

ANTHROPOMETRIC, SOCIOECONOMIC AND HEALTH PROFILE OF EMPLOYEES ASSISTED BY THE WORKER'S FOOD PROGRAM

Perfil antropométrico, socioeconômico e de saúde de funcionários assistidos pelo programa de alimentação do trabalhador

Perfil antropométrico, socioeconómico y de salud de empleados asistidos en el Programa de Alimentación del Trabajador

Original Article

ABSTRACT

Objective: To determine the anthropometric, socioeconomic and health profile of employees covered by the Worker's Food Program (Programa de Alimentação do Trabalhador - PAT) in Fortaleza-CE, Brazil, and check the caloric suitability in meals provided by the company. **Methods:** This was a cross-sectional, observational, descriptive and quantitative study, where 103 employees between 18 and 60 years constituted a simple random sample without replacement, with the variables grouped into the following identification items: socioeconomic status, health and anthropometric assessment. For the food analysis, lunch menus and the per capita amounts daily offered were compared to the specifications of the Worker's Food Program. Calories and macronutrients suitability was performed in the software Avanutri™. **Results:** The socioeconomic profile showed that workers were mostly aged 20 to 40 years, high-school graduates, married, and homeowners. Regarding health status, workers were overweight, showing prevalence of hypertension, diabetes and obesity. The analyzed meal was found to be hypercaloric, hypoglycemic, hyperproteic and with normal contents of lipids. **Conclusion:** The workers had body mass index (BMI) of overweight, were in treatment of chronic non-degenerative diseases and were mainly women with income up to one minimum wage, who received inadequate food in calories, carbohydrates and proteins.

Descriptors: Collective Feeding; Workers; Anthropometry.

RESUMO

Objetivo: Determinar o perfil antropométrico, socioeconômico e de saúde de funcionários assistidos pelo Programa de Alimentação do Trabalhador (PAT) em Fortaleza-CE, Brasil, e verificar a adequação calórica na alimentação recebida em seu ambiente de trabalho. **Métodos:** Trata-se de um estudo transversal, observacional, descritivo e quantitativo, no qual se estudaram 103 funcionários entre 18 e 60 anos, sendo uma amostra aleatória simples, sem reposição, com as variáveis agrupadas nos seguintes quesitos de identificação: situação socioeconômica, avaliação antropométrica e de saúde. Para a análise da alimentação, os cardápios do almoço e as quantidades per capita oferecidas diariamente foram confrontados com as especificações do PAT. A adequação calórica e de macronutrientes foi realizada no software Avanutri®. **Resultados:** O perfil socioeconômico mostrou que os trabalhadores apresentavam, em sua maioria, uma faixa etária entre 20 e 40 anos, tinham ensino médio completo, eram casados e possuíam moradia própria. Quanto ao estado de saúde, os trabalhadores apresentaram sobrepeso, prevalência de hipertensão arterial, diabetes e obesidade. A refeição analisada se mostrou hipercalórica, hipoglicídica, hiperproteica e normolipídica. **Conclusão:** Os trabalhadores avaliados tinham índice de massa corporal (IMC) de sobrepeso, estavam em tratamento de doenças crônicas não degenerativas eram, em sua maioria, mulheres com renda de até um salário mínimo, cuja alimentação recebida era inadequada em calorias, carboidratos e proteínas.

Descritores: Alimentação Coletiva; Trabalhadores; Antropometria.

