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Factors associated withconsumptionof fruits and vegetables by teenagers in Penha, Brazil

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ABSTRACT. Food is essential for the promotion of health and the low intake of fruits and vegetables (FV) is a risk factor for chronic non-communicable diseases. Current descriptive and cross-sectional study evaluated the consumption of FVby teenagers in Penha, Santa Catarina State, Brazil, and its relation to nutritional and socioeconomic status. The study involved 361 adolescents who were assessed through a self-administered questionnaire featuring demographic and socioeconomic variables. Body Mass Index was applied to assess nutritional status coupled to a Food Frequency Questionnaire for Adolescents for the consumption of FV. The sum of the responses was compared to the recommendations of the World Health Organization (>400 g day^{-1}), ranking them as adequate or inadequate. Results showed the prevalence of males (51%), adherence to physical activity (71%) and eutrophy (65%). Nonetheless, only 32% met the minimum recommendations of FV daily consumption which revealed an inverse association with the consumption of soft drinks. Taking snacks at school makes most teenagers consume less FV. Although no association between the consumption of FV, nutritional and socioeconomic status was found, the consumption of FV is below the recommendations.

Keywords: adolescence, socioeconomic factors, food consumption.

Fatores associados ao consumo de frutas e hortaliças em adolescentes no município de Penha, Brasil

RESUMO. A alimentação é primordial para a promoção da saúde, e a baixa ingestão de frutas e hortaliças (FH) é fator de risco para as doenças crônicas não transmissíveis. Esse estudo objetivou avaliar o consumo de FH por adolescentes do município de Penha, Estado de Santa Catarina, Brasil, e sua relação com o perfil nutricional e socioeconômico. Trata-se de um estudo transversal e descritivo com 361 adolescentes avaliados por meio de um questionário auto-aplicável com variáveis demográficas e socioeconômicas. Para avaliar o estado nutricional foi aplicado o Índice de Massa Corporal e para o consumo de FH um Questionário de Frequência Alimentar para Adolescentes, onde se realizou somatória das respostas e comparação às recomendações da Organização Mundial da Saúde (> 400$gdia^{-1}$), classificando como adequadas e inadequadas. Os resultados mostram prevalência do sexo masculino (51%), adesão à prática de atividade física (71%) e eutrofia (65%). Todavia, somente 32% atenderam as recomendações mínimas do consumo diário de FH, apresentando associação inversa ao consumo de refrigerantes. Nota-se que, ao levar lanches para a escola, a maioria dos adolescentes tende a consumir menos FH. Embora não houvesse associação entre o consumo de FH, estado nutricional e condições socioeconômicas dos adolescentes, foi possível observar que este consumo está aquém das recomendações.

Palavras-chave: adolescentes, fatores socioeconômicos, consumo de alimentos.

Introduction

Adolescence, the period between 10 and 19 years of age, is characterized by intense transformations, especially physical, caused by growth and structural maturation of the different organs and tissues. Although teenagers´ nutritional needs and nutrient intake recommendations are well known, it has been observed that adolescents are subject to deviations in the consumption of several nutritional sources. They may be predisposed towards the consequences, either by depletion or by excess of nutrients important to the organism (ANDRADE et al., 2013; CIAMPO; CIAMPO, 2014).

Increasing consumption of semi-prepared food (due to practicality), food consumed outside home, sociocultural values and socioeconomic conditions among the factors that interfere in the nutrition during this period of life, may be highlighted, besides the influence of the social media and corporal perception (SANTOS et al., 2012;

BEZERRA et al., 2013; RUSSEL; BUHRAU, 2015). Thus, the nutritional demand may result in inadequate eating habits with important repercussions on health (CIAMPO; CIAMPO, 2014).

The adequate consumption of fruits and vegetables (FV) is an essential part of the diet for daily nutritional needs. Since vegetables are a source of nutrients, phytochemicals, diet fibers and low lipids, enhancing their antioxidant capacity, the health benefits from the regular consumption of FV are associated with a lower risk of chronic non-communicable diseases (CNCD), such as cardiovascular diseases, cancer, diabetes mellitus Type II, obesity and the risk of multimorbidities (RUEL et al., 2014; BRESCIANI et al., 2015).

