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Food containing added sugar: frequency of consumption and preference among Brazilian university student

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Abstract
Cross-sectional study to analyze the frequency of consumption and preference for processed foods containing added sugar among university students in southeastern Brazil. Data were collected through a questionnaire (SurveyMonkey®), distributed by e-mail to all students currently enrolled in classroom courses, which assessed the frequency of consumption and preference level of twenty-one types of processed foods containing added sugar. All the listed foods were widely available in the consumer market. Frequency of consumption was measured on a scale from 1 to 8 points ('Never' to 'Three times a day') and level of preference on a scale from 0 to 5 points ('I don't like it' to 'I like it a lot'), with a total score of 168 and 105 points, respectively. Correlation between the two was calculated based on the Spearman Correlation Coefficient, and variance in terms of r^2. Among 3,665 valid questionnaires, there was a significant positive correlation between frequency of consumption and preference for foods with added sugar ($r = 0.448$, $p < 0.001$). Level of preference explained 22% of variance in frequency of consumption ($r^2 = 0.22$). As preference level increases, frequency of consumption tends to be higher, making highly palatable foods a risk to health.

Keywords: sugars, dietary sugars, dietary sucrose, food preference, feeding behavior

1. Introduction

The behavioral and cultural values of any population are reflected in its patterns of food consumption, which in turn comprise various dietary habits [1]. One dietary characteristic of significant importance is food taste, with the preference for sugar, for example, considered to be innate/intrinsic [2].

Recent decades have seen several changes in consumption patterns worldwide, largely due to the strong presence of the food industry and associated media support, involving the introduction of foods developed to recreate and accentuate tastes found in nature [3, 4, 5]. Such foods are characterized by high percentages of sugar, salt and fat added during processing, all of which can have a considerable impact on the final taste of the product. Typical examples include beverages such as milk, soda and processed juices, as well as morning cereals, cookies, cakes, bread, cereal bars, and granola [6].

Accounting for regional, social and cultural differences, sugar is found in the human daily diet in many forms. The word 'sugar' more accurately includes the wide variety of intrinsic sugars available, such as those found in fruits, vegetables and milk; free sugars, which may be monosaccharide or disaccharide, and which are added to foods by both industrial producers and final consumers; and also, the sugars that are found naturally in high concentrations in honey, syrup and fruit juices. However, the term 'sugar' is more often used to refer to white sugar, which is not generally inherent in food but is rather added during the manufacturing process. This sugar, which may be considered as either intrinsic or added is sucrose, a disaccharide constituted by the monosaccharides glucose and fructose, most commonly extracted from sugar cane or sugar beet [7].

When a diet's composition is balanced and adequate, food consumption has a positive impact on an individual's overall health. In contrast, an unbalanced diet can lead to negative health consequences, and can be considered the causal factor in many different chronic and non-transmissible diseases. Indeed, the high consumption of foods containing added sugar is associated both directly and indirectly with the development of various health issues, with obesity considered the sixth most important factor of mortality in the world. Furthermore, excess sugar consumption is also associated with type 2 diabetes, dyslipidemia, dental caries, poor nutrition and cardiovascular diseases, among other conditions, all of which have a great impact on national health care systems [8, 9].

In 2003, the World Health Organization firmly recommended as a general policy that the consumption of free sugar per person, adult or child, should be limited to a maximum of 40 g/day (15 kg/year), equivalent to 6% - 10% of the total energy consumed daily [1]. In 2015 an even greater reduction in free sugar ingestion to less than 5% of total caloric consumption was suggested as bringing additional benefits to overall health, although this guideline was presented as a special recommendation with the main goal of creating a policy that would stimulate discussion and action plans [9]. Despite this, data from the Brazilian Ministry of Agriculture revealed that in 2009 the

consumption of free sugar was approximately 59.2 kg/year per capita [10]. Similarly, according to the United States Department of Agriculture (USDA), the amount of free sugar consumed in the U.S. is currently about 64 kg/year per capita [7].

Added sugar is considered by the American Food and Drugs Administration as a safe product for consumption, being 'generally recognized as safe' (GRAS) [11]. However, this is effectively pseudo-safety, because added sugar consumption is associated with many health issues [1]. This discrepancy is compounded by the liberty of exhibition that the media possess regarding products containing sugar, which can have a considerable effect on consumer choice.