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Received on: 01/10/2012

Revised on: 02/14/2012

Accepted on: 05/02/2012

RESUMEN

Objetivo: Determinar el perfil antropométrico, socioeconómico y de salud de empleados asistidos en el Programa de Alimentación del Trabajador (PAT) en Fortaleza-CE, Brasil, y verificar la adecuación calórica de la alimentación recibida en su ambiente de trabajo. **Métodos:** Se trata de un estudio trasversal, observacional, descriptivo y cuantitativo, en el cual se estudió 103 empleados entre los 18 y 60 años, siendo la muestra aleatoria simple, sin reposición, con las variables agrupadas en los siguientes requisitos de identificación: situación socioeconómica, evaluación antropométrica y de salud. Para el análisis de la alimentación, los menús de comida y las cantidades per capita ofrecidas a diario fueron afrontados con las especificaciones del PAT. La adecuación de calorías y macronutrientes fue realizada con el software Avanutri®. **Resultados:** El perfil socioeconómico mostró que los trabajadores estaban, en su mayoría, en la franja etaria entre 20 y 40 años, tenían la educación secundaria completa, estaban casados y poseían vivienda propia. Respecto al estado de salud, los trabajadores presentaban sobrepeso, prevalencia de hipertensión arterial, diabetes y obesidad. La comida analizada se mostró hipercalórica, hipoglucida, hiperproteica y normolipídica. **Conclusión:** Los trabajadores evaluados tenían índice de masa corporal (IMC) de sobrepeso, estaban en tratamiento de enfermedades crónicas no degenerativas, eran, en su mayoría, mujeres que recibían hasta el sueldo mínimo, cuya alimentación recibida era inadecuada en calorías, carbohidratos y proteínas.

Descriptor: Alimentación Colectiva; Trabajadores; Antropometría.

INTRODUCTION

The Worker's Food Program (*Programa de Alimentação do Trabalhador - PAT*), food supplementation program created by the Federal Government, is intended for workers with incomes of up to five minimum wages per month. It aims to improve the nutritional status of workers and promote their health through healthy eating, seeking positive implications for their quality of life, increasing productivity and preventing work-related illnesses⁽¹⁻⁸⁾.

To accomplish its goals, and in line with the Interministerial Ordinance No. 66 of August 25, 2006, PAT proposes that, during the preparation of the menu, the minimum nutritional requirements are followed. The main meals (lunch, dinner and supper) should contain 600-800 calories, assuming an increase of 20% (400 calories) compared to the total energy value (TEV) of 2,000 calories per day, and should correspond to 30-40% of the daily VET^(2,9).

In the first year of its implementation at the national level in 1977, the PAT reached 1,200 companies, with a total of 700 thousand workers assisted. According to the Ministry

of Labour and Employment (*Ministério do Trabalho e Emprego*), in 2007, in Ceará, about 270,000 workers were benefited. In the same year, in Brazil, the program reached 11 million workers^(2,10).

There have been few surveys concerning the evaluation of the nutritional impact on workers when not adopting a healthy diet, according to the parameters mentioned above^(2,4,11,12). In order to know which health problems they may develop on that account, studies evaluating the effects of the program on the health of workers become necessary, mainly regarding the nutrition-related diseases^(2,4,11,12).

The program is having difficulties to reach their goals, due to an oversupply of protein and energy, leading to a prevalence of obesity, hypertension and increased levels of cholesterol and triglycerides among workers benefited by PAT. For the program to keep its guidelines, it is necessary to comply with the nutritional recommendations specified by Ordinance No. 66 and, above all, to know the commensal worker who receives such feeding supply daily, taking into account his anthropometric, economic and social profile^(1,4,10,11,13).

Due to the growing range of beneficiary employees, it is necessary to deepen the knowledge about their health status and the influence of the food offered.

Therefore, the realization of this study is important due to insufficient relevant scientific production in this area. It also covers other aspects of the work, and thus can assist and provide data to government agencies, to improve the adequacy of feeding supply to the worker's real needs.

Given this, the aim of this study is to determine the anthropometric, socioeconomic and health profile of the employees covered by PAT in Fortaleza and check the caloric suitability of the feeding supply received in the workplace.

METHODS

This is a cross-sectional, observational, descriptive and quantitative study, conducted in two companies in the field of industrial textile manufacturing, of a private legal nature, medium sized, which are inserted into PAT, in Fortaleza, Brazil, and provide meals to employees in the work environment in the modality of self-management.

The population is composed of 508 employees, being 378 from company A and 130 from company B. For sample calculation, simple random sample without replacement was used. After calculation, the sample obtained comprised 58 interviewees for company A and 45 interviewees for company B, with a confidence interval of 90% and a sampling error of 10%. That is, one can state with 90% confidence that the calculated sample is significant in

relation to its population.

