



Nutritional quality of major meals consumed away from home in Brazil and its association with the overall diet quality



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ABSTRACT

Objective. The objective of the study is to evaluate the nutritional quality of meals consumed away from home and its association with overall diet quality.

Method. Data was obtained from 834 participants of a Health Survey in São Paulo, Brazil. Food intake was measured by a 24-hour dietary recall applied telephonically using the Automated Multiple-Pass Method. Overall dietary quality was assessed by the Brazilian Healthy Eating Index Revised (B-HEIR) and the Meal Quality Index (MQI) was used to evaluate dietary quality of the main meals. The association between the B-HEIR and the MQI was assessed by linear regression analysis.

Results. The consumption of at least one of the three main meals away from home was reported for 32% of respondents (70 adolescents, 156 adults and 40 elderly). The average MQI score of lunch consumed away from home was lower than lunch consumed at home, with higher amounts of total and saturated fats. The average score of B-HEIR was 58 points and was associated with the MQI score, energy, meal consumption location and gender.

Conclusion. Lunch consumed away from home presented the worst quality, being higher in total and saturated fat. However, the meals consumed at home also need improvement.

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Introduction

Once considered a problem only in high income countries, overweight and obesity are now sharply on the rise in low and middle income countries, particularly in urban settings (Popkin, 2001). Modern societies seem to be converging on a diet high in saturated fats, sugar, and refined products and low in fiber rich-foods (Popkin and Gordon-Larsen, 2004).

The increased food consumption away from home has been pointed as one of the causes for the obesity epidemic (Abreu et al, 2005; Bes-Rastrollo et al, 2010; Lin et al, 1999; Kant and Graubard, 2004; Kearney et al, 2001; Ziegler et al, 2006). In Brazil, for example, the food service market grew from 7.5 million meals served in 1998 to 16.5 million meals served in 2011 (ABERC, 2012). Some cross-sectional and longitudinal studies have shown an association between food consumption away from home and the frequency of eating out, and weight gain (Befort et al, 2006; Satia et al, 2004; Schmidt et al, 2005). The high energy density of foods eaten away from home is a possible explanation for this association (Schroder et al, 2007).

While previous studies have suggested a negative influence of away from home food consumption on obesity among all age groups, no previous research in Brazil has explored the direct effect of the quality of meals consumed away from home on the quality of dietary intake. Among the few published studies on food away from home to populations, most do not consider each meal separately, grouping all food consumed at lunch and dinner in one group, usually called “meals”, which prevents a more detailed description of the types of foods consumed at each meal outside the home. Considering that, diet is a modifiable risk factor for chronic diseases and the growing number of people who eat away from home, the objective of this study was to evaluate the quality of meals consumed away from home and its association with the overall diet quality.

Methods

Data were obtained from a cross-sectional population-based survey on health and living conditions with a representative sample of adolescents, adults and elderly people living in the city of São Paulo, southeastern Brazil, in 2008 (Inquéritos de Saúde de São Paulo-ISA).²

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¹ Contributed towards study concepts and design, and towards data analysis and interpretation.

² The cross-sectional population-based survey on health and living conditions (ISA): <http://www.fsp.usp.br/isa-sp/>.

The present study, a subsample of ISA, used data on 834 residents of the city of São Paulo, of which 232 were adolescents aged between 12 and 19 years, 304 were adults aged between 20 and 59, and 298 were elderly aging 60 years or more, from both genders. Data collection started in 2009 with a duration of 12 months. For each potential participant were made five tentatives calls, after these five attempts the Individuals that were not located were classified how refused.

For the current analysis, away from home eating was defined as those foods *reportedly consumed away from home, irrespective of place of production*. For example, snacks prepared at home and consumed at work were considered away from home eating. This definition has been previously used (Orfanos et al, 2007).

There is no agreement in literature about the definition of eating away from home. Although the definition used in this study has been used previously (Kearney et al, 2001; Orfanos et al, 2007), some authors define eating away from home as foods prepared outside the home irrespective of place of consumption (Burns et al, 2002; Lin et al, 1999). The USDA and Australian data suggest that the energy content of commercially prepared meals may be higher than that of meals prepared at home (Guthrie et al, 2002; Lin et al, 1999).

Food intake was measured by a 24-hour dietary recall, considering all seasons of the year and days of the week, applied by telephone using the Nutrition Data System for Research software developed at the University of Minnesota for gathering nutritional information, which incorporates the Automated Multiple-Pass Method. The primary source of nutritional food values was the US Department of Agriculture (USDA) nutritional composition table, and this was extended with information provided by food manufacturers, the scientific literature and other published food tables.

The Automated Multiple-Pass Method is a 5-step dietary interview that helps individuals to recall foods and beverages consumed on the day before the interview and to record them in detail, thus reducing dietary measurement errors (Moshfegh et al, 2008). This method enables to collect specific information about the place of consumption of each food, which allowed identifying a total of 309 foods reported as consumed away from home, irrespective of place of production. It should be pointed out that, it is possible that some food items were consumed both away from home and at home and used to calculate the MQI away from home as the MQI at home.

