

MEALS SERVED AT A FOOD AND NUTRITION SERVICE: AN EVALUATION OF WORKERS' HEALTH

Refeições servidas em unidade de alimentação e nutrição: uma avaliação da saúde dos trabalhadores

Comidas de la unidad de alimentación y nutrición: una evaluación de la salud de los trabajadores

Original Article

ABSTRACT

Objective: To evaluate the nutritional composition of meals served at a Food and Nutrition Service in relation to the nutritional parameters established by the Worker's Food Program, and to evaluate the risk factors associated to the non-communicable chronic diseases found among the beneficiaries of the service. **Methods:** An observational, cross-sectional and descriptive study conducted at the Food and Nutrition Service, located at a company that provides automotive services in the municipality of Curitiba, Paraná (PR), in October 2014. For data collection, information regarding the nutritional composition of meals served at midday was gathered. An anthropometric evaluation was conducted, and a questionnaire was applied to evaluate the lifestyle of 19 company employees. **Results:** In general, the total energy value (1,311.7 Kcal), proteins (19%), total fats (32%), fibers (21.14 g), sodium (1,828.6 mg), and the percentage of calories from proteins (12%) in the meals served were above the limits established by the Worker's Food Program. It was found that 53% of the employees were overweight, 21% were smokers, 58% did not practice physical activity, and 32% presented some pathological condition, with the diagnosis of arterial hypertension reported by all the employees. **Conclusion:** The meals served at the Food and Nutrition Service evaluated did not meet the parameters established for worker's nutrition, which could harm the health of beneficiaries, when associated to the main risk factors found among them, such as excess weight, sedentary lifestyle, and prevalence of arterial hypertension, besides the lack of compliance with Brazilian labor laws.

Descriptors: Nutrition Programs and Policies; Chronic Disease; Collective Feeding; Nutritional Status.

RESUMO

Objetivo: Avaliar a composição nutricional das refeições servidas em uma Unidade de Alimentação e Nutrição em relação aos parâmetros nutricionais estabelecidos pelo Programa de Alimentação do Trabalhador e avaliar os fatores de risco associados às Doenças Crônicas Não Transmissíveis existentes nos beneficiados. **Métodos:** Realizou-se estudo observacional, transversal e descritivo em uma Unidade de Alimentação e Nutrição, localizada em uma empresa do setor de prestação de serviços automotivos, no município de Curitiba-PR, em outubro de 2014. Para a coleta de dados, obtiveram-se informações referentes à composição nutricional das refeições servidas no período do almoço, durante um mês. Realizou-se avaliação antropométrica e aplicou-se um questionário para avaliar o estilo de vida de 19 funcionários da empresa. **Resultados:** Na média geral, o valor energético total (1.311,7 Kcal), proteínas (19%), gorduras totais (32%), fibras (21,14 g), sódio (1828,6 mg) e o percentual proteico-calórico (12%) das refeições estavam acima dos limites estabelecidos pelo Programa de Alimentação do Trabalhador. Constatou-se que 53% dos funcionários estavam com sobrepeso, 21% eram fumantes, 58% não praticavam atividade física e 32% apresentavam alguma patologia, sendo o diagnóstico de hipertensão arterial relatado por todos os funcionários. **Conclusão:** As refeições servidas na Unidade de Alimentação e Nutrição avaliada estavam inadequadas aos parâmetros estabelecidos para a alimentação do trabalhador, o que pode acarretar prejuízo à saúde dos beneficiários quando

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associado aos principais fatores de riscos encontrados, como sobrepeso, sedentarismo e prevalência de hipertensão arterial, além do não cumprimento à legislação trabalhista brasileira.

