.

The procedure for data tabulation was performed on a database of the EpiData software (version 3.1). For the analyzes, the SPSS software (version 10) was used, employing procedures of descriptive statistics (relative and absolute frequency distributions). In the bivariate analysis, the study resorted to the application of the χ^2 test. This procedure was used to compare the prevalence of inadequate consumption of fruit, vegetables, natural fruit juice and soft drinks (dependent variables) by place of residence (independent variable).

Association analysis between the independent variable and the dependent variables were conducted by using separately for each of the dependent variables, logistic regression. Initially, raw analysis were conducted and, in the sequence, multivariable ones, which were conducted in order to control potential confounder factors (gender, age, maternal education). In all tests, the adopted level of statistical significance was less than 0.05.

RESULTS

From all students between 14 and 19 years of age, present in the randomly selected classes back in the occasion of the visit for data collection (4,269), 55 of them refused to participate and 7 questionnaires were excluded because of incomplete and unconscious data. The final sample consisted of 4,207 teenagers (59.8% female) enrolled in 76 schools in 44 municipalities in Pernambuco. Most students (58%) were aged between 17 to 19 (average 16.8 + 1.4 years of age). About 4 out of every 5 students were living in urban areas (78.9%), 78% did not have a job and 57.5% were studying in the daytime.

In Table 1, the sociodemographic characteristics of the sample by place of residence were presented. Among the variables analyzed in this study, with the exception of maternal education (6.1%), the rate of unanswered questions did not exceed 1.5%.

In relation to food intake, it was observed that 62.9% (95%CI 61.4 – 64.4) of the adolescents were exposed to daily consumption of soft drinks. It was also found that about 1 out of 3 adolescents do not consume fruit, or do it less often than once a day (33.3%; 95%CI 31.9 – 34.8), natural fruit juice (33.2%; 95%CI 31.8 – 34.7) and vegetables (36.3%; 95%CI 34.8 – 37.8).

In the bivariate analysis, it was found that the place of residence was associated to inadequate intake of natural fruit juice ($p = 0.002$) and soft drinks ($p < 0.001$), but it was not associated to fruit intake ($p = 0.387$) and vegetables ($p = 0.565$). It was observed that the prevalence of occasional consumption of natural fruit juice was higher among teenagers living in rural areas when compared to those of the urban area. However, the proportion of adolescents exposed to inappropriate consumption of soft drinks was statistically lower among students who reported residing in rural areas in comparison to the ones from the urban side (Figure 1).

This result remained virtually unchanged, even after the adjustment for potential confounders (gender, age, and maternal education). The chance of exposure to occasional consumption of natural fruit juice was 21% greater among adolescents who reported residing in the rural area in comparison to those who reported living in the urban one. However, the chance of exposure to daily soft drink consumption was 32% lower among students who live in rural areas when compared to those living in urban ones (Table 2).

DISCUSSION

The results revealed that the prevalence of occasional consumption of natural fruit juice was higher among adolescents living in rural areas when compared to those living in urban

Table 1. Sociodemographic characteristics of the sample ($n = 4,207$) by place of residence.

Variable	Urban		Rural	
	n	%	n	%
Gender [#]				
Male	1,311	39.8	367	41.8
Female	1,983	60.2	510	58.2
Age (years)				
14 – 16	1,423	43.1	334	37.9
17 – 19	1,876	56.9	547	62.1
Occupation status ^α				
Does not work	2,593	79.0	665	76.3
Works	688	21.0	206	23.7
Maternal education ^β				
≤ 8	2,124	68.4	723	87.8
9 – 11	763	24.	6	8.
≥ 12	218	7.0	34	4.1
Period ^γ				
Daytime (morning/afternoon)	1,891	57.4	508	57.7
Evening	1,405	42.6	372	42.3

Data missing: [#]n= 9; ^αn=28; ^βn=256; ^γn= 4.