Indeed, increasing levels of obesity, non-transmissible chronic diseases and possible sugar addiction have prompted suggestions from specialists that the advertising of such foods is a contributive factor in making healthy choices even harder, especially for children [12].

Considering the above, the present study aimed to estimate the correlation between frequency of consumption and appreciation of processed foods containing added sugar for university students in southeastern Brazil.

2. Materials and Methods

We developed a cross-sectional study focusing on the consumption of sucrose added to processed food.

The sampled population was taken from the 32,000 students regularly enrolled in classroom courses in 2014 at a university in southeastern Brazil.

An estimate of proportion was used to calculate the sample, with a significance of 95% and variance of 5%, using as its basis the pattern of sugar abuse/addiction observed by Rosa of 34% for a total of 415 individuals, including a rate of 20% for possible losses [13]. However, using an online questionnaire, we ultimately selected a convenience sample, including all questionnaires that were fully filled (n=3,665).

Via e-mail, the online questionnaire was sent to all students regularly enrolled in classroom courses at the university, including all information relating to the study and the data to be entered. All students who completed the questionnaire accepted the informed consent form, with the local ethics committee approving the project (CAAE – 19811613.1.0000.5149).

During the questionnaire, all questions had to be answered by responding to a request to advance from one question to the next. Access was limited to one person only (Survey Monkey control) via IP (internet protocol) identification. Questionnaires were sent on 01/27/2014 and remained available until 03/15/2014.

The questionnaire was developed using the Survey Monkey platform and included the following sections: 1) Informed consent form; 2) Definition of responder (age, sex, ethnicity, parents' schooling level, family income, number of persons in family, who you live with); 3) Evaluation of individual consumption frequency for foods containing added sugar; 4) Preference of consumption for the same foods.

For food selection, two tables were developed comprising 21 commercial products that were frequently consumed, and easily available for the sample population in the university canteens. In the first table, each participant provided answers regarding their frequency of consumption on a scale including eight possible responses (never, rarely, once a day, twice a day, three times a day, once in a week, twice in a week or three times in a week). In the second table, participants declared their appreciation for each of the foods, assigning a score from zero to five on a preference scale.

Scores were then calculated for each food item in terms of frequency of consumption, with a possible total ranging from 21 to 168, and preference, ranging from 21 to 105. Subsequent data descriptive analyses included the establishment of any correlation between consumption frequency and preference based on the Spearman's rank correlation coefficient, with proportion of variance as explained by the value of r^2.

3. Results & Discussion

A total of 3,798 answered questionnaires were received, of which 3,665 (96.49%) were validated as complete. Registered losses (3.51%) were related to either interruption before finishing the questionnaire, or invalidation due to possible mistakes in completing the questionnaire.

Respondent mean age was 25.80 years (± 7.67). Among the students, 58.82% declared themselves to be white and 65.62% were women. Parents schooling level revealed 43.24% of mothers and 38.36% of fathers to hold university degrees. Family income ranged from US$ 840.00 to US$ 1,265.00 for 23.32% of the sample, with 48.10% reporting an income above US$ 1,266.00. Among the students, 56.18% were declared as living with their parents, and 93.10% in families with 5 or fewer individuals.

Data regarding the consumption frequency of the selected processed foods containing added sugar are displayed in Table 1, and the preference for these foods in Table 2.

Among foods with a higher consumption frequency (three times a day), those most widely consumed were milk-based beverages (7.60%) and bread (5.68%) (Table 1).

Around 77% of respondents reported the daily consumption (at least once a day) of bread. Milk beverages were consumed daily by 61.40%, followed by cookies (35.60%), yogurt (31.40%), chocolate milk (27.20%), artificial refreshments (24.80%), and sweets (25.54%).

In terms of foods consumed from one to three times a week, chocolate was the most cited (40.34%), followed by sweets (36.26%), cakes (34.30%), soda (33.06%), cookies (28.80%), and ice cream (26.20%).

Foods with the lowest consumption frequency, classified as 'never/rarely', included milkshakes (96.30%), sweet popcorn (96.30%), jam (90.56%), jelly (89.05%), condensed milk (88.24%), and morning cereals (87.70%).

