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Association of socioeconomic, labor and health variables related to Food Insecurity in workers of the Popular Restaurants in the city of *Rio de Janeiro*

Associação das variáveis socioeconômicas, laborais e de saúde relacionadas à Insegurança Alimentar em trabalhadores dos Restaurantes Populares do município do Rio de Janeiro

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ABSTRACT

Objective

This study aimed to analyze the prevalence of perceived food insecurity in households of employees of Popular Restaurants, as well as associate this perception with socioeconomic, labor and health variables.

Methods

This is a cross-sectional study of 273 workers from seven restaurants located in the city of *Rio de Janeiro*, Brazil. We applied a questionnaire with different scales and anthropometric measurements were taken. Assessment of food insecurity was performed using the Brazilian Food Insecurity Scale, classifying individuals in food security and food insecurity. The analyses were performed by calculating the gross and adjusted *odds ratio*. The logistic regression was performed considering three groups of variables: socio-economic, employment and health.

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Results

The estimated prevalence of food insecurity was 53.7%. The variables: education (*OR*=2.39; 95%CI=1.38-4.16), time working in kitchens <29 months (*OR*=2.72; 95%CI=1.44-5.16) and opinion on the satisfaction with food composition and regularity (*OR*=2.01; 95%CI=1.12-3.57) were significantly associated with food insecurity.

Conclusion

Although the study population find themselves inserted into a social facility to promote food security, food insecurity results are worrying. Additionally, factors like lower education and less time working in restaurants increased the chance to realize their households in food insecurity.

Keywords: Food security. Socioeconomic factors. Workers.

RESUMO

Objetivo

Este estudo teve como objetivo analisar a prevalência da percepção da insegurança alimentar nos domicílios dos trabalhadores dos restaurantes populares, bem como associar essa percepção às variáveis socioeconômicas, laborais e de saúde.

Métodos

Trata-se de um estudo seccional, com 273 trabalhadores de sete restaurantes localizados no município do Rio de Janeiro. Aplicou-se um questionário com diversas escalas e foram aferidas medidas antropométricas. A avaliação da insegurança alimentar foi realizada por meio da Escala Brasileira de Insegurança Alimentar, que classificou os indivíduos em segurança alimentar e insegurança alimentar. As análises calcularam as odds ratio brutas e as ajustadas. A regressão logística foi efetuada considerando três blocos de variáveis: socioeconômicas, laborais e de saúde.

Resultados

A prevalência de insegurança alimentar estimada foi de 53,7%. As variáveis: escolaridade (OR=2,39; IC95%=1,38-4,16), tempo de trabalho em cozinhas <29 meses (OR=2,72; IC95%=1,44-5,16) e opinião sobre a satisfação na composição e regularidade da alimentação (OR=2,01; IC95%=1,12-3,57) associaram-se significativamente com a insegurança alimentar.

Conclusão

Apesar de a população estudada encontrar-se inserida em um equipamento social destinado a promover a segurança alimentar, os resultados de insegurança alimentar são preocupantes. Além disso, fatores como ter escolaridade mais baixa e menos tempo de trabalho em restaurantes aumentaram a chance de perceber seu domicílio em insegurança alimentar.

Palavras-chave: *Segurança alimentar e nutricional. Fatores socioeconômicos. Trabalhadores.*

INTRODUCTION

The debate about food insecurity remains in the public agendas because the world admittedly has the technology and knowledge necessary to solve most problems related to access to adequate quality food. However, the solutions do not seem to have been implemented at the necessary scale.

A study conducted in 2012 by the United States Department of Agriculture (USDA) found a prevalence of food insecurity of 14.5%, where one or more family members reduced food intake or skipped some meals throughout the year[1]. In Brazil the 2009 *Pesquisa Nacional por Amostra de Domicílios* (PNAD, National Household Sample Survey) found large prevalences of mild (18.7%), moderate (6.5%), and severe (5.0%) food insecurity[2]. Among socioeconomic factors, income is the greatest determinant of food insecurity. The lack of financial resources can limit one's ability to acquire food, limiting access to

food qualitatively and quantitatively to a significant percentage of the population[3].