Descritores: *Programas e Políticas de Nutrição e Alimentação; Doença Crônica; Alimentação Coletiva; Estado Nutricional.*

RESUMEN

Objetivo: *Evaluar la composición nutricional de las comidas de la Unidad de Alimentación y Nutrición respecto los parámetros de nutrición establecidos en el Programa de Alimentación del Trabajador y evaluar los factores de riesgo asociados a las Enfermedades Crónicas No Transmisibles de los beneficiados.*

Métodos: *Se realizó un estudio observacional, transversal y descriptivo en una Unidad de Alimentación y Nutrición localizada en una empresa del sector de servicio automotriz, en el municipio de Curitiba-PR en octubre de 2014. Para la recogida de datos se obtuvieron informaciones respecto la composición nutricional de las comidas servidas en el almuerzo durante un mes. Se realizó la evaluación antropométrica y se aplicó un cuestionario para evaluar el estilo de vida de 19 empleados de la empresa.*

Resultados: *En la media general, el valor energético total (1.311,7 Kcal), proteínas (19%), las grasas totales (32%), las fibras (21,14 g), el sodio (1828,6 mg) y el porcentual proteico-calórico (12%) de las comidas estaban por encima de los límites establecidos en el Programa de Alimentación del Trabajador. Se constató que el 53% de los trabajadores tenían sobrepeso, el 21% eran fumadores, el 58% no practicaban actividad física, el 32% presentaban alguna patología y el diagnóstico de hipertensión arterial fue relatado por todos los trabajadores. Conclusión: Las comidas de la Unidad de Alimentación y Nutrición evaluada eran inadecuadas para los parámetros establecidos para la alimentación del trabajador lo que puede perjudicar a la salud de los beneficiarios al asociarlas a los principales factores de riesgo encontrados como el sobrepeso, el sedentarismo y la prevalencia de hipertensión arterial además del no cumplimiento de la legislación brasileña de trabajo.*

Descritores: *Programas y Políticas de Nutrición y Alimentación; Enfermedad Crónica; Alimentación Colectiva; Estado Nutricional.*

INTRODUCTION

The nutritional profile transition in Brazil is characterized by dietary pattern modification associated with reduced physical activity, which is directly reflected in the change in body composition of the population⁽¹⁾. In addition to this, it is also noticeable an increased prevalence of chronic Non-communicable Diseases (NCDs), which constitute the health problem of largest magnitude and account for approximately 70% of the causes of deaths, severely affecting poor layers of the population and groups with higher vulnerability, such as people with low income and education level⁽²⁾.

The World Health Organization (WHO) highlights that the main risk factors for NCDs are smoking, excessive alcohol consumption, inadequate diets, physical inactivity and obesity, which can lead to morbidities such as heart disease, diabetes mellitus, some cancers, and chronic respiratory diseases⁽³⁾.

In order to change the scenario of NCDs in the country, the Ministry of Health (MoH) implemented in 2011 an action plan, integrating various sectors for the prevention and control of these diseases and their risk factors⁽⁴⁾. Among the actions are strategies to support the implementation of nutritional parameters established by the Worker Food Program (WFP), focused on healthy eating and prevention of these diseases in the workplace⁽⁵⁾.

The WFP was created by the federal government through Law No. 6,321, of April 14, 1976⁽⁶⁾, and regulated by Decree No. 5 of January 14, 1991⁽⁷⁾. It is considered a complementary food program organized by the government, companies and workers in partnership, which prioritizes low-income workers, aimed at reducing the incidence of labor accidents and the rates of absenteeism and turnover, and increasing productivity in the companies⁽⁸⁾.

Joining the WFP is voluntary but, in order to enjoy the benefits, the beneficiary companies must prepare their meals following the nutritional parameters required by Interministerial Decree No. 66/2006⁽⁹⁾ and Ordinance No. 193/2006⁽¹⁰⁾, which establish criteria regarding the distribution of macronutrients, fiber and sodium in meals; amount of fruits, legumes or vegetables; and the requirement of technical responsibility (nutritionist) for the program implementation.