Foods with the highest preference scores (scores of 4 or 5) included chocolate (73.50%), ice cream (67.10%), bread (65.60%), sweets (57.80%), milkshakes (50.23%), cakes (50.16%) and yogurt (50.10%). Less appreciated foods included sweetened refreshments (60.79%), sweet popcorn (60.16%), jelly (46.10%), morning cereals (41.60%), candy (38.70%), granola (36.20%), soda (36.00%), and cereal bars (34.30%) (Table 2).

Sweet popcorn and milkshakes had the lowest frequency of consumption out of all foods listed (96.30% of students declared that they never or rarely consumed these foods) but varied in their proportion of high-preference scores (4-5) at 50.23% and 13.54%, respectively. Whereas milkshakes are less widely available in the university canteens, sweet popcorn can be found in most locations.

Statistical analysis revealed a positive correlation between the two categories, likely reflecting the fact that a higher preference results in greater consumption. However, the r^2

value of 0.22 (Figure 1) indicates that this correlation explains only about 20% of variance, suggesting the presence of other factors affecting consumption patterns.

4. Discussion

The selection of certain food types is affected by many different factors, including not only their nutritional properties, but also social and cultural factors [14]. As a result, an accurate evaluation of food selection is a difficult task, encouraging further study.

Preference, availability, cost and practicality are only some of the factors acting in the selection process of certain foods. Thanks to advances in food technology, the modern-day food industry is able to increase the supply of processed meals to best fit our functional needs, creating products that are widely available, reasonably priced, and ready-to-eat. These foods are also considered hyper-palatable, with their processing carried out to produce a flavor exceeding that of traditional products. The addition of substances such as sugar, fat and salt makes food tastier, leading to greater preference and consequently higher consumption [4]. However, the search for a balanced diet and improved health is now commonplace in both scientific and non-scientific publications and has resulted in the increasing recognition of the low quality of processed foods.

The unbalanced consumption of added sugar is a common risk factor for many chronic and non-communicable diseases. Although this knowledge is widely appreciated the consumption rates of such foods remain extremely high [1, 7, 9, 10]. Furthermore, noncompliance at both the individual and collective level regarding the World Health Organization's recommendation of low daily sugar intake reinforces the importance of establishing the factors responsible for high sugar ingestion [9].

All the foods selected in the present study contain added sugar and are also available as a snack option in the great majority of university cafeterias. Food availability varies due to regional, cultural and temporal factors and acts consequently on food choice. However, the reasonable price of foods due to increasing commercialization must also be considered as an interference factor [14].

Among the twenty-one chosen foods, nine (42.85%) were consumed at least once a day by at least 18.00% of the sample population.

Certain foods such as bread and sweets have a significant cultural tradition in the Brazilian diet. Studies have shown high bread consumption among the Brazilian population, while a significant increase in the consumption of sweets in kg/per capita was recorded in southeastern Brazil, between 2002-2003 and 2008-2009, from 0.65 to 8.84 [10, 15]. In the present study, 77.90% of students declared daily bread consumption, although only 65.60% reported a preference for bread. Sweets, on the other hand, were preferred by 57.80% but were consumed daily by 25.54%. Similarly, high-preference items such as cake (50.16%), chocolate (73.50%) and ice cream (67.10%) were associated with a frequency of consumption of "never or rarely" by 60.00%, 40.30% and 70.45% of respondents, respectively. These data reinforce the notion that preference is not the only factor affecting the consumption frequency of certain foods [16, 17].

Pearson's correlation analysis (r) between the two factors under study (preference and frequency of consumption) produced a value of 0.469, indicating a moderate positive relationship, i.e., high-preference foods are consumed more frequently. Nevertheless, according to the coefficient of determination (r^2), preference explains only approximately 20% of the variability observed in the consumption frequency of the selected added-sugar foods, suggesting the action of additional factors. In addition, the data were obtained from a population associated with good living conditions and with a strong chance of making healthy dietary choices [18].

Considering the above, it is important to assess the marketing and advertising strategies of commercialized food manufacturers, especially given the influence of the media on an individual's food choices. In Brazil, food products account for the largest proportion of TV advertising, and as such the media will likely have a considerable influence on food selection, not only through TV watching but also via internet and cinema use. In addition to this influence, the food industry also uses other strategies to encourage consumption, ranging from product distribution at certain sales points to their promotion by increasing portion sizes in packaging with attractive prices [19, 20].

