Clustering of unhealthy food habits and its association with socioeconomic factors among Brazilian workers

Agrupamento de hábitos alimentares não saudáveis e sua associação com fatores socioeconômicos entre trabalhadores brasileiros

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A B S T R A C T

Objective

Investigate the clustering of four unhealthy food habits (low intake of fruits, low intake of vegetables, high intake of candy, and high intake of fried snacks), and to identify the association between the number of these clustered habits and sociodemographic variables.

Methods

This was a cross-sectional representative study of industrial workers from 24 Federative Units in Brazil conducted between 2006 and 2008. The low weekly intake of fruits and vegetables (<5 days/week) and high weekly intake of candy and fried snacks (≥5 days/weeks) were evaluated using a validated questionnaire. Simultaneity was analyzed with stratification by sex, calculating the Observed (O) and Expected (E) prevalence and the O/E ratio for each of the 16 possible food intake combinations.

Results

Among the 47,477 workers studied, in both men and women, the simultaneous presence of high weekly intake of candy and fried snacks(O/E=3.58; 95%CI=3.12–4.10 and O/E=2.17; 95%CI=1.76–2.62) and of the four

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unhealthy food habits (O/E=2.32; 95%CI=2.01–2.66 and O/E=4.02; 95%CI=3.44–4.65) exceeded the expected percentages if these foods were consumed separately. When compared to subjects without or with only one unhealthy food habit, the combination of the four negative dietary behaviors was more frequent among women, workers with a lower education level, and those living without a partner.

Conclusion

Unhealthy food habits tend to cluster together in both sexes, suggesting a strong interaction, particularly for the four unhealthy food habits together, especially among women, less educated workers and without a partner.

Keywords: Epidemiological studies. Feeding behavior. Occupational Health.

R E S U M O

Objetivo

Investigar o agrupamento de quatro hábitos alimentares não saudáveis (baixo consumo de fruta, baixo consumo de verdura, alto consumo de doce e alto consumo de salgadinho), e identificar a associação entre a quantidade desses hábitos agrupados e variáveis sociodemográficas.

Métodos

Esse foi um estudo transversal e representativo de trabalhadores das indústrias de 24 Unidades Federativas do Brasil, realizado de 2006 e 2008. Os baixos consumos semanais de fruta e verdura (<5 dias/semana) e os altos consumos semanais de doce e salgadinho (>5 dias/semana) foram avaliados por questionário validado. A simultaneidade foi analisada com estratificação por sexo, conforme a prevalência Observada (O), Esperada (E), Razão (O/E) para cada uma das 16 combinações possíveis de consumo alimentar.

Resultados

Nos 47 477 trabalhadores investigados, tanto em homens quanto em mulheres, respectivamente, a presença simultânea alto consumo semanal de doce e salgadinho (O/E=3,58; IC95%=3,12–4,10 e O/E=2,17; IC95%=1,76–2,62) e dos quatro hábitos alimentares não saudáveis juntos (O/E=2,32; IC95%=2,01–2,66 e O/E=4,02; IC95%=3,44–4,65) foram aquelas que mais excederam os percentuais esperados, caso esses alimentos fossem ingeridos de forma independente. Comparados aos sujeitos com nenhum ou um hábito alimentar não saudável, a combinação de quatro comportamentos alimentares negativos foi mais frequente entre as mulheres, trabalhadores com menor nível de escolaridade e que viviam sem companhia.

Conclusão

Hábitos alimentares não saudáveis tendem a se agrupar em ambos os sexos, sugerindo uma forte interação, especialmente para os quatro hábitos alimentares não saudáveis em conjunto, principalmente nas mulheres, trabalhadores com menor escolaridade e que vivem sem parceiro.

Palavras-chave: *Estudos epidemiológicos. Comportamento alimentar. Saúde do trabalhador.*

I N T R O D U C T I O N

The eating habits of populations have undergone marked changes in recent decades, mainly as a result of the reduced consumption of natural foods such as fruits and vegetables [1] and the increased consumption of processed foods, especially ready meals and away-from-home food. In Brazil, eating out accounts for about 31% of food expenditure [2].

An unhealthy diet is characterized by an energy imbalance caused by a poor variety of foods and by an excessive consumption of fats and simple sugars. A high intake of salt, sugary foods and saturated fats and a low intake of fruits and vegetables are examples of unhealthy food habits. These behaviors pose a health risk since they are associated with a high prevalence of chronic non-communicable diseases such as type II diabetes, cardiovascular diseases and some types of cancer [3]. However, many difficulties are encountered in the analysis of food intake when each type of food is considered individually. In addition, the individual effect of a food tends to

be lower than its combined effect. Within this context, studies investigating the consumption of groups of foods are more realistic and have been suggested as a methodological strategy in epidemiological studies [4].