In this context, the World Health Organization recommends the daily intake of 400 g of FV, equivalent to 5 portions of 80 g each (WHO, 2004; NOSA et al., 2013). In its Food Guide for Brazilian Population, the Brazilian Ministry of Health recommends the consumption of three portions of food and two to three portions of vegetables, or 400 g a day, emphasizing the importance of diversifying the consumption of these foods during meals (BRASIL, 2008).

The daily consumption of FV all over the world is still below the recommended levels (REKHY; McCONCHIE, 2014). Among Brazilians the intake of these foods is also low. The Household Budget Survey (HBS) conduced in 2008 and 2009 identified insufficient consumption of fruits and vegetables (< 400 g daily) in more than 90% of the Brazilian population. Corroborating these data, the telephone-based Surveillance of Risk and Protective Factors for Chronic Disease (VIGITEL) found that only 18.9% of Brazilians consume five or more daily servings of FV (BRASIL, 2011a and b).

In the state of Santa Catarina, Brazil, research on the dietary intake of adolescents is scarce, particularly on the specific information with regard to FV consumption (COSTA et al., 2012).

Current study aims at evaluating the consumption of fruits and vegetables of adolescents in Penha, Santa Catarina State, Brazil, and its relation to the nutritional status and socioeconomic conditions.

Material and methods

The descriptive cross-sectional study was conducted in Penha, a town in the southern State of Santa Catarina, Brazil, with students enrolled in the 5th to 9th grade of primary schools. In the first half of 2012, Penha had 13 educational institutions, with 838 students enrolled. A pilot study was conducted on a randomly selected school to evaluate the questionnaire to be applied but data were excluded from the sample due to the restructuring of the questionnaire.

The questionnaire was self-applied and included the following items: identification, lifestyle, nutritional status, socioeconomic status, and consumption of fruits and vegetables (FV). Family income was determined according to the educational level of the head of household, while possessions were assessed according to the Economic Classification Criterion Brazil (OSCC) established by the Brazilian Association of Research Companies – ABEP (2010).

To assess the nutritional status of the adolescents, weight (kg) and height (m) were taken to calculate the Body Mass Index (BMI). Classification of teenagers was undertaken with Anthro Plus, following score-Z proposed by WHO (2007).

FV consumption was estimated by Food Frequency Questionnaire for Adolescents (FFQA), adapted from Slater and collaborators, containing 35 foods, with 16 fruits and 19 vegetables. The frequency of ingestion of these foods was evaluated as follows: less than once a month, three times per month, once a week, two to four times a week, once a day, twice or more times a day. Frequency of intake was grouped into: monthly, weekly and daily, for further statistical analysis (SLATER et al., 2003).

The responses that indicated the daily ingestion of each food were summed to verify whether FV consumption complied with the recommendations of WHO (2004). The classification of FV consumption was considered appropriate for the sum ≥ 400 g and inappropriate for < 400 g (WHO, 2004).

Participation was voluntary and the Informed Consent Form (ICF) was signed by the teenagers´ parents or guardians. The study was also approved by the Committee for Ethics in Research of UNIVALI, under Protocol 570/11 complying with Resolution no. 196/96.

Microsoft Office Excel 2010 and EpiInfo 6.0.4 were usedfor statistical analysis. Averages and standard deviations were calculatedto describe the quantitative variables. Categorical variables were described by their absolute (n) and relative (%)frequencies. The association between categorical variables was tested using Pearson's chi-square test. Differences were considered significant at $p<0.05$ (KIRKWOOD; STERNE, 1988).

Results and discussion

The study sample consisted of 361 adolescents, with a predominance of males (51%); mean age was

12 years, with a minimum age of 10 years and maximum age of 18 years.

The socio-demographic characteristics investigated such as gender, age, income and education of head of household showed no statistically significant association when related to the consumption of fruits and vegetables (FV) of the teenagers (Table 1).