An unbalanced student diet at school goes against the principles of education and health. Due to the characteristics of our sample population, the obtained consumption frequency and preference results, as well as the confirmed association between added sugar and many health issues all add weight to the hypotheses that sugar can cause addictive or abusive behavior [1, 9, 12, 21]. We therefore recognize the need for a health promotion program at the university regarding the quality of food offered to the students and other cafeteria users.

Considering the presented results, any health promotion program has the potential for success if food preference can be discounted on an individual or social basis. Diet outside the home is characterized by a predominance of high-energy foods of low nutritional content, which, according to Bezerra *et al*. indicates that such consumption must be considered in any future public health programs directed at improving the Brazilian diet [22].

Nevertheless, we believe that the academic community is best positioned to establish healthy dietary conditions within the university environment, by actively participating not only in preparing proposals for change, but also in implementing and especially maintaining the process of improvement in student health. An individual's present and future health depends on several factors related to quality of life, one of which is diet and nutrition. The academic community thus has the potential to become a great ally in the creation and implementation of projects leading to changes in school dietary patterns, helping to create the idea that the healthy choice is the easy choice [19, 23].

Indeed, the responsibility for healthy eating choices cannot be left only in the hands of those who, due to a complexity of factors, are vulnerable to making negative choices. Measures must be considered that reduce the impact of media influence, the freedom of food manufacturers to use healthy-harmful substances and the mislabeling of such foods, as well as the lack of intra-community trade with respect to the sales strategies of these products.

It should be noted that the present study is limited by the low representativeness of the convenience sample used, despite the total number of respondents. A recent study conducted in Brazil at 62 public universities showed that two-thirds of students come from families with an average

monthly income of US$ 450.00, far lower than that of the population surveyed here [24]. This change in the profile of the university population stems from the implementation of public policies that ensure greater access for lower-income students. Considering the importance of income on food choice, the results obtained here cannot be generalized for all students. However, given that its purpose was to correlate consumption frequency and preference for a range of processed foods containing added sugar, the present study can be considered valid for similar groups.

5. Tables and Figures

Table 1: Consumption frequency of processed foods containing added sugar among the students of a southeastern Brazilian university. 2014

Foods	3 times/day		1 or 2 times/day		3 times / week		1 or 2 times / week		Never/ rarely	
	N	%	N	%	N	%	N	%	N	%
Milkshakes	0	0.00	25	0.70	14	0.40	95	2.60	3531	96.30
Sweet popcorn	6	0.20	28	0.80	12	0.30	89	2.40	3530	96.30
Jam	3	0.08	128	3.49	52	1.42	163	4.45	3319	90.56
Jelly	3	0.08	98	2.68	42	1.15	258	7.04	3264	89.05
Condensed milk	9	0.25	47	1.28	33	0.90	342	9.33	3234	88.24
Morning cereals	6	0.16	175	4.77	69	1.87	200	5.50	3215	87.70
Granola	14	0.40	390	10.64	129	3.52	347	9.46	2785	75.98
Ice cream	9	0.24	114	3.11	74	2.02	886	24.18	2582	70.45
Candy	65	1.80	365	9.90	255	7.00	650	17.70	2330	63.60
Cereal bars	15	0.40	450	12.20	196	5.40	460	12.60	2544	69.40
Refreshment beverages	94	2.56	816	22.24	228	6.20	341	9.30	2186	59.70
Artificial Juice	69	1.90	617	16.38	270	7.37	611	16.70	2098	57.20
Chocolate milk	76	2.10	923	25.10	221	6.00	376	10.30	2069	56.50
Cakes	15	0.40	417	11.40	170	4.60	1087	29.70	1976	53.90
Soda	73	2.00	425	11.60	320	8.73	892	24.33	1955	53.34
Yogurt	43	1,2	1108	32,00	368	10,0	654	17,80	1492	40,70
Chocolate	46	1.30	662	18.06	397	10.83	1082	29.51	1478	40.30
Sweets	73	1.99	863	23.55	426	11.60	904	24.66	1399	38.20
Cookies	88	2.40	1219	33.20	343	9.40	709	19.40	1306	35.60
Milk beverages	279	7,60	1971	61,00	312	8,50	308	8,40	795	21,70
Bread	208	5.68	2647	72.22	341	9.30	168	4.60	301	8.20

Table 2: Preference for processed foods containing added sugar among the students of a southeastern Brazilian university. 2014