The study, conducted in the period from June to August 2011, presented a sample of 103 adults. The criteria for sample selection included the company workers aged between 18 and 60 years, regardless of sex, who agreed to participate by signing the Free Informed Consent Form. Exclusion criteria comprised employees under age 18, regardless of sex, pregnant women and employees on leave due to illness.

Pregnant women were not assessed in this study because nutritional evaluation in pregnant women requires specific tables and charts. Employees under 18 were not included because, according to the Ministry of Labor and Employment, the worker must be proven at least 18 years to start a job.

Each worker was informed that their participation was voluntary and, if not willing to participate or willing to give it up at any time, there would not be losses in any way. They were also informed that at any time of the survey, they could clarify any doubts.

The form used for data collection, previously developed and applied by researchers, was divided into 4 categories: identification, socioeconomic status, health assessment and anthropometric measurements. The identification data assessed included: name, phone number, gender and date of birth. As to the socioeconomic profile, it investigated the following items: education, marital status, activity developed in the company, income and housing ownership.

Health evaluation was performed through the assessment of any preexisting illness, receiving treatment at the time of data collection, when workers reported on previous chronic diseases and type of medication used for the treatment.

The workers were inquired when they were in line at the refectory and the procedures (application of data collection form and anthropometry) were done before the meal. After the explanation of the purpose of the study, the workers were asked to sign the Consent Form, and then, anthropometry was performed.

The weight was measured using an anthropometric scale (Digital Glass™), with maximum weight capacity of 150 kg and 100 g graduation, unlocked and reset. The worker stood barefoot, in the middle of the platform, facing the researcher, with arms along the body and without any support. The type of clothing they used at the time of weighing was the uniform of light fabric, provided by the company. They were asked to withdraw any tools and personal belongings from the pockets, so that no interference occurred.

Height was measured with an inelastic measure tape (Wiso™), with graduation of 1 cm and maximum height of

150 cm. The employee stood barefoot with arms along the body, feet and heels together and leaning against the wall, and head up.

From the weight and height, it was calculated the body mass index (BMI), which is the proportion of body weight (in kilograms) to height (in meters) squared (kg/m^2)⁽¹⁴⁾.

To analyze the food provided, both company were asked to inform the lunch menus and the quantities per capita daily offered to workers, for confrontation to the specifications of PAT. Each company provided the menus of the main meal, that is lunch, for five days in a week. The caloric adequacy and macronutrient intake were assessed by Avanutri™ software, version 4.0, analyzing each company's menus; then, the arithmetic mean between the two menus was calculated.

The amounts supplied per capita were calculated by dividing the total number of meals served on the day into the whole amount of food used, as shown by the stock output. The nutritional value of the meals was defined based on the variables: energy, carbohydrate, protein and total fat.

The adequacy of menus was assessed facing Ordinance No. 66 of the Ministry of Health, 2006, according to which the main meals should provide 30-40% of total daily energy, based on a diet of 2000 kcal.

Data analysis was conducted through the Statistical Package for Social Science (SPSS) for Windows, version 17.0, from descriptive statistics (mean, minimum and maximum, and standard deviation) and frequency data.

This study has been approved by the Ethics Committee of University of Fortaleza, under Opinion no.82/2009, in accordance with Resolution 196/96 of the National Health Council (*Conselho Nacional de Saúde*).

RESULTS

The study evaluated 103 workers, being 24 (23.3%) males and 79 (76.7%) females.

Table I reports the sociodemographic characteristics of the employees, classified by gender. The predominant age group was between 20 and 40 years, which comprises 66 (64%) female and male.

The most predominant educational level included 53 (51.5%) employees with secondary level of education, followed by 19 (18.4%) with complete primary education.

Regarding the marital status, 52 (50.5%) were married, followed by 51 (49.50%) single, taking into account men and women; 16 (66.7%) men were married, while 51 (54.4%) women were single.

On the issue of monthly income, 60 (58.3%) of the employees received less than one minimum wage, followed by 37 (35.9%) who earned 1-2 minimum wages.