The aim of the study was to evaluate the nutritional composition of meals served in a Food and Nutrition Service in relation to the nutritional parameters established by the WFP and assess the risk factors associated with the existing NCD among the beneficiary.

METHODS

Observational, cross-sectional, descriptive study, carried out during October 2014, in a Food and Nutrition Service (FNS), located in a company providing automotive services, in the city of Curitiba, PR, selected by convenience and access criteria.

The company adopts the self-management mode, running a self-service cafeteria, except for the protein dish and dessert, which are offered in portions, and provides 400 meals on average per day, served in the lunch period. Inclusion criteria were being a WFP beneficiary company, having a full-time nutritionist, interest in and willingness to participate in the study. The selection criteria for employees

were age above 18 years, performing activities of moderate type in the company, having meals in the FNS and signing the Informed Consent (IC) form.

For evaluation of the nutritional composition of meals, the preparations served at lunchtime were assessed for a month (October/2014), with 20 business days, divided into four weeks, with service from Monday to Friday. Information collection initially concerned the ingredients and the amount of fresh food used in preparations; secondly, the household measures, correction factor, and cooking were evaluated, by means of the Household Measurement Table of the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística - IBGE*)⁽¹¹⁾, and the total efficiency of the preparations was calculated⁽¹²⁾. The per capita efficiency was defined as the quantity of food produced divided by the number of meals served per day⁽¹³⁾.

Subsequently, the total energy value (TEV) was calculated, as well as the amounts of carbohydrates, proteins, total fats, saturated fats, fibers and sodium^(11,14), and the protein-calorie percentage (NdPCal)⁽¹⁵⁾ of each meal.

The results were compared to the values recommended by the Interministerial Decree No. 66/2006⁽⁹⁾ and Ordinance No. 193/2006⁽¹⁰⁾, as shown in Table I.

To evaluate the risk factors of existing NCDs among the workers attending the FNS, an anthropometric assessment was performed, with the Body Mass Index (BMI) obtained by body weight (kg) divided by height squared (m²), and a questionnaire adapted from the Ministry of Health was applied⁽¹⁶⁾.

For the anthropometric assessment, the study used criteria established by the Food and Nutrition Surveillance System (*Sistema de Vigilância Alimentar e Nutricional -*

Chart I - Nutritional parameters established by the Worker's Food Program for main meals (lunch, dinner and supper), 2015.

Distribution of the nutritional variables	Established parameters
Total Energy Value	Should contain 600-800 calories, admitting an increase of 20% in the TEV of 2000 calories/day (400 calories), and should be in the range of 30% to 40% of the daily Total Energy Value
Carbohydrates	60% of the Total Energy Value
Proteins	15% of the Total Energy Value
Total fat	25% of the Total Energy Value
Saturated fats	Less than 10% of the Total Energy Value
Fibers	7 to 10 grams
Sodium	720 to 960 miligrams
NdPCal	A minimum of 6% and maximum of 10% of Total Energy Value

SISVAN)⁽¹⁷⁾. For body weight measurement, the employees wore light clothing and no shoes, and were placed on a Glife® electronic digital scale, with precision of 0.1 kg. In the evaluation of height, a 150 cm tape measure, with an accuracy of 0.1 cm, was fixed at a flat wall without baseboard, from the height of 50 cm from the ground. In this measurement, the subjects kept their feet together, heels touching the wall in upright posture, with eyes fixed on the horizon (or head adjusted to the Frankfurt plane), and a ruler was lined on their head to measure the height on the tape. BMI classification was made according to the cutoff points used for nutritional diagnosis of adults, established by the World Health Organization⁽¹⁸⁾.

A questionnaire adapted from the Ministry of Health⁽¹⁶⁾, with multiple-choice questions relating to the workers' lifestyle (smoking, physical activity, alcohol consumption and diseases), was subsequently applied, in order to evaluate,

among this population, the existence of morbidities or risk factors for their development.