The overall dietary quality was assessed by the Brazilian Healthy Eating Index Revised (B-HEIR) (Previdelli et al, 2011). The B-HEIR components were primarily based on Dietary Guidelines for Brazilians (MS, 2006) and expressed on a density basis (1000 kcal/g). Intakes at the standard level or higher were assigned the maximum number of total points: 5 points (Total Grains; Whole Grains; Dark-Green and Orange Vegetables and Beans (GOV-B); Total Vegetables; Total Fruit and Whole Fruit); 10 points (Dairy Products; Meat and Beans; Oils; Saturated Fat; and Sodium) and 20 points for SoFAAS (total calories from solid fat, alcohol and added sugar) (Previdelli et al, 2011).

The Meal Quality Index (MQI) was used to evaluate dietary quality of the main meals, i.e., breakfast, lunch and dinner (Bandoni and Jaime, 2008). It is composed of five components, with scores ranging from 0 to 20 points, based on the World Health Organization's recommendations (WHO, 2003) and in the Dietary Guide for the Brazilian Population (MS, 2006). Intermediate values were scored proportionally. The MQI components are described below.

Adequacy of the consumption of vegetables and fruit

This item enabled verification of the adequacy of the offered amounts of this food group (in grams per meal). Since the daily recommended intake is 400 g/day, equivalent to five portions per day, it is expected that a large meal would provide at least two portions, i.e. consumption of 160 g. This amount was scored as 20, while availability of less than 80 g received a score of 0.

Carbohydrate consumption

This item was expressed as the percentage of carbohydrate consumption (kcal) in relation to energy. Total carbohydrates should, ideally, provide between 55% and 75% of total energy intake. Meals whose carbohydrate consumption was within this range received a score of 20, while meals whose consumption was less than 40% received a score of 0.

Total fat consumption

Between 15% and 30% of total energy intake is recommended to be derived from fat. Meals with energy provided by fat, which were within this range, were

scored as 20, while those with total fat consumption greater than 40% received a score of 0.

Saturated fat consumption

Total energy consumption coming from saturated fatty acids less than 10% was scored as 20, while consumption greater than 13% received a score of 0.

Menu variability

Menu variability took into account the number of different foods (score ranging from 0 to 14 points, where 14 was scored for 11 or more different types of foods and 0 was scored for fewer than five different foods) and the number of food groups (score ranging from 0 to 6 points, where 6 was scored for menus with at least five different groups and 0 was scored for fewer than three different food groups). For foods to be taken into account, at least half a portion should be consumed, except for foods in the sugar and sweets group, oils and fats group and the miscellanea group (coffee, tea and salt, among others), which were not included in this index. At the end of this stage, the two scores were summed to establish the variety index on a scale ranging from 0 to 20 points.

The Meal Quality Index developed by Bandoni and Jaime (2008) was used to evaluate the quality of meals consumed at home and away from home, assessing the overall meal nutritional quality. This index was based on the Revised Dietary Quality Index (Haines et al, 1999), Healthy Eating Index (Kennedy et al, 1995) and Healthy Eating Index adapted for the Brazilian population (Fisberg et al, 2004). This instrument was shown to be valid for evaluation of meals, since the scores correlate positively with the availability of nutrients that are considered to protect against chronic non-communicable diseases, and inversely with the availability of nutrients that are associated with increased risk (Gorgulho et al, 2011).

The association between the B-HEIR and the meals consumed away from home was assessed by linear regression analysis (stepwise forward selection), once the B-HEIR had a normal distribution. The dependent variable was the overall dietary quality (B-HEIR) and the independent variables were the meal consumed away from home (breakfast, lunch or dinner), meal location (at or away from home), gender (male or female), household income per capita (tertile), age group (adolescent, adult or elderly) and nutritional status (overweight or not).

The analyses were performed using "survey" module of STATA and the significance level was 5%. The project was approved by the Research Ethics Committee of the School of Public Health, University of São Paulo.

Results

Among the 834 respondents, 32% (70 adolescents, 156 adults and 40 elderly) reported, in the day measured, consumption of at least one of the three main meals (breakfast, lunch and dinner) outside home.

The comparison between at home and away from home meal quality is presented in Table 1. There was a statistically significant difference on the average score for lunch, when the meal is consumed away from home. However, the breakfast consumed at home had lower variability of food groups ($p < 0.001$).

The average score of the B-HEIR was 58.29 (CI 95%: 57.08–59.49; interquartile range: 50.48–68.24) points, and the scores of each component are shown in Table 2.

Table 3 shows the mean score of B-HEIR, all variables described by bivariate analysis participated in the multiple model, which was considered appropriate after residue analysis. There was an association between the B-HEIR and lunch consumed away from home.

The linear regression model shows that the lunch consumed away from home has lead to an average reduction of six points in the B-HEIR, independent of gender, income per capita, nutritional status and age.

Discussion

The present study evaluated the quality of meals consumed away from home and its association with the overall dietary quality.

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