Foods	Preference scores					
	0-1 Any or Low preference		2-3 Medium preference		4-5 High preference	
	N	%	N	%	N	%
Refreshment beverages	2228	60.79	1054	28.76	383	10.45
Sweet popcorn	2205	60.16	964	26.30	496	13.54
Jam	1690	46.10	1289	35.20	686	18.70
Cereal bars	1258	34.30	1624	44.30	783	21.40
Candy	1419	38.70	1366	37.30	880	24.00
Jelly	1296	35.36	1425	38.88	944	25.76
Granola	1328	36.20	1333	36.40	1004	27.40
Morning cereals	1524	41.60	1100	30.00	1041	28.40
Artificial juices	1077	29.40	1466	40.00	1122	30.60
Soda	1321	36.00	1122	30.60	1222	33.40
Cookies	648	17.68	1578	43.05	1439	39.27
Chocolate milk	963	26.30	1209	33.00	1493	40.70
Condensed Milk	904	24.70	1159	31.60	1602	43.70
Milk beverages	681	18.60	1299	35.40	1685	46.00
Yogurt	525	14.30	1304	35.60	1836	50.10
Cakes	460	12.55	1367	37.29	1838	50.16
Milkshakes	881	24.04	943	25.73	1841	50.23
Sweets	523	14.30	1022	27.90	2120	57.80
Bread	213	5.80	1049	28.60	2403	65.60
Ice cream	347	9.50	858	23.40	2460	67.10
Chocolate	327	8.90	646	17.60	2692	73.50

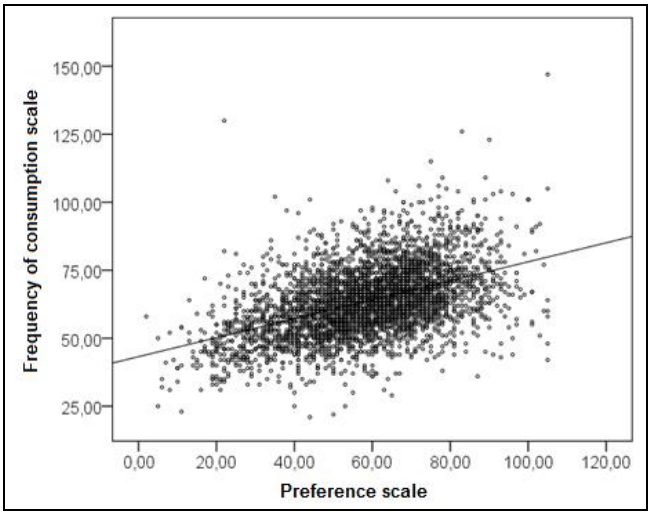

Fig 1: Relationship between frequency of consumption and preference for processed foods containing added sugar among the students of a southeastern Brazilian university. 2014. (r=0.469; $p<0.001$; $r^2=0.22$)

6. Conclusions

The results obtained from the online questionnaire regarding processed foods containing added sugar presented a positive correlation between frequency of consumption and preference. However, food preference is only one factor that should be considered, since this correlation explained only about 20% of data variance.

Further studies are thus required that examine the individual and social aspects of the preference for sugar in order to better understand how the choice of food containing added sugar affects public health.