When evaluating the genders, or rather, 51% males and 49% females, there were similarities in FV consumption. As for income and low schooling of the head of household, there was no direct relation to teenagers´ consumption of FV. In contrast, a study on 812 adolescents found that there was an association between income, low education of head of household and FV intake (BIGIO et al., 2011). Similarly, Valmorbida and Vitolo (2014) evaluated 388 pre-school children and reported that low socioeconomic level and low parent schooling were negatively associated with the consumption of fruits and vegetables. The same report showed consumption lower than a daily portion of FV, which represented biological and social vulnerability. Therefore, income is one of the main obstacles for the increase of FV consumption in the diet (HOUGH; SOSA, 2015) and, according to Bihan et al. (2012), subgroups of low income consume less FV when compared to those with a higher income.

In Chapecó, Santa Catarina State, Brazil, a transversal study with adolescents assisted by social projects showed that the consumption of fruits and vegetables was lower than the recommended rate, characterized by a situation worsened by the distorted perception of the quality of consumption and by social vulnerability (TEO et al., 2014).

The social and environmental influence is important within the scope of food and nutrition, and is directly related to eating habits. Another relevant constraint is the effect of economic cycles that show more and more a picture of food insecurity and illness (GILL, 2015).

Several studies point out that the socioeconomic aspects and healthy life habits, such as the practice of physical activities and low intake of fast food, are closely connected to the regular intake of FV. Further, the variety of FV is also connected to financial difficulties (RAMALHO et al., 2012; CONKLIN et al., 2014; HOUGH; SOSA, 2015).

Assessing the nutritional status, 65% of the adolescents were eutrophic (Table 1). Corroborating current study, Braga et al. (2007) showed that the high prevalence of eutrophy in 86% of the adolescents. These findings are similar to those by Coutinho et al. (2007), in which 81% of adolescents had normal weight. In the same way, Barbosa et al. (2010) evaluated students from the eighth and ninth grades of a municipal school and found that 81% of males and 74% of females were eutrophic.

Although the predominance of eutrophy is a positive result since it reveals a good physiological development, it must be highlighted that the study showed a high percentage of overweight/obesity (35%), acknowledged as a major risk for cardiovascular diseases. Although the clinical manifestations of these diseases occur at maturity, studies have shown that co-morbidities such as dyslipidemia, hypertension and insulin resistance may be present in childhood and adolescence. In fact, they are responsible for the increased risk of morbidity and mortality in adulthood, besides promoting social and psychological problems (COBAYASHI et al., 2010; GILL, 2015; HOUGH; SOSA, 2015).

Although genetic factors predispose the development of obesity, environmental and behavioral factors, such as lack of physical activity, increased time spent in watching television and increased consumptionof fast foods, are strong

Table 1. Socio-demographic characteristics and classification of nutritional status according to adequacy of fruits and vegetables intake by adolescents.

Variables	Total		< 400 g		≥ 400 g		p⋆
	n	%	n	%	N	%	
Gender							
Male	185	51	112	61	73	39	0.873
Female	176	49	108	61	68	39	
Age							
10 – 12	239	34	147	62	92	38	0.758
≥ 13	122	66	73	60	49	40	
Socio-economical Classification							
A and B	197	55	126	64	71	36	0.198
C and D	164	45	94	57	70	43	
Schooling of head of household (years)							
≥ 8	252	70	155	62	97	38	0.737
< 8	109	30	65	60	44	40	
Nutritional Status							
Slimness/Eutrophy	233	65	135	58	98	42	0.115
Overweight/Obesity	128	35	85	66	43	34	

⋆Chi-squared test

determinants of its growth (REY-LÓPEZ et al., 2008; RAMALHO et al., 2012; VALMORBIDA; VITOLO, 2014; REKHY; McCONCHIE, 2014; HOUGH; SOSA, 2015).