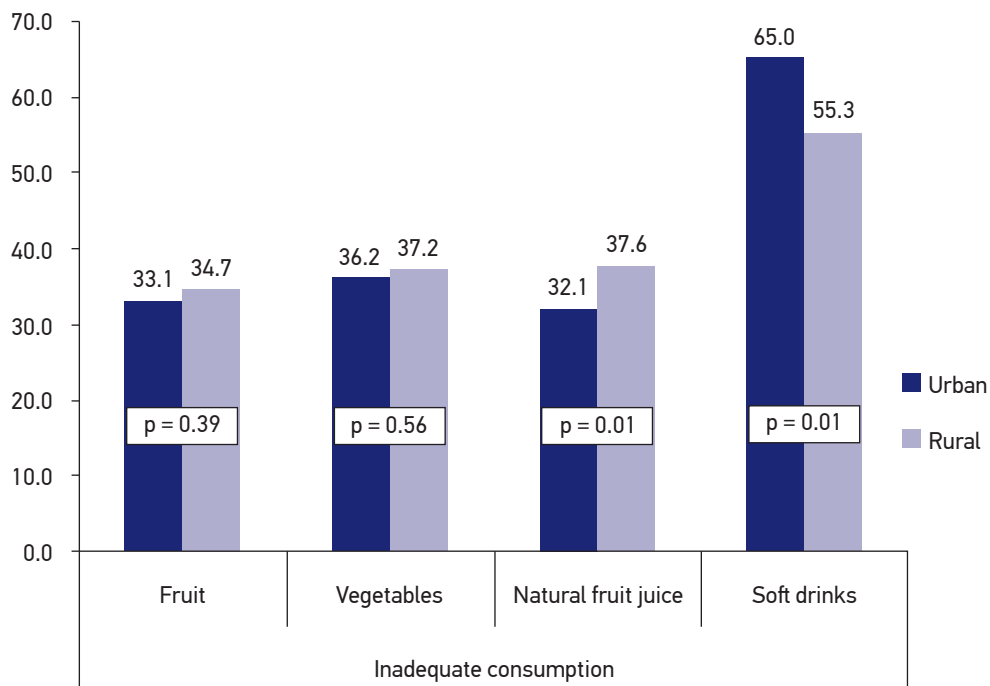


Figure 1. Prevalence of occasional consumption of fruit, vegetables, natural fruit juice and daily consumption of soft drinks by place of residence.

Table 2. Binary logistic regression to estimate the association between place of residence and inadequate consumption of fruit, vegetables, natural fruit juice and soft drinks on adolescents.

Variable	Inadequate food consumption			
	Raw OR (95%CI)	p-value	Adjusted OR * (95%CI)	p-value
Outcome: occasional fruit consumption				
Urban	1		1	
Rural	1.07 (0.92 – 1.25)	0.387	1.07 (0.90 – 1.26)	0.444
Outcome: occasional vegetable consumption				
Urban	1		1	
Rural	1.05 (0.90 – 1.22)	0.565	1.04 (0.88 – 1.22)	0.626
Outcome: occasional natural fruit juice consumption				
Urban	1		1	
Rural	1.27 (1.09 – 1.48)	0.003	1.21 (1.03 – 1.43)	0.023
Outcome: daily soft drink consumption				
Urban	1		1	
Rural	0.67 (0.57 – 0.78)	< 0.001	0.68 (0.58 – 0.80)	< 0.001

*Adjusted Odds Ratio by gender, age and maternal education.

area. However, the proportion of adolescents exposed to daily consumption of soft drinks was significantly higher among students who reported residing in the urban area.

A study conducted by Mendes and Catão¹⁹, with teenagers (10 to 16 years of age) enrolled in two public schools of Formiga (MG), indicated a greater percentage of adequate consumption of fruit and vegetables among students who live in the urban area when compared to those living in rural areas. According to these authors, these data can be explained by the greater availability and accessibility of such food in urban areas. A recent research conducted by Suliburska et al.²⁰ indicated that the youngsters from the urban area choose fruit and vegetables as their preferred food more often. Differences in eating habits of these teenagers may also be caused by economic and educational factors²¹.

In this study, it was found that the place of residence was directly associated to the inadequate consumption of natural fruit juice and soft drinks, considering two contrasting dietary indicators. The juice is healthier, but the preparation is time consuming. Also, some fruit are expensive and require suitable hygiene prior to its consumption. On the other hand, soft drinks are cheaper, practical and have a longer expiration date. In the present study, as mentioned, it was observed a higher consumption of soft drinks among adolescents residing in urban areas, a result which converges with those reported in a survey carried out by Colic-Barić et al.²², with Croatian schoolchildren ranging from 8 to 16 years of age, and with the study by Shi et al.²³, with Chinese students from 12 to 14 years of age.