The *Política Nacional de Segurança Alimentar e Nutricional* (PNSAN, National Food Security Policy) consists of programs and actions that allow regular and permanent access to adequate quality food, and food practices that promote health and are environmentally sustainable. One of the programs is the very affordable food services called Popular Restaurants[4].

Popular Restaurants produce and sell healthy and balanced meals at US$0.43. Their main objective is to form a network of social protection and promotion in areas with great concentrations of low-income workers, older adults, unemployed individuals, students, and street dwellers at risk or socially vulnerable, ensuring their right to food[5].

In the State of *Rio de Janeiro*, Popular Restaurants are managed by the *Secretaria de Estado, As-sistência Social e Direitos Humanos* (SEASDH, State Department of Social Assistance and Human Rights) and run by outsourced food services[6]. In 2013 the *Associação Brasileira das Empresas de Refeições Coletivas* (ABERC, Brazilian Food Service Association) estimated that the sector had 195 thousand employees[7].

The main characteristics of these workers is low skill level, low education level, low income, and high turnover[8-10]. This description of the workers is similar to that of Popular Restaurants users and also of the food insecure population.

The objective of this study was to analyze the prevalence of perceived food insecurity at the households of Popular Restaurants workers and associate this perception with socioeconomic, labor, and health variables.

METHODS

This is a cross-sectional study based on the thesis "Prospective study of Popular Restaurants workers from *Rio de Janeiro*". The workers first contacted in 2010 to learn about the study. The first and second data collections happened in 2011 and 2013, respectively.

The study consisted of workers involved in meal preparation in seven Popular Restaurants in *Rio de Janeiro* (*Campo Grande*, *Central, Bangu*, *Bonsucesso*, *Irajá*, *Madureira*, and *Méier*) that were open in 2011. Trained interviewers administered a questionnaire to the workers and took their anthropometric measurements. The interviewees were dieticians, administrative assistants, stockists, stockist assistants, cooks, cook assistants, cashiers, butchers, butcher assistants, attendants, and general service assistants. One cook and seven watchmen from the night shift were excluded from the study because they were unavailable at better hours.

The first contact with the restaurants resulted in a list of positions of 401 workers in October 2010. In February, when data collection began and one of the restaurants was closed for remodeling, 308 employees were available. Of these, 17 (3.6%) had been transferred and 18 (4.9%) were on a health leave of absence. Therefore, 273 employees were interviewed and measured between February and December 2011.

The data collection team was trained for standardizing the interviews. They read the interviewer's manual, simulated questionnaire administration, and measured height, weight, and waist circumference twice to reduce intra- and inter-measurer variation.

A simple random sampling was done in 10% of the questionnaires to check the answers and review data entry. The sampling was done by the software R version 2.15.2[11].

Food insecurity was assessed by the *Escala Brasileira de Insegurança Alimentar* (EBIA, Brazilian Food Insecurity Scale), which has been translated and validated to the Portuguese language with 14 absolute questions (yes/no)[12]. The scale classifies households as food secure, mildly food insecure, moderately food insecure, and severely food insecure[13] based on the dwellers' experiences in the last three months. To assess food insecurity associations, three sets were considered for the response variable: sociodemographic, labor, and health:

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1. *Set of sociodemographic variables*: gender, education level (elementary school - up to nine years of formal education; high school or more - more than nine years of formal education); age group (19-39 years old; 40 or more years old); marital status (married/single); skin color (white/brown/black); children (yes/no); home (owned or other - rented, borrowed, or others); basic sanitation composed of the variables: sanitary conditions, garbage collection, and piped water (very good/good/regular); whether the individual receives benefits: welfare, disability pension, social rent, special child; socioeconomic class according to the *Associação Brasileira de Empresas de Pesquisa* (ABEP, Brazilian Association of Survey Companies)[14] (B1/B2, C1, C2/D); household income per member - minimum salary (more than 2 to 5, more than 1 to 2, more than ½ to 1, more than ¼ to ½, up to ¼); satisfaction with food prices (satisfied/unsatisfied).