When evaluating physical activity outside school, it was found that most of the teenagers (71%) do physical activity (Table 1). According to Wanderley et al. (2009), physically active individuals are healthier and tend to develop lower mortality rates from chronic non-communicable diseases (NCDs). Contrastingly, frequently young people adopt a lifestyle in which most of their free time is spent watching television, using computers and playing video games (WANDERLEY et al., 2009).

Changes in lifestyle of adolescents lead to frequent replacement of lunch and/or dinner for snacks, probably due to factors such as lack of time, convenience, social media influence and preference for flavor, combined with the habit of eating away from home and consumption of increasing food portions (ENES; SLATER, 2010; TORAL et al., 2009; VARGAS et al., 2011). The number of meals by adolescents is directly related to traditions, socioeconomic and educational level of the family, classmates and even the media (CAMPANA et al., 2009).

Although there is no significant association between the number of meals and daily FV consumption, 60% of the adolescents reported that they had four or fewer meals a day. These rates are much lower than current dietary recommendations for the Brazilian population (BRASIL, 2008; PHILIPPI, 2008).

The non-fractioning of meals may trigger problems from prolonged fasting; in other words, the individual is more prone to gastritis or to having bulky meals to 'compensate' the fast. The habit of replacing nutritional meals by snacks featuring high energy density but low nutritional valueis increasingly common among teenagers, compromising energy balance and leading to overweight (LEAL et al., 2010).

Assessment of water intake by adolescents revealed that it was lower than that recommended by the Food Guide for the Brazilian Population (BRASIL, 2008). In contrast, the intake of soft drinks was high, showing an inverse relationship to the consumption of FV ($p = 0.043$).

High consumption of soft drinks has been touted as one of the possible factors related to weight gain in several countries. The consumption of sugar-sweetened beverages as a major contributor to the epidemic of overweight and obesity in children and adolescents has been heavily debated (ENES; SLATER, 2010; MOREIRA et al., 2010).

The trend for increase in the consumption of soft drinks and other processed products with high caloric density and little nutritional value has recently been observed in low-income families attended to by the Brazilian government´s assistance program called "BolsaFamília" (Family Pocket Money) (SEGALL-CORRÊA; SALLES-COSTA, 2008).

Current analysis also investigated the intake of sweets, snacks and fried foods and discovered that most adolescents (96; 91; 87% respectively) consume these foods (Table 2). It seems that by taking snacks to school, most teenagers tend to consume less FV ($p = 0.073$).

Table 2. Eating habits and food consumption of fruits and vegetables by adolescents.

Variables	Total		< 400g		≥ 400 g		
	n	%	n	%	n	%	p⋆
Meals day^{-1}							
≤ 4	217	60	131	60	86	40	0.784
> 4	144	40	89	62	55	38	
Water intake							
< 6	238	66	147	62	91	38	0.656
≥ 6	123	34	73	59	50	41	
Soft drinks intake							
Yes	350	97	216	62	134	38	0.043
No	10	3	3	30	7	70	
Sweets intake							
Yes	346	96	209	60	137	40	0.407
No	14	4	10	71	4	29	
Snacks intake							
Yes	327	91	197	60	130	40	0.471
No	33	9	22	67	11	33	
Fried food intake							
Yes	314	87	192	61	122	39	0.750
No	46	13	27	59	19	41	
Snack at school							
Yes	101	28	69	68	32	32	0.073
No	260	72	151	58	109	42	
Practice of physical activity							
Yes	255	71	149	58	106	42	0.129
No	106	29	71	67	35	33	

⋆Chi-square test

Adolescents´ food intake is characterized by excessive consumption of soft drinks, sugar and junk foods, an expression used to indicate foods which have high rates of saturated fat, sugar, cholesterol and/or salt, and little or no amount of micronutrients, and thus a reduction in the intake of FV. Since many teenagers consume this type of food every day, eating disorders and low intake of micronutrients are predominant (VITOLO, 2008; TORAL et al., 2007).

Table 3 shows FV are consumed by adolescents at least once a day. Results demonstrate low consumption and little variety in the choice of FV, underscoring that only 8 among the 35 options available in the food survey (FFQA) were reported by respondents. Regarding distributionby gender, boys reported higher consumption for all food, except for tomato (22%), when compared to girls.