A recent survey conducted by Estima et al.²⁴ with adolescents (14 and 17 years of age) from a technical school in the metropolitan region of São Paulo, revealed an elevated consumption of processed fruit juice (38.1%), followed by ordinary soft drinks (28.6%), in detriment of other drinks such as natural fruit juice (22.2%) and water (9.5%) . The authors mention that the main reason given for the consumption of soda was the flavor. In addition to that, cultural and environmental factors, such as family and friends influence on food choice and where this food is consumed (home, school, work) were other reasons which explained this elevated consumption. Andrade et al.²⁵ found that food consumption among teenagers in the city of Rio de Janeiro was characterized by an elevated intake of food of poor nutritional value and high caloric content, like the industrialized ones (soft drinks, cookies, chocolate, ice cream), indicating high energy density for the total energy consumption.

It is important to pinpoint that the sample of this study included only adolescents enrolled in the state's public high school, which limits the extrapolation of results to all adolescents of Pernambuco. Also, it was not possible to analyze if the frequency of consumption of other food was associated to the place of residence, due to methodological boundaries set during yet the planning of the study. However, the study presents positive aspects, with particular emphasis on the range (statewide) and on the sample size, sufficient to ensure prevalence estimates with reasonable accuracy. Moreover, as far as it is known, this is the first survey in the Northeast of the country to present differences in the frequency of food consumption among teenagers in rural and urban areas.

The data indicated in this study are noteworthy, because it was found that there is less consumption of natural fruit juice among adolescents, in detriment to an increase in the consumption of

soft drinks. Given these findings, it is suggested the implementation of informative actions in order to raise awareness among parents, teenagers, teachers, managers and the public sector as to the importance of consuming fruit, natural fruit juice and vegetables and low intake of soft drinks in order to adopt healthy eating habits. Besides that, strategies for nutrition education in the school environment could provide improvement in the students' eating habits, since most teenagers spend a considerable amount of time in this environment. This scenario evidences the importance of government initiatives to invest in public programs, such as the National School Feeding Program (*Programa Nacional de Alimentação Escolar*).

CONCLUSION

Given the results presented, it can be concluded that the prevalence of occasional consumption of natural fruit juice was statistically higher among adolescents living in rural areas when compared to those living in urban area. The proportion of adolescents exposed to daily consumption of soft drinks was significantly higher among students who reported residing in the urban area.

This study provides the diagnosis of an unexplored reality and points out to the need for broader proportions research, which can help building an integrated policy of care, at municipal and state levels, for adolescents and their families, living in rural and urban areas. In future researches, the comparison between place of residence with other food and food groups may add new evidence to the available body of knowledge. Information on the location and the motives of consumption may help control the commercialization of industrialized beverages in schools.

The proposition for further researches, considering the size of the portions used in relation to the intake recommendations of these food in comparison to adolescent dietary intake by place of residence, will also be of great value in order to better adjust future interventions for the most vulnerable groups. Furthermore, it is suggested to analyze personal factors (taste preferences) and environmental (availability, accessibility, cost, cultural norms and quality of food) that may influence food intake in adolescents living in urban and rural areas, as identified in studies previous¹⁻⁵.

REFERENCES

1. Rasmussen M, Krølner R, Klepp KI, Lytle L, Brug J, Bere E, et al. Determinants of fruit and vegetable consumption among children and adolescents: a review of the literature. Part I: quantitative studies. *Int J Behav Nutr Phys Act* 2006; 3: 22.
2. Bonomo E, Caiaffa WT, César CC, Lopes ACS, Lima-Costa ME. Consumo alimentar da população adulta segundo perfil socioeconômico e demográfico: Projeto Bambuí. *Cad Saúde Pública* 2003; 19(5): 1461-71.
3. Johnson JS, Nobmann ED, Asay E. Factors related to fruit, vegetable and traditional food consumption which may affect health among Alaska Native People in Western Alaska. *Int J Circumpolar Health* 2012; 71: 1-8.
4. Niclasen B, Rasmussen M, Borup I, Schnohr C. The intake of fruit and sweets in rural and urban Greenland - development from 1994 to 2006. *Int J Circumpolar Health* 2011; 70(2): 186-94.