2. *Set of labor variables*: position - ADM/Die (stockist, head cook, Administrative Assistant/Dietician), production (cook assistant, cook, butcher), GSA/Attendant (General Service Assistant and attendant); time working in Popular Restaurants - in tertiles: <29 months, ≥29 months, and <72 months, ≥72 months); commuting time (<40 minutes, ≥40 minutes, and <60 minutes, ≥60 minutes); and whether the individual had other jobs to increase income (yes/no).

3. *Set of health variables*: perceived health (very good, good, regular/bad); Body Mass Index (BMI) (normal/overweight); satisfaction with diet composition and regularity (satisfied/dissatisfied); diet self-assessment (balanced/unbalanced); vegetable and fruit intake frequency (daily, 2 to 6 times a week, 1 or fewer times a week); smoker (yes/no); and whether the individual consumed alcohol in the last two weeks (yes/no).

Statistical analysis

The probabilistic model of this study scrutinized the dependent variable as absolute where a yes meant the household was food insecure. Households with children younger than 18 years of age were not counted separately.

An exploratory analysis of the data was conducted to verify the distribution of each covariate of the sample to define the best categories. Next bivariate analysis was conducted, calculating the crude *odds ratios* to verify association between the outcome and the other variables of interest. All variables with $p<0.20$ in bivariate analysis were selected for multiple regression analyses. A *p*-value of 0.20 was chosen to avoid excluding potentially important study variables.

A logistic regression model was built with absolute outcome: food security or food insecurity. Initially, the socioeconomic variables (set 1) with $p<0.20$ in bivariate analysis were modeled and those with $p<0.05$ were selected to compose the model with the labor variables (set 2). The variables that resulted from this model (sets 1 + 2) with $p<0.05$ were selected to compose the model with the health variables (set 3). The variables that were significant ($p<0.05$) in this last block (sets 1 + 2 + 3) composed the final model.

The association was assessed by the likelihood-*ratio* test and the adjustment quality of the final logistic regression model was assessed by the goodness-of-fit test (Akaike Information Criterion). All analyses were performed by the software R version 2.15[11]. The project was approved by *Sub-Reitoria de Pós-Graduação e Pesquisa/Universidade do Estado do Rio de Janeiro* Research Ethics Committee under Protocol n° 062/2010.

RESULTS

Most study subjects owned their homes and were brown, married males aged 19 to 39 years with children. Additionally, most had up to nine years of formal education. Although 45.1% were classified as class C1 according to Brazil's socioeconomic classification, 8.2% reported having trouble affording a healthy diet and 58.1% reported being unsatisfied with the price of food.

Table 1. Prevalence of food security according to categories of socioeconomic and demographic variables of a sample of popular restaurants workers from *Rio de Janeiro*.

Variables	Insecurity		*OR*	95%CI
	n	%		
Gender				
Male	82	52.2	1.00	
Female	63	55.8	1.13	0.69 - 1.84
Education level				
>9 years of formal education	50	43.5	1.00	
Up to 9 years of formal education	95	61.3	2.06	1.26 - 3.36
Age group				
19-39	86	54.4	1.00	
40 or more	59	52.7	0.97	0.6 - 1.59
Marital status				
Single[1]	69	57.5	1.00	
Married	74	50.3	1.35	0.83 - 2.21
Skin color				
White	24	50.0	1.00	
Brown	44	54.3	1.20	0.62 - 2.32
Black	77	54.6	1.19	0.58 - 2.43
Children				
No	42	52.5	1.00	
Yes	103	54.8	1.76	0.15 - 20.23
Home				
Owned	99	50.0	1.00	
Not owned[2]	46	63.9	1.77	1.01- 3.08
Basic sanitation[3]				
Very good	133	53.8	1.00	
Good	7	41.2	0.60	0.22 - 1.63
Regular	6	83.3	4.29	0.49 - 37.22
Receives social benefit[4]				
No	102	50.5		
Yes	43	63.2	1.69	0.96 - 2.97
Socioeconomic classification (Abep)				
B1/B2	24	46.2	1.00	
C1	63	52.5	1.27	0.66 - 2.44
C2/D	58	60.4	1.72	0.87 - 3.41
Income per member (minimum salaries)				
More than 2 to 5	2	50	1.00	
More than 1 to 2	29	50	1.45	0.23 - 9.32
More than ½ to 1	39	49.4	1.46	0.23 - 9.23
More than ¼ to ½	67	59.3	2.09	0.34 - 13.02
Up to ¼	8	66.7	3.00	0.35 - 25.87
Satisfaction with food prices				
Satisfied	57	50.4	1.00	
Dissatisfied	88	56.1	0.80	0.49 - 1.31