7. References

1. WHO. World Health Organization. Technical Report Series 916. Diet, nutrition and the prevention of chronic diseases. Report of a Joint WHO/FAO Expert Consultation. Geneva, 2003; 150p. Available on: http://apps.who.int/iris/bitstream/handle/10665/42665/WHO_TRS_916.pdf;jsessionid=8CC92669596F801D614679C7239DF4CF?sequence=1
2. Modaï P, Lowenstein W. Peut-on parler d'addicton alimentaire? Revue de la littérature et discussión clinique. Le Courrier des Addictions, 2013; 15:30-35.
3. Borzekowski DLG, Robinson TN. The 30-Second Effect: An Experiment Revealing the Impact of Television Commercials on Food Preferences of Preschoolers. J Am Diet Assoc. 2001; 101:42-46.
4. Hawkes C. Marketing food to children: the global regulator environment. Marketing food to children. World Health Organization Press. Geneva, 2004; 88p. Available on: http://apps.who.int/iris/bitstream/handle/10665/42937/9241591579.pdf?sequence=1&isAllowed=y
5. Fortuna JL. Sweet preference, sugar addiction and the familial history of alcohol dependence: shared neural pathways and genes. J Psychoactive Drugs. 2010; 42:147-51.
6. Berkey CS, Rockett HR, Field AE, Gillman W, Colditz GA. Sugar-added beverages and adolescent weight change. Obes Res, 2004; 12:778-88.
7. USDA/ERS. United States Department of Agriculture. Economic Research Service. Added sugar and sweeteners. Washington. DC. 2010. Available on: https://www.ers.usda.gov/topics/crops/sugar-sweeteners/
8. WHO. World Health Organization. Obesidad y sobrepeso. Nota descriptiva N° 311, May. 2014. Available on: http://www.who.int/mediacentre/factsheets/fs311/es/
9. WHO. World Health Organization. Guideline: Sugars intake for adults and children. Geneva, 2015. Available on: http://apps.who.int/iris/bitstream/handle/10665/149782/9789241549028_eng.pdf?sequence=1
10. BRASIL. Pesquisa de orçamentos familiares 2008-2009: análise do consumo alimentar pessoal no Brasil / IBGE, Coordenação de Trabalho e Rendimento. - Rio de Janeiro: IBGE, 2011. 150 p. Available on: https://biblioteca.ibge.gov.br/visualizacao/livros/liv50063.pdf
11. United States Food and Drug Administration. Select Committee on GRAS Substances (SCOGS) Opinion: Sucrose. 2015. Available on: http://wayback.archive-it.org/7993/20171031060839/https://www.fda.gov/Food/IngredientsPackagingLabeling/GRAS/SCOGS/ucm260083.htm
12. Rosa MAC, Gomes CMA, Rocha NS, Kessler F, Slavutzky SMB, Ferreira EF, Pechansky F. Dependence module of the MINI plus adapted for sugar dependence: psychometric properties. Psicologia: Reflexão e Crítica 2013; 26:77-86.
13. Rosa MAC, Campos MV, Cardoso AV, Kessler F, Pechansky F, Ferreira EF. Prevalence of sugar dependence in a sample of obese individuals of Porto Alegre, Brazil. Anuario de Investigación en Adicciones 2011; 12:31-36.
14. Popkin BM. Urbanization, liestyle changes and the nutrition transition. World Development. 1999; 27:1905-16.
15. BRASIL. Instituto Brasileiro de Geografia e Estatística. Pesquisa de Orçamentos Familiares 2002-2003: análise da disponibilidade domiciliar de alimentos e do estado nutricional no Brasil. Rio de Janeiro: IBGE, 2004. Available on: https://ww2.ibge.gov.br/home/estatistica/populacao/condicaodevida/pof/2002analise/default_.shtm
16. Monteiro CA, Levy RB, Claro RM, Castro IRR, Cannon G. A new classification of foods based on the extent and purpose of their processing. Cad. Saúde Pública, 2010; 26:2039-2049.
17. Drewnowski A, Menella JA, Johnson SL, Bellisle F. Sweeteness and food preference. J. Nutr. 2012; 142:1142S-1148S.
18. Buss PM. Health promotion and quality of life. Ciênc. Saúde coletiva, 2000; 5:163-77.
19. Fiates GMR, Amboni RDMC, Teixeira E. Consumer behavior, eating habits and television viewing in students from Florianópolis, Brazil. Rev Nutr 2008; 21:105-114.
20. PHE. Public Health England. Sugar Reduction: from evidence into action. Publications gateway number 2015391PDF, 1.16MB, 48 pages. London. 2015. Available on: https://www.gov.uk/government/publications/sugar-reduction-from-evidence-into-action
21. Ahmed SH, Guillem K, Vandaele Y. Sugar addiction: pushing the drug-sugar analogy to the limit. Curr Opin Clin Nutr Metab Care, 2013; 16:434-9.

22. Bezerra IN, Souza AM, Pereira RA, Sichieri R. Consumption of foods away from home in Brazil. Rev. Saúde Pública 2013; 47(supl.1):200s-211s.
23. Barbosa RMS, Colares LGT, Soares EA. Development of food-based dietary guidelines in several countries. Rev. Nutr. 2008; 21:455:67.
24. ANDIFES. Associação Nacional dos Dirigentes das Instituições Federais de Ensino Superior. Classes D and E are majority in Federal Universities. 2016. Available on http://www.andifes.org.br/politicas-de-expansao-e-inclusao-contribuem-para-que-as-classes-d-e-e-sejam-a-maioria-dos-estudantes-das-universidades-federais/