5. Cummins S, Smith DM, Taylor M, Dawson J, Marshall D, Sparks L, et al. Variations in fresh fruit and vegetable quality by store type, urban-rural setting and neighbourhood deprivation in Scotland. *Public Health Nutr* 2009; 12(11): 2044-50.
6. Instituto Brasileiro de Geografia e Estatística (IBGE). POF 2008-2009: mais de 90% da população comem poucas frutas, legumes e verduras. 2011. Disponível em: http://www.ibge.gov.br/home/presidencia/noticias/noticia_visualiza.php?id_noticia=1937&id_pagina=1. (Acessado em: 18 de maio de 2012).
7. Coelho AB, Aguiar DRD, Fernandes EA. Padrão de consumo de alimentos no Brasil. *Rev Econ Sociol Rural* 2009; 47(2): 335-62.
8. Dapi LN, Nouedoui C, Janlert U, Haglin L. Adolescents' food habits and nutritional status in urban and rural areas in Cameroon, Africa. *Scand J Nutr* 2005; 49(4): 151-58.
9. Mazengo MC, Simell O, Lukmanji Z, Shirima R, Karveti RL. Food consumption in rural and urban Tanzania. *Acta Trop* 1997; 68(3): 313-26.
10. Australian Institute of Health and Welfare. Rural, regional and remote health: Indicators of health status and determinants of health. Rural Health Série n. 9. Canberra: Australian Institute of Health and Welfare; 2008.
11. Neutzling MB, Assunção MCF, Malcon MC, Hallal PC, Menezes AMB. Hábitos alimentares de escolares adolescentes de Pelotas, Brasil. *Rev Nutr* 2010; 23(3): 379-88.
12. Ness AR, Maynard M, Frankel S, Davey S G, Frobisher C, Leary SD. Diet in childhood and adult cardiovascular and all cause mortality: the Boyd Orr cohort. *Heart* 2005; 91(7): 894-98.
13. Mikkilä V, Räsänen L, Raitakari OT, Pietinen P, Viikari J. Longitudinal changes in diet from childhood into adulthood with respect to risk of cardiovascular diseases: The Cardiovascular Risk in Young Finns Study. *Eur J Clin Nutr* 2004; 58(7): 1038-45.
14. Madruga SW, Araújo CLP, Bertoldi AD, Neutzling MB. Manutenção dos padrões alimentares da infância à adolescência. *Rev Saúde Pública* 2012; 46(2): 376-86.
15. Peltzer K, Pengpid S. Fruits and vegetables consumption and associated factors among in-school adolescents in seven African countries. *Int J Public Health* 2010; 55(6): 669-78.
16. Cavalcanti CBS, Barros MVG, Meneses AL, Santos CM, Azevedo AMP, Guimarães FJSP. Obesidade abdominal em adolescentes: prevalência e associação com atividade física e hábitos alimentares. *Arq Bras Cardiol* 2010; 94(3): 371-77.
17. Tassitano RM, Barros MVG, Tenório MCM, Bezerra J, Hallal PC. Prevalência e fatores associados ao sobrepeso e à obesidade em adolescentes, estudantes de escolas de Ensino Médio de Pernambuco, Brasil. *Cad Saúde Pública* 2009; 25(12): 2639-52.
18. Jaime PC, Monteiro CA. Fruit and vegetable intake by Brazilian adults, 2003. *Cad Saúde Pública* 2005; 21 Suppl: 19-24.
19. Mendes KL, Catão LP. Avaliação do consumo de frutas, legumes e verduras por adolescentes de Formiga – MG e sua relação com fatores socioeconômicos. *Alim Nutr* 2010; 21(2): 291-96.
20. Suliburska J, Bogdański P, Pupek-Musialik D, Glód-Nawrocka M, Krauss, H., Piątek, J. Analysis of lifestyle of young adults in the rural and urban areas. *Ann Agr Environ Med* 2012; 19(1): 135-9.
21. Oyhenart EE, Castro LE, Forte LM, Sicre ML, Quintero FA, Luis MA, et al. Socioenvironmental conditions and nutritional status in urban and rural schoolchildren. *Am J Hum Biol* 2008; 20(4): 399-405.
22. Colić-Barić I, Kajfež R, Satalić Z, Cvjetić S. Comparison of dietary habits in the urban and rural Croatian schoolchildren. *Eur J Nutr* 2004; 43(3): 169-74.
23. Shi Z, Lien N, Kumar BN, Holmboe-Ottesen G. Socio-demographic differences in food habits and preferences of school adolescents in Jiangsu Province, China. *Eur J Clin Nutr* 2005; 59(12): 1439-48.
24. Estima CCP, Philippi ST, Araki EL, Leal GVS, Martinez MF, Alvarenga MS. Consumo de bebidas e refrigerantes por adolescentes de uma escola pública. *Rev Paul Pediatr* 2011; 29(1): 41-5.
25. Andrade RG, Pereira RA, Sichieri R. Consumo alimentar de adolescentes com e sem sobrepeso do Município do Rio de Janeiro. *Cad Saúde Pública* 2003; 19(5): 1485-95.

Received on: 07/30/2012

Final version presented on: 10/12/2012

Accepted on: 01/15/2013