Note: [1]This category includes widowers and divorcees, among others; [2]Rented, borrowed, or another condition; [3]Composed of the variables: sanitary conditions, garbage collection, and piped water; [4]Welfare, disability pension, social rent, disease aid, special child.
OR: *Odds Ratio*; 95%CI: 95% Confiance Interval; Abep: *Associação Brasileira de Empresas de Pesquisa*.

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Regarding labor characteristics, 54.4% were general service assistants or attendants and 67.7% spent more than 40 minutes commuting to work with a mean commuting time of 54 minutes. Furthermore, 47.4% had other jobs to increase income.

Most (81.5%) individuals reported having good or very good health; 68.5% reported being satisfied with the composition and regularity of their diet and 52.3% informed having a balanced diet; finally, 47.0% consumed vegetables and fruits daily and 46.7% had consumed alcohol in the last two weeks.

Over half (53.7%) of the Popular Restaurants workers believed their household was food insecure as follows: 40.0% mild, 5.2% moderate, and 8.5% severe. Some statistically significant variables had a prevalence of food insecurity in excess of 60.0%: low education level, not owning a home, receiving social benefit, working in Popular Restaurants for shorter periods (<29 months), and dissatisfaction with diet composition and regularity. Additionally, individuals with low education level, working as general service assistant or attendant, and working for less time in Popular Restaurants were twice as likely to perceive food insecurity (Tables 1, 2, and 3).

The final model showed that the households of employees with up to nine years of formal education and with less time working in Popular Restaurants were almost three times more likely to be food insecure compared with the reference categories. And employees who were dissatisfied with the composition and regularity of their diet were two times more likely to have food insecure households (Table 4).

DISCUSSION

A high percentage of individuals with low education level, less time working in Popular Restaurants, and dissatisfied with the composition and regularity of their diets perceived their households as food insecure, showing the magnitude of the problem.

Table 2. Prevalence of food security according to the categories of labor variables of a sample of popular restaurants workers from *Rio de Janeiro*.

Variables	Insecurity		*OR*	95%CI
	n	%		
Position				
ADM/Die[1]	18	40.9	1.00	
Production[2]	41	51.9	1.56	0.74 - 3.28
GSA/Attendant	86	58.5	2.04	1.03 - 4.04
Employed at popular restaurants				
≥72 months	41	42.7	1.00	
≥29 months and <72 months	50	58.8	1.92	1.06 - 3.46
<29 months	54	61.4	2.13	1.18 - 3.84
Commuting time[3]				
<40 minutes	51	58.6	1.00	
≥40 minutes and <60 minutes	39	52.7	0.79	0.42 - 1.48
≥60 minutes	55	50.9	0.73	0.41 - 1.29
Has another job to increase income				
No	69	48.6	1.00	
Yes	76	59.4	1.55	0.95 - 2.5

Note: [1]Stockist, administrative assistant, and dietician; [2]Cook assistant, cook (general), butcher, and chef; [3]Time spent commuting.
OR: *Odds Ratio*; 95%CI: 95% of Confidence Interval; ADM/Die: Administrative Assistant/Dietician; GSA/Attendant: General Service Assistant/Attendant

Table 3. Prevalence of food security according to categories of health variables of a sample of popular restaurants workers from *Rio de Janeiro*.