The analysis of the simultaneity of risk behaviors permits to observe whether exposure to a certain food habit is related to the adoption of other habits [5] and whether the negative effect caused by simultaneous exposure is greater than the sum of the individual effect of exposure to each behavior [6]. Thus, the identification of the simultaneity of food habits in a population makes their diet more comprehensible, facilitates decision making in public health, and can contribute to the planning and development of interventions aimed at multiple behaviors.

Few studies have investigated food habits in Brazilian workers and the results are a matter of concern as they indicate possible exposure to an unhealthy diet [7]. Additionally, a close relationship exists between the working environment and food habits since some meals are consumed during working hours. In view of these findings, the working environment is considered a favorable location for the development and implementation of health promotion programs [8].

Since behavioral risk factors are modifiable throughout the life span of an individual, it is important to identify subgroups of workers that are more exposed to unhealthy food habits, which could reduce the risk of a life that is more prone to chronic disease [9], absenteeism and reduced productivity at work. Therefore, the objectives of the present study were to investigate the clustering of unhealthy food habits and to identify the association between the number of these clustered habits and sociodemographic variables.

METHODS

This study is part of a national survey on the "Lifestyle and Leisure-Time Habits of Industrial Workers" conducted from 2006 to 2008 in which 24 of the 27 Federative Units of Brazil participated. Only the states of *Rio de Janeiro, Piauí* and *Sergipe* did not participate in the survey in a timely manner [10].

The sample size was calculated based on an estimated prevalence of leisure-time physical inactivity of 45% found in a survey conducted in *Santa Catarina* in 1999 involving a sample of industrial workers [11]. The sample size calculation considered a sampling error of three percentage points, a 95% confidence interval, a design effect of 1.5, and the addition of 20% for losses and refusals. The sample was recruited in three phases: (1) selection of workers according to the size of the company determined based on the number of workers as follows: small (20–99), medium (100–499) and large (≥500); (2) worker stratification according to the company size by the regional units, i.e., *Serviço Social da Indústria do Brasil* (SESI, The Brazilian Industrial Social Service) subdivision within a region of the country; (3) according to regional unit through random selection of the companies by drawing lots. Finally, the workers were drawn systematically within the selected companies by means of provided lists with the names of their employees. Further details can be found in the previous publication [10].

The questionnaire developed and validated by Barros [11] was used for data collection. For this study, the unhealthy food habits were the dependent variables: low intake of fruits and fruit juices, low intake of vegetables or green salads, high intake of fried snacks, and high intake of candy. The following questions were used to determine the low intake of fruits/fruit juices and vegetables/green salads, respectively: "In a normal week, how many days do you eat fruits or drink fruit juices?" and "In a normal week, how many days do you eat vegetables or green salads?". Low intake was defined as <5 times per week. The questions applied to determine high intake of fried snacks and candy were: "In a normal week, how many days do you eat fried snacks?" and "In a normal week,

how many days do you eat candy?" High intake was defined as ≥5 times per week. The following independent variables were investigated: gender (male and female), age (≤29, 30–39, 40–49 and ≥50 years), current marital status (with and without a partner), education level (≤7, 8 to 10, 11 and ≥12 years of schooling) and monthly household income at the time of the study (in US$: ≤280.00, 281.00–700.00, 701.00–1,400.00 and ≥1,401.00).

The database was constructed by scanning the questionnaires with the Sphinx software (Sphinx Software Solutions, Inc., Washington, District of Columbia, United States). All statistical analyses were performed using the Stata 13.0 software (Stata Corporation, College Station, Texas, United States). The survey was approved by the Ethics Committee of the Universidade Federal de Santa Catarina (Approval n° 306/2005 and n° 009/2007). The SESI, the partner entity in the survey, authorized this secondary analysis of the data.

First, the absolute and relative frequencies of the sociodemographic variables and the presence and number of unhealthy food habits were determined. The 16 combinations of unhealthy food habits were examined regarding the prevalence of Observed (O) and Expected (E) values and their respective *Ratios* (O/E). The expected prevalence was calculated based on the multiplication of the probabilities of each individual behavior in the population studied. These analyses were stratified by gender.