Table I - Sociodemographic and socioeconomic characteristics of the employees, classified by gender. Fortaleza-CE, 2011.

Variables	Gender				Total	
	Male		Female			
	n	%	n	%	n	%
Age range (in years)						
< 20	2	8.30	1	1.30	3	2.90
20 -- 30	9	37.50	24	30.40	33	32.00
30 -- 40	9	37.50	24	30.40	33	32.00
40 -- 50	3	12.50	22	27.80	25	24.30
≥ 50	1	4.20	8	10.10	9	8.70
Total	24	100.00	79	100.00	103	100.00
Educational level						
Incomplete primary school	3	12.50	15	19.00	18	17.50
Complete primary school	6	25.00	13	16.50	19	18.40
Incomplete secondary	1	4.20	8	10.10	9	8.70
Complete secondary	14	58.30	39	49.40	53	51.50
Incomplete bachelor or equivalent	---	---	1	1.30	1	1.00
Complete bachelor or equivalent	---	---	3	3.80	3	2.90
Total	24	100.00	79	100.00	103	100.00
Marital status						
Single, divorced or widow	8	33.30	43	54.40	51	49.50
Married or stable union	16	66.70	36	45.60	52	50.50
Total	24	100.00	79	100.00	103	100.00
Monthly income						
Under 1 MW	12	50.00	48	60.80	60	58.30
1 to 2 MW	9	37.50	28	35.40	37	35.90
Above 3 MW	3	12.50	3	3.80	6	5.80
Total	24	100.00	79	100.00	103	100.00
Housing ownership						
Of one's own	22	91.70	62	78.50	84	81.60
Rented	2	8.30	17	21.50	19	18.40
Total	24	100.00	79	100.00	103	100.00
Length of service (in years)						
< 1	6	25.00	13	16.50	19	18.40
1 -- 3	8	33.30	18	22.80	26	25.20
3 -- 5	1	4.20	9	11.40	10	9.70
5 -- 7	3	12.50	9	11.40	12	11.70
≥ 7	6	25.00	30	38.00	36	35.00
Total	24	100.00	79	100.00	103	100.00

Table II presents the descriptive measures of the employees classified by gender. For the anthropometric profile obtained, according to age groups, the average age found among males was 32.71 years, with an average BMI of 24.67 kg/m² (normal). The average age of females was 36.32 years, with an average BMI of 25.26 kg/m² (overweight).

Table III reports the age range, length of service of the employee and preexisting illnesses, classified by nutritional status. When relating age range and nutritional status, 23 (22.33%) workers had a normal nutritional status and were within the age group 20-30 years, followed by 14 (13.59%) who were overweight but were 30 to 40. In this same age group, 5 (4.85%) workers were obese, in grade 1 status.

The length of service, classified by nutritional status, reports that 18 (17.48%) employees had BMI of normal classification, followed by 16 (15.53%) who were overweight; 48 (46.66%) presented nutritional status of overweight and obesity grade 1, which is already alarming.

The health profile of the evaluated employees showed

that 38 (36.88%) had diseases or were in treatment of a chronic non-degenerative disease, being predominant the arterial hypertension - 10 (9.71%) of the employees - followed by diabetes in 3 (2.91%) of them. Of the workers who were being treated for hypertension, 9 (8.74%) were overweight and obese.

Table IV gathers the information about the type of occupancy the workers have within the company, classified by nutritional status, which revealed 50 (48.54%) workers classified as overweight, obesity grade 1 and grade 2.

The companies provide a single menu that serves the operational and administrative staff, offering the following preparations: rice, beans, salad, two types of dishes based on meat (protein food) and garnish. When analyzing the nutritional characteristics of menus, the energy supplied was found, in average, higher than the daily recommendations. Analysis of the calorific value in lunch preparations showed an average of 1,643.06 calories (hypercaloric), divided into 24.51% carbohydrate (hypoglycemic), 51.37% proteins (hyperproteic) and 24.11% fat (normolipidic).

Table II - Descriptive measures of the employees, classified by gender. Fortaleza-CE, 2011.