Variables	Insecurity		*OR*	95%CI
	n	%		
Perceived health				
Very good	42	53.8	1.00	
Good	72	50.7	0.82	0.47 - 1.44
Regular/bad	31	62.0	1.28	0.62 - 2.66
Body Mass Index				
Normal[1]	58	49.6	1.00	
Overweight[2]	85	56.3	0.76	0.47-1.24
Satisfaction with diet composition/regularity				
Satisfied[3]	91	48.9	1.00	
Dissatisfied	54	64.3	1.55	0.95 - 2.5
Has a balanced diet				
Yes	68	47.2	1.00	
No	77	61.1	0.57	0.35 - 0.92
Fruit and vegetable intake frequency				
Daily	66	52	1.00	
2 to 6 times a week	52	53.6	1.08	0.63 - 1.85
1 or fewer times a week	27	58.7	1.27	0.64 - 2.52
Smoker				
Yes	25	56.8	1.19	0.62 - 2.31
No	120	53.1	1.00	
Alcohol intake[4]				
No	72	50.3	1.00	
Yes	73	57.9	0.73	0.45 - 1.19

Note: [1]Normal: ≥18.5 - ≤24.9 kg/m^2; [2] Overweight: ≥25 kg/m^2; [3]Includes very satisfied and satisfied; [4]In the last two weeks.
OR: *Odds Ratio*; 95%CI: 95% of Confidence Interval.

Table 4. Final logistic regression model of food insecurity in families of popular restaurants workers from *Rio de Janeiro*.

Variables	Crude		Adjusted		*p*-value
	OR	95%CI	*OR*	95%CI	
Socioeconomic set					
Education level					
> than 9 years	1.00		1.00		
Up to 9 years	2.06	1.26 - 3.36	2.76	1.61 - 4.73	0.0002
Labor set					
Employed at popular restaurants					
≥72 months	1.00		1.00		
≥29 months and <72 months	1.92	1.06 - 3.46	2.20	1.17 - 4.15	0.014
<29 months	2.13	1.18 - 3.84	2.71	1.45 - 5.11	0.002
Health set					
Satisfaction with diet composition/regularity					
Satisfied	1.00		1.00		
Dissatisfied	1.55	0.95 - 2.5	2.10	1.19 - 3.70	0.011

Note: *OR*: *Odds Ratio*; 95%CI: 95% of Confidence Interval.

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In the population of Popular Restaurants workers from *Rio de Janeiro*, the prevalence of food-insecure households was almost twice of that found by PNAD 2009 (30.2%). Salles-Costa *et al.*[15] studied families from the district *Campos Elíseos* in *Duque de Caxias*, considered one of the poorest districts of *Rio de Janeiro*, and found a prevalence of food insecurity of 53.8%, similar to that found herein. In two municipalities characterized by low human development indices in the states of *Pernambuco* and *Paraíba*, household food insecurity prevalences reached almost 90.0%[16].

Even in countries like the United States, the USDA[1] found a prevalence of food insecurity of 14.5% in 43,770 families in 2012. Between 2007 and 2008 in Canada, 7.1% of the general population was food insecure; during this same period, the prevalence of food insecurity among Canadian workers was of 4.0%. However, when categorized by sector, the highest prevalence was in the hospitality/food service sector (10.1%)[17]. In 2008 in *Colombia*[18], a reality closer to the Brazilian reality, the prevalence of food insecurity was 40.8%.

Another relevant point in the study sample is overweight as 56.7% of the sample was overweight. However, most still perceive their households to be food insecure. In *Pelotas* (RS) a study made a similar finding, that is, the so-called nutrition transition[19]. The coexistence of nutritional deficits and overweight, micronutrient deficiencies, and chronic non-communicable diseases within the same region or within the same household can still be found in Brazil and other developing countries. Individually, 47.0% of the Popular Restaurants workers reported consuming fruits and vegetables daily. Nonetheless, with the situation of food insecurity at home, the intake of fruits and vegetables dropped to once a week for 58.7% of the sample. When food insecurity prevalence is compared with low fruit and vegetable intake frequency, we presume that this condition together with overweight may be related to the intake of energy-dense, nutrient-poor foods.

In the case of Popular Restaurants workers who make two meals a day at work, having access to varied menus throughout the week, including fruits and non-starchy vegetables, may explain why they have a stronger tendency to perceive their households as food insecure since when they compare their food intake to the food intake of their families, they notice the difference between having or not a qualitatively healthy and quantitatively adequate diet at home. A common finding among food insecurity studies is that the individuals who are most likely to report food insecurity are those belonging to the socioeconomic classes with the lowest access to adequate quality food, a reflex of the social inequalities that persist in today's world.