As for the smoking habit, the workers were classified into nonsmokers, smokers and former smokers⁽¹⁶⁾. The frequency of physical activity was investigated for evaluation of the sedentary lifestyle, with workers classified as active, when exercising at least 30 minutes five times a week, or more than 150 minutes per week. Those who did not meet these criteria were considered sedentary⁽¹⁹⁾. The alcohol consumption was classified as present or absent, being assessed the weekly intake frequency⁽¹⁶⁾.

The results were analyzed by means of simple descriptive statistics (mean and standard deviation), and the study was conducted after approval by the Research Ethics Committee of José Campos Andrade University Center, under opinion no. 798,420.

RESULTS

Regarding the inclusion criteria, the study sample was composed of 19 employees, of which fifteen performed operational functions, and the remaining four, administrative functions.

Table I displays the result of the nutritional composition of the meals offered in the FNS. It was found that, on average, the TEV (1311.7 kcal), proteins (19%), total fats (32%), sodium (1828.6 mg), fibers (21.14 g), and the NdPCal (12%) of meals were above the limits recommended by the WFP (Chart I).

As for the variables "sex", "age" and "BMI" (Table II), it was observed that 68% (n=13) of the employees were men, and the majority of survey participants (63%, n=12)

were in the age range between 20 and 50 years, 53% (n=10) were overweight and 21% (n=4) were obese.

The evaluation of variables "smoking", "physical activity" and "alcohol consumption" is shown in Table III. It is observed that 42% (n=8) of the employees were non-smokers, and 37% (n=7) declared to be former smokers. Concerning physical activity, 58% (n=11) did not perform any. Regarding the habit of drinking, 32% (n=6) reported drinking alcohol frequently, of which 50% (n=3) reported consuming it more than twice a week, or daily.

The distribution of the disorders reported by the employees attending the FNS is seen in Table IV. It is observed that 32% (n=6) of the sample had some kind of disease, and the diagnosis of hypertension was reported by all participants.

Table I - Evaluation of the nutritional composition of meals served at lunchtime in a Food and Nutrition Service of an automotive services company. Curitiba, Paraná, 2014.

Day	TEV	CH (%)	PTN (%)	NdPCal (%)	TF (%)	SF (%)	Fiber (g)	Sodium (mg)
1	1016.7	50	16	10	34	14	16.5	1494.9
2	1501.0	50	14	8	36	10	17.3	2201.7
3	1291.8	49	20	11	31	8	19.1	1598.3
4	1408.0	52	19	10	29	6	30.4	1321.2
5	1471.8	51	12	8	37	8	39.4	2129.6
6	924.5	53	16	9	31	8	31.3	2304.1
7	911.0	60	18	11	22	7	18.2	1751.3
8	1401.0	40	16	10	44	14	21.0	1990.1
9	1494.7	35	20	13	45	16	18.3	1734.0
10	1685.7	57	17	10	25	6	18.2	2363.5
11	1009.4	56	23	14	21	5	17.3	1776.9
12	1209.1	39	20	13	41	15	15.9	1716.8
13	1230.7	39	22	13	39	12	17.5	1870.4
14	1444.1	49	21	13	30	10	20.0	1929.6
15	1595.0	43	28	17	29	6	30.2	1453.9
16	962.0	53	24	15	23	9	17.2	1807.6
17	1191.5	54	24	15	22	4	16.9	2061.9
18	1490.9	40	19	12	41	16	17.2	1743.2
19	1192.7	54	18	11	28	6	20.7	1569.5
20	1802.6	38	24	16	38	8	20.0	1753.6
Mean	1311.56	48.1	19.55	11.95	32.3	9.4	21.13	1828.6
SD	259.49	7.36	3.89	2.58	7.58	3.81	6.39	281.66

TEV=Total Energy Value; CH=carbohydrate; PTN=protein; NdPCal=protein-calorie percentage; TF=total fat; GS=saturated fat; g=gram; %=percentage; mg=miligram; SD=standard deviation.