Table 3. Distribution of teenagers according to gender and consumption of fruits and vegetables.

Food Group	Male		Female		Total	
	n	%	n	%	n	%
Fruits						
Banana	71	38	55	31	126	35
Orange/Tangerine	47	25	40	23	87	24
Apple/Pear	49	26	35	20	84	23
Guava	36	19	22	13	58	16
Vegetables						
Tomato	41	22	41	23	82	23
Lettuce	42	23	39	22	81	22
Cucumber	28	15	19	11	47	13
Corn	24	13	20	11	44	12

Results show that a small sectionof adolescents under analysis meets the minimum recommendations (400 g) of FV daily intake set by WHO (2004), or rather, adequate consumption was prevalent in 32% (n=141). The estimates of this study were consistent with other studies that showed insufficient intake of FV by Brazilians (FIGUEIREDO et al., 2008; PALMA et al., 2009; VIEBIG et al., 2009; CAMPOS et al., 2010; MENDES, CATÃO, 2010; MONDINI et al., 2010; SAMPAIO, 2010; MONTICELLI et al., 2013).

Conclusion

It was not possible in current studyto observe anyassociation between consumption of fruits and vegetables (FV), nutritional status and socioeconomic conditions since consumption of FV was below recommendations. However, there was an inverse association between FV and soft drinks intake.

As for the nutritional state, most adolescents are eutrophics. Nonetheless, it is important to note that the study evinced high overweight/obesity rates. Weight excess is a major risk factor for chronic non-communicable diseases, especially in adult life.

Further research is suggested to assess the consumption of FV by adolescents as well as other factors associated to it. It is urgent to promote increased consumption of these foods by implementing educational programs and health promotion in schools and among the population. Encouraging teenagers to eat more FV is betting on a healthier future and ensure the best choice of food; otherwise, the excess of unhealthy foods will remain a feature of modern society.

References

ANDRADE, M. L. R.; BRITO, M. C. C.; FREITAS, C. A. S. L. Planejamento familiar: um recurso estratégico à maternidade responsável de adolescentes primíparas. **Sanare**, v. 12, n. 1, p. 27-32, 2013.

ABEP-Associação Brasileira de Empresas de Pesquisa. **Critério de classificação econômica Brasil, 2014**. Available from: <http://www.abep.org/codigos-e-guias-da-abep>. Access on: July 6, 2015.

BARBOSA, A. P. G.; WAIHRICH, M. E. M.; MATTOS, K. M.; PEREIRA, A. D. A. Adolescentes: uma análise nutricional. **Disciplinarum Scientia**, v. 11, n. 1, p. 61-70, 2010.

BEZERRA, I. N.; SOUZA, A. M.; PEREIRA, R. A.; SICHIERI, R. Consumo de alimentos fora do domicílio no Brasil. **Revista de Saúde Pública**, v. 47, n. 1, p. 1-11, 2013.

BIGIO, R. S.; VERLY JUNIOR, E.; CASTRO, M. A.; CÉSAR, C. L. G.; FISBERG, R. M.; MARCHIONI, D. M. L. Determinantes do consumo de frutas e hortaliças em adolescentes por regressão quantílica. **Revista de Saúde Pública**, v. 45, n. 3, p. 448-456, 2011.

BIHAN, H.; MÉJEAN, C.; CASTETBON, K.; FAURE, H.; DUCROS, V.; SEDEAUD, A.; GALAN, P.; LE CLÉSIAU, H.; PÉNEAU, S.; HERCBERG, S. Impact of fruit and vegetable vouchers and dietary advice on fruit and vegetable intake in a low-income population. **European Journal of Clinical Nutrition**, v. 66, n. 3, p. 369-75, 2012.

BRAGA, P. D.; MOLINA, M. C. B.; CADE, N. V. Expectativas de adolescentes em relação a mudanças do perfil nutricional. **Ciência & Saúde Coletiva**, v. 12, n. 5, p. 1221-1228, 2007.