In addition, the factors associated with the cumulative number of unhealthy food habits were determined by multinomial logistic regression in crude and adjusted analysis. In the adjusted model, the socioeconomic variables (education level and monthly household income) were controlled for demographic variables (gender, age and current marital status). For statistical modeling, a backward selection strategy was adopted, with a critical value of significance of $p \leq 0.20$ for maintenance in the model in order to control for confounding factors. A *p*-value ≤0.05

was considered statistically significant. The results are expressed as *Odds Ratio* (OR) and 95% Confidence Interval (95%CI).

RESULTS

Of the total number of workers eligible for the study (N=52,774), 47,886 responded to the questionnaire corresponding to a response rate of 90.7%. Subjects who did not report their gender (n=409) were excluded. Thus, the final sample consisted of 47,477 workers from 2,775 Brazilian companies. Table 1 shows the sociodemographic characteristics of the sample and the prevalence of each unhealthy food habit. Low intake of fruits and juices was the most frequent behavior, which differed significantly between genders (60.6% men and 56.2% women; $p<0.001$).

The proportion of numbers, three and four unhealthy food habits was higher among women (24.6%, 7.0% and 1.2% *versus* 21.2%, 5.6% and 0.6% in men, respectively), as shown in Figure 1. In contrast, the proportion of two unhealthy food habits was higher among men compared to women (38.6% *versus* 32.1%) (Figure 1).

Table 2 shows the frequency of the 16 different food habit combinations. The low intake of fruits and vegetables was the most frequent combination, found in 32.0% of men and in 23.4% of women. For the combination of two unhealthy food habits, an interaction was observed between the intake of fried snacks and candy. Regarding the combination of three unhealthy food habits, the low intake of vegetables and the high intake of fried snack and candy showed the highest clustering potential (O/E=2.06, 95%CI=1.71; 2.46 and O/E=1.91; 95%CI=1.48; 2.43 for men and women, respectively). The combination of all four unhealthy food habits showed the greatest difference between observed and expected proportions in both genders. The frequency of

Table 1. Sociodemographic characteristics and food habits in industrial workers according to gender (Brazil, 2006–2008).

Variables	Men (n=33,161)		Women (n=14,316)		p^b
	n	%	n	%	
Age (years)					<0.001
≤29	14,965	45.3	6,836	47.9	
30–39	10,085	30.5	4,554	31.1	
40–49	5,678	17.2	2,265	15.9	
≥50	2,298	7.0	640	4.2	
Current marital status					<0.001
With a partner	20,117	60.8	6,547	45.8	
Without a partner	12,952	39.2	7,742	54.2	
Education (years)					<0.001
≤7	7,274	22.0	1,695	11.9	
8	5,666	17.1	1,759	12.3	
9–11	16,372	49.5	7,801	54.6	
≥12	3,782	11.4	3,021	21.2	
Monthly household income (US$)[a]					<0.001
≤280.00	10,810	32.9	4,259	30.1	
281.00–700.00	13,821	42.1	5,630	39.8	
701.00–1,400.00	5,337	16.3	2,879	20.3	
≥1,401.00	2,850	8.7	1,395	9.8	
Food habit					
Low intake of fruits and juices	19,999	60.6	8,004	56.2	<0.001
Low intake of vegetables	16,559	50.2	6,045	42.4	<0.001
High intake of fried snacks	2,424	7.4	921	6.5	0.003
High intake of candy	4,095	12.4	2,886	20.3	<0.001

Note: [a]Variable with the largest number of missing data for men (n=343; 1.0%) and women (n=153; 1.1%); [b]*p*-value resulting from Chi-square tests or tests of linear trend.
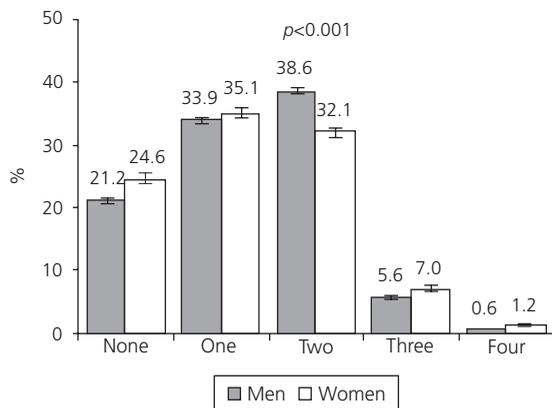
Figure 1. Proportion of male and female industrial workers with 0 to 4 unhealthy food habits (*i.e.*, low intake of fruits/juices, low intake of vegetables, high intake of fried snacks, and high intake of candy). Brazil, 2006–2008.

the concomitant occurrence of this combination was 50.0% higher in men and 400.0% higher in women than predicted if the frequency of the food habits were independent.