The orientation of food insecurity issues, especially in the observance of socioeconomic issues, points toward social inequalities expressed at the national, state, and municipal spheres. Although the study population consists of formally employed individuals, 31.8% reported not having enough money to eat appropriately, and of these, 68.6% reported being food insecure, indicating inadequate income. Almost half (45.3%) of the urban population of cities in *Paraiba*[20] reported not having enough money to buy food. Santos *et al.*[19] found almost a tenfold prevalence (27.7%) of food insecurity in families receiving less than two minimum salaries compared with families receiving four or more minimum salaries (2.8%). According to the *Instituto Brasileiro de Análises Sociais e Econômicas* (Ibase, Brazilian Institute for Social and Economic Analyses)[21], the percentage of the family income spent on food increases as family income decreases. Usually activities that do not require specific skills do not pay well enough for the families to meet their basic needs, so they have a negative impact on wellbeing and quality of life[22].

In the study sample, up to nine years of formal education was significantly associated with perceived food insecurity at home as these individuals were two times more likely to be food insecure than those with more than nine years of

formal education. Both the 2004 and 2009 PNAD[2] found that education is an important factor in the determination of food security: as the years of formal education increase, the prevalence of food insecurity decreases.

Salles-Costa *et al.*[15] found that the education level of the family head was also significantly associated with food insecurity. In the ecological study conducted by Foley *et al.*[23] in South Australia with 19,037 individuals, a significant association was also found between low education level and food insecurity ($p<0.01$). A study in Canada also found that workers with low education level were significantly more likely to be food insecure[18]. Access to education may be considered one of the factors responsible for high social inequality, and the further an individual is from quality education, the more restricted he will be in exercising his full political rights and citizenship, especially regarding the human right to appropriate food.

Roughly 63.2% of Popular Restaurants workers who perceived being food insecure reported receiving a social benefit (welfare, disability pension, social rent, disease aid, and/or special child). Studies of individuals who receive social benefits also report high prevalences of food insecurity. PNAD[24] found that 66% of the individuals who received social benefits were food insecure. IBASE found that 80% of the families on welfare were food insecure[25]. Surveys conducted in *Viçosa* (MG)[26] and *Toledo* (PR)[27] found prevalences of 72.8% and 75.0%, respectively, of food insecurity in individuals on welfare. In the United States, 57.0% of food insecure families benefited from one or more of three food and nutrition assistance programs in the month before the survey[28]. Families who benefit from social programs are more vulnerable, have low income, live in unsatisfactory basic sanitation conditions, have low education level, and their skin color, socioeconomic class, and living location are similar to those of the study sample.

Time working in Popular Restaurants was significantly associated with perceived food insecurity at home: shorter employment time increases the likelihood of food insecurity. Aguiar *et al.*[29] found that Popular Restaurants have employee turnover rates of 17.3 to 40.3%. This worker may feel insecure with respect to his job, generating uncertainly regarding food acquisition.

Since this was a sectional study, it was not possible to establish causal relationships between food insecurity and the independent variables. Another limitation is the variable used as dependent in the association. Because it is a scale based on an individual's perception of his household, and because Popular Restaurants workers are aware of what a healthy diet is and have access to varied foods during work, comparison of his food secure situation with that of his family could increase his perception of food insecurity when compared with the general population.

However, since the number of studies on Popular Restaurants workers is scarce, and although they work at a government facility that aims to promote food security, their employment status with the outsourced food service companies is uncertain, just like that of other food service employees. Hence, this study contributes to a better understanding of the socioeconomic, labor, and health situation of soup kitchen workers, and is the first study to analyze their perceived food security status.

CONCLUSION

Although the study population works at a government facility that aims to promote food security, the prevalences of food insecurity are concerning. Moreover, factors such as low education level and shorter employment time at Popular Restaurants increase their chances of perceiving their household as food insecure.

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C O L L A B O R A T O R S

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