BRASIL. Ministério da Saúde. Guia alimentar para a população brasileira: promovendo a alimentação saudável. Série A. **Normas e manuais técnicos**. Brasília: Ministério da Saúde, 2008.

BRASIL. Ministério da Saúde. Instituto Brasileiro de Geografia e Estatística. **Pesquisa de orçamentos familiares 2008-2009**: análise do consumo alimentar pessoal no Brasil. Rio de Janeiro: IBGE, 2011a.

BRASIL. Ministério da Saúde. **VIGITEL Brasil 2010**: vigilância de fatores de risco e proteção para doenças crônicas por inquérito telefônico. Brasília: Ministério da Saúde, 2011b. (Série G. Estatística e Informação em Saúde).

BRESCIANI, L.; CALANI, L.; COSSU, M.; MENA, P.; SAYEGH, M.; RAY, S.; RIO, D. D. (Poly)phenolic characterization of three food supplements containing 36 different fruits, vegetables and berries. **Pharma Nutrition**, v. 3, n. 2, p. 11-19, 2015.

CAMPANA, E. M. G.; BRANDÃO, A. A.; POZZAN, R.; FRANÇA, M. R.; FONSECA, F. L.; PIZZI, O. L.; MAGALHÃES, M. E. C.; FREITAS, E. V. de; BRANDÃO, A. P. Pressão arterial em jovens como marcador de risco cardiovascular: estudo do Rio de Janeiro. **Arquivos Brasileiros de Cardiologia**, v. 93, n. 6, p. 657-665, 2009.

CAMPOS, V. C.; BASTOS, J. L.; GAUCHE, H.; BOING, A. F.; ASSIS, M. A. A. Fatores associados ao consumo de frutas, legumes e verduras em adultos de Florianópolis. **Revista Brasileira de Epidemiologia**, v. 13, n. 2, p. 352-362, 2010.

CIAMPO, L. A. D.; CIAMPO, I. R. L. D. A importância do zinco para a saúde do adolescente. **Adolescência & Saúde**, v. 11, n. 2, p. 80-86, 2014.

COBAYASHI, F.; OLIVEIRA, F. L. C.; ESCRIVÃO, M. A. M. S.; SILVEIRA, D.; TADDEI, J. A. A. C. Obesidade e fatores de risco cardiovascular em adolescentes de escolas públicas. **Arquivos Brasileiros de Cardiologia**, v. 95, n. 2, p. 200-206, 2010.

CONKLIN, A. I.; FOROUHI, N. G.; SUHRCKE, M.; SURTEES, P.; WAREHAM, N. J.; MONSIVAIS, P. Variety more than quantity of fruit and vegetable intake varies by socioeconomic status and financial hardship. Findings from older adults in the EPIC cohort. **Appetite**, v. 83, p. 248-255, 2014.

COSTA, L. C. F.; VASCONCELOS, F. A. G.; CORSO, A. C. T. Fatores associados ao consumo adequado de frutas e hortaliças em escolares de Santa Catarina, Brasil. **Cadernos de Saúde Pública**, v. 28, n. 6, p. 1133-1142, 2012.

COUTINHO, N. M. P.; VALÕES, E. M.; LACERDA, N. C.; MENEZES, D. M. Avaliação nutricional e consumo de alimentos entre adolescentes de risco. **Revista da Rede de Enfermagem do Nordeste**, v. 8, n. 3, p. 9-16, 2007.

ENES, C. C.; SLATER, B. Obesidade na adolescência e seus principais fatores determinantes. **Revista Brasileira de Epidemiologia**, v. 13, n. 1, p. 163-171, 2010.

FIGUEIREDO, I. C. R.; JAIME, P. C.; MONTEIRO, C. A. Fatores associados ao consumo de frutas, legumes e verduras em adultos da cidade de São Paulo. **Revista de Saúde Pública**, v. 42, n. 5, p. 777-785, 2008.