The analysis of the association of sociodemographic factors with the sum of unhealthy food habits is shown in Table 3. Women were more likely to have four unhealthy food habits (OR=1.62; 95%CI=1.32; 1.99) than one or no habit compared to men. The probability of two, three or four unhealthy food habits tended to decrease with increasing age (*p*<0.001 in all categories). Workers who lived without a partner were also more likely to have two, three or four unhealthy food habits. The results

Table 2. Clustering of unhealthy food habits among industrial workers in Brazil according to gender (2006–2008).

N° of food habits	Food habits				Men (n=32,878)				Women (n=14,192)			
	Low intake of fruit	Low intake of vegetables	High intake of fried snacks	High intake of candy	n	% Observed	% Expected	O/E (95%CI)	n	% Observed	% Expected	O/E (95%CI)
0	○	○	○	○	6,976	21.2	16.1	1.30 (1.27; 1.33)	3,489	24.6	19.0	1.28 (1.24; 1.32)
1	●	○	○	○	6,308	19.2	24.5	0.78 (0.76; 0.79)	2,779	19.6	24.1	0.80 (0.77; 0.83)
1	○	●	○	○	3,242	9.9	16.1	0.61 (0.59; 0.63)	1,242	8.8	13.9	0.62 (0.59; 0.66)
1	○	○	●	○	432	1.3	1.3	1.02 (0.93;1,12)	107	0.7	1.3	0.57 (0.47; 0.69)
1	○	○	○	●	1,167	3.6	2.3	1.55 (1.46; 1.64)	853	6.0	4.8	1.24 (1.16; 1.33)
2	●	●	○	○	10,518	32.0	24.5	1.30 (1.27; 1.32)	3,317	23.4	17.6	1.31 (1.27; 1.36)
2	●	○	●	○	331	1.0	1.9	0.52 (0.46; 0.57)	124	0.9	1.7	0.52 (0.43; 0.62)
2	●	○	○	●	836	2.5	3.5	0.73 (0.68; 0.78)	643	4.5	6.1	0.74 (0.68; 0.80)
2	○	●	●	○	297	0.9	1.3	0.71 (0.63; 0.79)	65	0.5	1.0	0.47 (0.37; 0.61)
2	○	●	○	●	502	1.5	2.3	0.67 (0.61; 0.73)	299	2.1	3.5	0.59 (0.53; 0.67)
2	○	○	●	●	213	0.6	0.2	3.58 (3.12; 4.10)	102	0.7	0.3	2.17 (1.76; 2.62)
3	●	●	●	○	688	2.1	1.9	1.08 (1.00; 1.16)	191	1.4	1.2	1.10 (0.95; 1.27)
3	●	●	○	●	916	2.8	3.5	0.80 (0.75; 0.85)	653	4.6	4.5	1.02 (0.95; 1.11)
3	●	○	●	●	121	0.4	0.3	1.34 (1.11; 1.60)	86	0.6	0.4	1.43 (1.15; 1.77)
3	○	●	●	●	122	0.4	0.2	2.06 (1.71; 2.46)	66	0.5	0.2	1.91 (1.48; 2.43)
4	●	●	●	●	209	0.6	0.3	2.32 (2.01; 2.66)	176	1.2	0.3	4.02 (3.44; 4.65)

Notes: ●Presence unhealthy food habits; ○ Absence of food habits.
O/E: %Observed/%Expected; 95%CI: 95% Confidence Interval.

Table 3. Sociodemographic factors associated with the sum of unhealthy food habits among industrial workers in Brazil (2006–2008).