Gender	Age	Weight	Height	BMI
Male				
Mean	32.71	69.19	1.68	24.67
Standard deviation	10.00	10.48	0.06	3.53
Mode	28	60.00 and 70.00	1.60 and 1.69	23.01 and 23.43
Minimum	19.00	55.00	1.58	19.72
Maximum	62.00	91.00	1.81	31.16
Female				
Mean	36.32	60.91	1.55	25.26
Standard deviation	9.70	10.43	0.06	4.11
Mode	24	62.00	1.60	25.00; 25.79; 26.22; 27.34 and 31.22
Minimum	19.00	40.00	1.43	18.13
Maximum	57.00	94.00	1.69	38.63
Total				
Mean	35.48	62.84	1.58	25.13
Standard deviation	9.84	10.97	0.08	3.98
Mode	22; 24; 36 and 38	62.00	1.60	27.34 and 31.22
Minimum	19.00	40.00	1.43	18.13
Maximum	62.00	94.00	1.81	38.63

Table III - Age range, length of service, diseases and type of preexisting illness, classified by nutritional status. Fortaleza-CE, 2011.

Variables	Nutritional status										Total	
	Slight Underfeeding		Normal		Overweight		Obesity grade 1		Obesity grade 2			
	n	%	n	%	n	%	n	%	n	%	n	%
Age range (in years)												
< 20	---	---	3	2.91	---	---	---	---	---	---	3	2.91
20 -- 30	1	0.97	23	22.33	7	6.80	1	0.97	1	0.97	33	32.04
30 -- 40	---	---	13	12.62	14	13.59	5	4.85	1	0.97	33	32.04
40 -- 50	---	---	10	9.71	12	11.65	3	2.91	---	---	25	24.27
≥ 50	---	---	3	2.91	4	3.88	2	1.94	---	---	9	8.74
Total	1	0.97	52	50.49	37	35.92	11	10.68	2	1.94	103	100.00
Length of service (in years)												
< 1	1	0.97	9	8.74	6	5.83	2	1.94	1	0.97	19	18.45
1 -- 3	---	---	13	12.62	8	7.77	4	3.88	1	0.97	26	25.24
3 -- 5	---	---	6	5.83	2	1.94	2	1.94	---	---	10	9.71
5 -- 7	---	---	6	5.83	5	4.85	1	0.97	---	---	12	11.65
≥ 7	---	---	18	17.48	16	15.53	2	1.94	---	---	36	34.95
Total	1	0.97	52	50.49	37	35.92	11	10.68	2	1.94	103	100.00
Diseases and type of preexisting illness												
With preexisting disease	---	---	16	15.53	15	14.56	7	6.79	---	---	38	36.88
Arterial hypertension	---	---	1	0.97	7	6.80	2	1.94	---	---	10	9.71
Diabetes	---	---	---	---	2	1.94	1	0.97	---	---	3	2.91
Cardiovascular disease	---	---	1	0.97	1	0.97	1	0.97	---	---	3	2.91
Renal disease	---	---	---	---	---	---	1	0.97	---	---	1	0.97
Liver disease	---	---	2	1.94	---	---	---	---	---	---	2	1.94
Other diseases	---	---	12	11.65	5	4.85	2	1.94	---	---	19	18.44
No disease	1	0.97	36	34.97	22	21.36	4	3.88	2	1.94	65	63.12
Total	1	0.97	52	50.50	37	35.92	11	10.67	2	1.94	103	100.00

Table IV - Occupation of the employees, classified by nutritional status. Fortaleza-CE, 2011.