GILL, T. Introduction: an overview of the key drivers of obesity and their influence on diet. In GILL, T. (Ed.). **Managing and preventing obesity**: Behavioural factors and dietary interventions. Cambridge: Woodhead Publishing, 2015. p. 1-14.

HOUGH, G.; SOSA, M. Food choice in low income populations – a review.**Food Quality and Preference**, v. 40, p. 334-342, 2015.

KIRKWOOD, B. R.; STERNE, J. A. C. **Essentials of medical statistics**. Oxford: Blackwell; 1988.

LEAL, G. V. S.; PHILIPPI, S. T.; MATSUDO, S. M. M.; TOASSA, E. C. Food intake and meal patterns of adolescents, São Paulo, Brazil. **Revista Brasileira de Epidemiologia**,v. 13, n. 3, p. 457-67, 2010.

MENDES, K. L.; CATÃO, L. P. Avaliação do consumo de frutas, legumes e verduras por adolescentes de Formiga-MG e sua relação com fatores socioeconômicos. **Alimentos e Nutrição**, v. 21, n. 2, p. 291-296, 2010.

MONDINI, L.; MORAES, A. S.; FREITAS, I. C. M.; GIMENO, S. G. A. Consumo de frutas e hortaliças por adultos em Ribeirão Preto, SP. **Revista de Saúde Pública**, v. 44, n. 4, p. 686-694, 2010.

MONTICELLI, F. D. B.; SOUZA, J. M. P.; SOUZA, S. B. Consumo de frutas, legumes e verduras por escolares adolescentes. **Journal of Human Growth and Development**, v. 23, n. 3, p. 1-7, 2013.

MOREIRA, P.; SANTOS, S.; PADRÃO, P.; CORDEIRO, T.; BESSA, M.; VALENTE, H.; BARROS, R.; TEIXEIRA, V.; MITCHELL, V.; LOPES, C.; MOREIRA, A. Food patterns according to sociodemographics, physical activity, sleeping and obesity in portuguese children. **International Journal of Environmental Research and Public Health**, v. 7, n. 3, p. 1121-1138, 2010.

NOSA, M.; ROBERTS, G.; RAJ, S.; BELL, C. **Niue**: NCD risk factors STEPs report. Manila: World Health Organization; Western Pacific Region, 2013.

PALMA, R. F. M.; BARBIERI, P.; DAMIÃO, R.; POLETTO, J.; CHAIM, R.; GIMENO, S. G.; FERREIRA, S. R. G.; SARTORELLI, D. S. Fatores associados ao consumo de frutas, verduras e legumes em Nipo-Brasileiros. **Revista Brasileira de Epidemiologia**, v. 12, n. 3, p. 436-445, 2009.

PHILIPPI, S. T. Alimentação saudável e a pirâmide dos alimentos. In: PHILIPPI, S. T. (Ed.). **Pirâmide dos alimentos**: fundamentos básicos da nutrição. São Paulo: Manole, 2008. p. 02-29.

RAMALHO, A. A.; DALAMARIA, T.; SOUZA, O. F. Consumo regular de frutas e hortaliças por estudantes universitários em Rio Branco, Acre, Brasil: prevalência e fatores associados. **Cadernos de Saúde Pública**, v. 28, n. 7, p. 1405-1413, 2012.

REKHY, R.; McCONCHIE, R. Promoting consumption of fruit and vegetables for better health. Have campaigns delivered on the goals? **Appetite**, v. 79, n. 1, p. 113-123, 2014.

REY-LÓPEZ, J. P.; VICENTE-RODRÍGUEZ, G.; BIOSCA, M.; MORENO, L. A. Sedentary behavior and obesity development in children and adolescents. **Nutrition, Metabolism & Cardiovascular Diseases**, v. 18, n. 3, p. 242-251, 2008.

RUEL, G.; SHI, Z.; ZHEN, S.; ZUO, H.; KRÖGER, E.; SIROIS, C.; LÉVESQUE, J-F.; TAYLOR, A. W. Association between nutrition and the evolution of multimorbidity: The importance of fruits and vegetables and whole grain products. **Clinical Nutrition**, v. 33, n. 3, p. 513-520, 2014.