Variable	2 versus 0 or 1				3 versus 0 or 1				4 versus 0 or 1			
	Crude analysis		Adjusted analysis		Crude analysis		Adjusted analysis		Crude analysis		Adjusted analysis	
	OR (95%CI)	p	OR (95%CI)	p	OR (95%CI)	p	OR (95%CI)	p	OR (95%CI)	p	OR (95%CI)	p
Gender		<0.001		<0.001		0.001		0.072		<0.001		<0.001
Men	1.00		1.00		1.00		1.00		1.00		1.00	
Women	0.77 (0.73; 0.80)		0.75 (0.72; 0.78)		1.15 (1.06; 1.25)		1.08 (0.99; 1.17)		1.80 (1.47; 2.20)		1.62 (1.32; 1.99)	
Age (years)		<0.001*		<0.001		<0.001*		<0.001		<0.001*		<0.001
≤29	1.00		1.00		1.00		1.00		1.00		1.00	
30–39	0.81 (0.77; 0.84)		0.82 (0.78; 0.86)		0.57 (0.52; 0.63)		0.62 (0.57; 0.69)		0.35 (0.27; 0.45)		0.43 (0.33; 0.56)	
40–49	0.67 (0.63; 0.71)		0.68 (0.64; 072)		0.40 (0.36; 0.46)		0.45 (0.39; 0.51)		0.21 (0.14; 0.32)		0.27 (0.18; 0.41)	
≥50	0.54 (0.50; 0.59)		0.54 (0.49; 0.59)		0.26 (0.21; 0.33)		0.29 (0.23; 0.36)		0.14 (0.07; 0.30)		0.19 (0.09; 0.41)	
Marital status		<0.001*		<0.001		<0.001*		<0.001		<0.001*		<0.001
With a partner	1.00		1.00		1.00		1.00		1.00		1.00	
Without a partner	1.13 (1.09; 1.18)		1.05 (1.01; 1.10)		1.66 (1.53; 1.79)		1.32 (1.22; 1.43)		2.94 (2.37; 3.65)		2.02 (1.61; 2.53)	
Educational level (years)		<0.001*		<0.001		0.781		0.498		0.136		0.701
≤7	1.00		1.00		1.00		1.00		1.00		1.00	
8	0.98 (0.91; 1.04)		0.94 (0.88; 1.00)		1.05 (0.92; 1.21)		0.91 (0.79; 1.04)		1.39 (0.95; 2.05)		1.11 (0.74; 1.66)	
9–11	0.85 (0.81; 0.90)		0.87 (0.82; 0.92)		1.14 (1.03; 1.27)		0.94 (0.84; 1.06)		1.65 (1.21; 2.25)		1.08 (0.76; 1.53)	
≥12	0.67 (0.63; 0.72)		0.88 (0.81; 0.96)		0.93 (0.81; 1.07)		0.94 (0.79; 1.11)		1.11 (0.74; 1.66)		0.86 (0.54; 1.36)	
Family income (quartile)		<0.001*		<0.001		<0.001*		<0.001		<0.005		0.159
≤280	1.00		1.00		1.00		1.00		1.00		1.00	
281–700	0.83 (0.79; 0.86)		0.88 (0.84; 0.92)		0.84 (0.77; 0.92)		0.90 (0.82; 0.99)		0.83 (0.66; 1.05)		0.94 (0.73; 1.19)	
701–1400	0.61 (0.58; 0.65)		0.69 (0.65; 0.74)		0.66 (0.59; 0.74)		0.75 (0.66; 0.85)		0.84 (0.63; 1.12)		1.01 (0.74; 1.39)	
≥1401	0.53 (0.49; 0.57)		0.62 (0.57; 0.68)		0.62 (0.53; 0.72)		0.74 (0.62; 0.88)		0.46 (0.30; 0.73)		0.65 (0.40; 1.07)	

Note: Results of multinomial logistic regression. In the adjusted analyses, socioeconomic variables were controlled for demographic variables; The results are expressed as *Odds Ratios* (OR) and 95% Confidence Intervals (95%CI). *p*-value resulting from tests for heterogeneity or for linear trends.

showed a higher magnitude as the number of simultaneous unhealthy food habits increased. Workers of higher education level (≥12 years) were less likely to have two simultaneous food habits (OR=0.88, 95%CI=0.81; 0.96) compared to those of lower education lev0el (≤7 years). Workers in the higher income category (monthly household income ≥ US$ 1,401.00) were more likely to have two and three unhealthy food habits (OR=0.62 and 0.74, respectively) than those in the lowest income category (monthly household income ≤US$280.00).

DISCUSSION

The present study investigated the simultaneity of unhealthy food habits and associated factors in a representative sample of Brazilian industrial workers. The results showed that the low intake of fruits and juices was more frequent in men than women. The low intake of fruits and vegetables was the most common combination in men and women, in agreement with other studies [2,12,13].