Occupation	Nutritional status										Total	
	Slight Underfeeding		Normal		Overweight		Obesity grade 1		Obesity grade 2			
	n	%	n	%	n	%	n	%	n	%	n	%
Stitcher	1	0.97	16	15.53	9	8.74	3	2.92	---	---	29	28.16
Assistant	---	---	13	12.62	2	1.94	1	0.97	1	0.97	17	16.50
Machine operator	---	---	9	8.74	4	3.88	---	---	---	---	13	12.62
Reviewer	---	---	1	0.97	5	4.85	---	---	1	0.97	7	6.79
Supervisor	---	---	3	2.92	---	---	1	0.97	---	---	4	3.89
Instructor	---	---	---	---	3	2.92	---	---	---	---	3	2.92
Mechanic	---	---	1	0.97	2	1.94	---	---	---	---	3	2.91
General services	---	---	1	0.97	1	0.97	1	0.97	---	---	3	2.91
Head fabric cutting	---	---	---	---	1	0.97	1	0.97	---	---	2	1.94
Production checker	---	---	2	1.94	---	---	---	---	---	---	2	1.94
Cook	---	---	---	---	1	0.97	1	0.97	---	---	2	1.94
Manager	---	---	2	1.94	---	---	---	---	---	---	2	1.94
Inspector	---	---	1	0.97	1	0.97	---	---	---	---	2	1.94
Others	---	---	3	2.92	8	7.77	3	2.92	---	---	14	13.61
Total	1	0.97	52	50.49	37	35.92	11	10.68	2	1.94	103	100.00

DISCUSSION

The present study allowed the analysis of the health conditions existing among the workers of two textile manufacturing companies and the food provided by these. It was shown that workers of companies benefited by PAT presented non-transmittable chronic diseases under treatment, with prevalence of hypertension, diabetes and obesity, which is consistent with the literature^(2,4-6,11,15,16).

In a research⁽¹⁵⁾ about chronic diseases among the employees, the results refer that 14.64% were affected by such diseases and, of the total, approximately 9% were under treatment for hypertension and diabetes. A result similar to the findings of this study, where 9,71% were found to be treating from hypertension, followed by diabetes.

In this research, the mean age for males was 32.71 years, and 36.32 years for females. These results are also similar to other studies^(2,4,15,16), that revealed an average of age of 36.4 years among the workers.

A study⁽³⁾ comprising workers served by PAT showed that 88% of the population was in the age range from 20 to 50 years and were married. Similar results are reported in literature^(2,15) showing the same age range, with 50,5% of the total being married.

In this study, men presented significantly lower mean values than women in relation to age and body mass index (BMI), with the same result of the study that was conducted in Bahia^(4,17), which differs from results of another study⁽²⁾. This can be justified by regional differences existing in the research sites and in target audience, involving different food issues, cultural and health aspects^(2,18).

In other work⁽¹⁸⁾, there was an association between PAT and the increase in the weight of the employees. It was also reported⁽³⁾ a high prevalence of overweight and obesity among employees benefitted by the programme, mainly of the male gender, what is also compatible with the result found in the present investigation. Employees of companies that received the benefits of the worker's food programme presented higher incidence of weight winning and overweight⁽⁴⁾.

Other studies^(1,3,4,11,19) found the same result in relation to the percentage distribution of the macronutrients, the carbohydrates supply inferior to recommended levels, protein supply superior to recommended and fat supply close to recommendations, in contrast to the findings of other investigations^(10,11). That can be explained by the methodological ways of collecting the *per capita* amounts and for not taking into account what is consumed by the worker.

The unsuitability of values established by PAT in the Ministerial Ordinance No. 66, of August 25, 2006, has already been reported in the literature^(6,8,12). In the present study, the lack of energy and macronutrients were seen to present high percentage of inadequacy.

Implementing the nutritional education for the workers, making them aware of the benefits of healthy eating, makes the treatment become collective and prioritized by all, no longer following a one-way direction. The nutritionist must play its role as an educator and fulfill the attributions intended for him, using their workspace to accomplish his role of health care professional.

The findings in the present study point out the primary need of guiding the companies in order to get their menus adjusted to the new nutritional parameters of the programme, through knowing the objectives of PAT and how to reach them, since the companies' participation is essential to the expansion and increased coverage of workers, especially those of low income.

CONCLUSION

The workers assessed presented BMI of overweight, were ongoing treatment from chronic non-degenerative diseases, were mostly women with income up to one minimum wage, whose main meals were provided with inadequate levels of calories, carbohydrates and proteins.

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