RUSSELL, C. A.; BUHRAU, D. The role of television viewing and direct experience in predicting adolescents' beliefs about the health risks of fast-food consumption. **Appetite**, v. 92, p. 200-206, 2015.

SANTOS, C. C.; RESSEL, L. B.; ALVES, C. N.; WILHELM, L. A.; STUMM, K. E.; SILVA, S. C. A influência da cultura no comportamento alimentar dos adolescentes: uma revisão integrativa das produções em saúde. **Adolescência & Saúde**, v. 9, n. 4, p. 37-43, 2012.

SAMPAIO, H. A. C.; SABRY, M. O. D.; DINIZ, D. B.; SÁ, M. L. B.; CASTRO, S. M. V.; FEIJÃO, I. E. P.; BEZERRA, S. R. Consumo de frutas e hortaliças por indivíduos atendidos pelo programa saúde da família na periferia da cidade de Fortaleza-Ceará. **Revista de Atenção Primária à Saúde**, v. 13, n. 2, p. 175-181, 2010.

SEGALL-CORRÊA, A. M.; SALLES-COSTA, R. Novas possibilidades de alimentação a caminho? **Democracia Viva**, n. 39, p. 68-73, 2008.

SLATER, B.; FISBERG, R. M.; PHILIPPI, S. T.; LATORRE, M. R. O. Validation of a semi-quantitative adolescents food frequency questionnaire applies at a

public school in São Paulo, Brazil. **European Journal of Clinical Nutrition**, v. 57, n. 5, p. 629-635, 2003.

TEO, C. R. P. A.; TAGLIETTI, R. L.; BAPTISTA, F.; MENEGHINI, V. M. Atitude e prática no consumo de frutas e hortaliças entre adolescentes em vulnerabilidade social. **Scientia Medica**, v. 24, n. 3, p. 237-244, 2014.

TORAL, N.; CONTI, M. A.; SLATER, B. Healthy eating according to teenagers: perceptions, barriers, and expected characteristics of teaching materials. **Cadernos de Saúde Pública**, v. 25, n. 11, p. 2386-2394, 2009.

TORAL, N.; SLATER, B.; SILVA, M. V. Consumo alimentar e excesso de peso de adolescentes de Piracicaba. São Paulo. **Revista de Nutrição**, v. 20, n. 5, p. 449-459, 2007.

VALMORBIDA, J. L.; VITOLO, M. R. Factors associated with low consumption of fruits and vegetables by preschoolers of low socio-economic level. **Jornal de Pediatria**, v. 90, n. 5, p. 464-471, 2014.

VARGAS, I. C.; SICHIERI, R.; SANDRE-PEREIRA, G.; DA VEIGA, G. V. Evaluation of an obesity prevention program in adolescents of public schools. **Revista de Saúde Pública**, v. 45, n. 1, p. 59-68, 2011.

VIEBIG, R. F.; PASTOR-VALERO, M.; SCAZUFCA, M.; MENEZES, R. P. Consumo de frutas e hortaliças por idosos de baixa renda na cidade de São Paulo. **Revista de Saúde Pública**, v. 43, n. 5, p. 806-813, 2009.

VITOLO, M. R. **Fatores determinantes para o excesso de peso em crianças e adolescentes**. In: VITOLO, M. R., CAMPAGNOLO, P. D. B. Nutrição: da gestação ao envelhecimento. Rio de Janeiro: Rubio, 2008. p. 339-345.

WANDERLEY, J. E. S.; CEZAR, E. H. A.; GUIMARÃES, M. R. M. Perfil antropométrico e consumo dietético de adolescentes do ensino médio de uma escola pública federal. **Revista Brasileira em Promoção à Saúde**, v. 22, n. 1, p. 09-15, 2009.

WHO-World Health Organization**. Global strategy**: on diet, physical activity and health. Geneva: WHO, 2004.

WHO-World Health Organization. **Growth reference data for 5 - 19 years**. Geneva: WHO, 2007.

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