A higher proportion of the four negative dietary behaviors was observed in women compared to men. In population studies, women tend to exhibit a lower intake of unhealthy foods than men [14,15]. The absence of this trend among industrial workers may be related to double work shifts and working overtime. In fact, studies indicate a lack of time [16] and limited availability of healthy foods when eating out [14] as obstacles to the consumption of healthy foods such as fruits and vegetables. These conditions may increase the exposure of female workers to unhealthy foods as observed in the present study. This does not seem to be a specific trend of the population studied but rather a characteristic of the dietary pattern of the adult population in Brazil. As an example of this reality, the 2008–2009 Household Budget Survey [2] found that only one-fourth of the population achieves the recommended daily intake of fruits and vegetables.

The simultaneous presence of high weekly intake of candy and fried snacks, as well as of the four food groups, exceeded the expected percentages in men and women. Although no specific data are available for the population studied, in Brazil, the consumption of candy and fried snacks is considered high in the adult population and is usually associated with eating out [17]. According to a national health survey [18], 21.7% of the population regularly consume sugary foods such as cakes, pies, chocolate, candies, cookies or sweet biscuits on 5 days or more per week. The observation of an interaction between food groups can be explained by the fact that processed foods cost less and can be rapidly prepared and consumed, and are easily found in away-from-home food. Thus, the simultaneity of unhealthy habits observed in this study may in part be due to changes in the working environment, including the increased participation of women in the workforce, and to the higher production, lower cost and easier access to processed foods. This finding supports the view that foods are not consumed randomly, but rather according to a pattern based on various factors, among them acquisitive power and availability.

Age was found to be a protective factor for unhealthy food habits, showing a linear trend. The tendency of age to confer protection against lifestyle risk factors, including dietary habits, has been reported previously for an English adult population [13]. In Brazil, studies on industrial workers concluded that the frequency of unhealthy behaviors is higher among young adults [8,19], especially the inadequate consumption of fruits and vegetables [8]. Age seems to be an important variable in terms of awareness and achieving healthy food habits, which can result from medical recommendations or even from the coexistence of risk factors for chronic diseases, increasing the incidence of premature death [20].

With respect to the association between food habits and marital status, it is reasonable

to assume that single workers are more exposed to an unhealthy diet, as observed in the present study. Certainly, marital status is an individual variable that can interfere with dietary patterns [21] and single workers are more likely to consume ready meals and to eat out. However, further studies are needed to explore these hypotheses so that possible trends can be identified.

Although only observed for the intermediate categories (2 and 3 *versus* 0 or 1), education level and income were protective factors for the cluster of unhealthy food habits. This observation is important since education level and income are the variables that most explain food intake in the Brazilian adult population, *i.e.*, the dietary pattern is mainly determined by socioeconomic conditions [21]. Other studies already demonstrated that a lower education level and lower income are associated with the accumulation of multiple unhealthy behaviors [13,14]. A favorable social condition ensures better access to health resources and, more importantly, may increase the opportunities to be healthy when compared to socially under privileged conditions.

The main limitation of this study was that no information was obtained about the lunchrooms of the companies, considering that many eating habits of the workers investigated are strongly influenced by the specific characteristics of the foods available in these spaces. This because the daily 8–hour work shift and probable distant location of medium- and large-sized factories from urban centers impairs the choice of healthier and varied meals. In addition, the arbitrary cut-off points adopted in this study for the outcomes should be viewed with caution, especially in comparison with studies that investigated these outcomes separately. In this respect, strengths of the study are the type of analysis used, which permits to detect a dietary pattern of the individual and not an exclusive behavior regarding eating habits, and the national representativeness of the sample studied.

There was a strong tendency to group unhealthy food habits in both sexes, notably in women, workers with lower levels of education and without a partner. The low consumption of fruits, juice, vegetables and the high consumption of candy and fried snacks with the unhealthy food habits more frequent among the workers. It is suggested that interventions be performed on workers in the industry with the aim of increasing the consumption of natural foods, especially fruits and vegetables. In addition, considering that food standards allow approximation to the reality of food consumption, it is recommended to use them for the monitoring and establishment of interventions in the general population.

CONTRIBUTORS

J BENEDET, G DEL DUCA and PM SILVEIRA participated in the conception of the study, bibliographic review, data interpretation, writing, critical review and final approval of the article. APP COUTINHO participated in the conception of study, analysis and interpretation of data, writing, critical review and final approval of the article. ESA OLIVEIRA and MV NAHAHS prepared and coordinated the project, generated a data collection, participated in the manuscript design, critical review and final approval of the article.

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