Table II - Sex, age range and body mass index of employees in a Food and Nutrition Service of an automotive services company. Curitiba, Paraná, 2014.

Variables	% (n=19)
Sex	
Male	68 (n=13)
Female	32 (n=6)
Age range	
Under 20 years	11 (n=2)
20 to 30 years	21 (n=4)
31 to 40 years	21 (n=4)
41 to 50 years	21 (n=4)
51 to 60 years	26 (n=5)
Body Mass Index	
Below 18,5 Kg/m ²	0 (n=0)
18,5 to 24,9 kg/m ²	26 (n=5)
25 to 29,9 kg/m ²	53 (n=10)
30 to 34,9 Kg/m ²	16 (n=3)
35 to 39,9 kg/m ²	5 (n=1)
Above 40 kg/m ²	0 (n=0)

n = sample number; % = percentage.

Table III - Life habits characteristics of workers in an automotive services company. Curitiba, Paraná, 2014.

Variables	% (n)
Smoking (n=19)	
Yes	21 (n=4)
No	42 (n=8)
Former smoker	37 (n=7)
Practice of physical activity (n=19)	
Yes	42 (n=8)
No	58 (n=11)
Frequency of physical activity (n=8)	
Once a week	12 (n=1)
Two to three times a week	0 (n=0)
More than three times a week	88 (n=7)
Alcohol consumption (n=19)	
Yes	32 (n=6)
No	68 (n=13)
Frequency of alcohol consumption (n=6)	
Now and then	33 (n=2)
Once a week	17 (n=1)
More than twice a week or daily	50 (n=3)

%=percentage; n=sample number.

Table IV - Distribution of the pathologies reported by workers in an automotive services company. Curitiba, Paraná, 2014.

Variables	% (n)
Diagnosed pathologies (n=19)	
Yes	32 (n=6)
No	68 (n=13)
Types of pathologies (n= 6)	
Arterial hypertension	32 (n=6)
Dyslipidemia	11 (n=2)

% = percentage; n = sample number.

DISCUSSION

Providing workers with adequate food is essential for maintenance of health and productivity of the company⁽²⁰⁾. In this sense, the companies participating in the WFP have the responsibility of ensuring the quality of food provided to the employees, the lunch being one of the main meals⁽⁹⁾, considered essential for the promotion of healthy food to the workers.

On the average, the TEV (1311.7 kcal) of the meals was inappropriate, since the WFP sets the value of 600 to 800 calories as the parameter for the main meals, assuming a 20% increase in the TEV of 2,000 Kcal/day, with a total of 1,200 Kcal/day. The meals TEV must still range from 30% to 40% of the daily TEV⁽⁹⁾. The average value of energy intake in this study was 66%, above the established limit. Therefore, the meals offered in the FNS studied do not guarantee healthy food to the workers, which may be related to the composition of preparations, which are composed of high-fat and high-protein ingredients, in association with frying methods.

Similar results were also found in other study conducted in Brazil, where high caloric density was observed in meals served to workers, and that result was attributed to large supplies of fat, protein, carbohydrate and cholesterol⁽²¹⁾. The positive energy balance, in association with low activity level, stands as one of the factors that favors an increase in the individuals' body mass, and may be related to overweight in the study population⁽²¹⁾. These facts reinforce the importance of developing varied menus, with an increase in the supply of fruits and vegetables, in order to help in reducing the energy density of meals in the FNS.

On average, the percentage of carbohydrates (48.1%) was below the nutritional parameters determined by the WFP (60%)⁽⁹⁾. It is worth noting that the percentage distribution of the nutrients is based on the overall average of calories found in food, which does not suggest necessarily a low supply of carbohydrates, but an inadequate percentage distribution of the nutrients. This occurs because foods that are source of carbohydrates are daily supplied through the composition of the main dish and are frequently (2 to 3 times per week) offered as a complement.

Regarding the percentage of proteins and protein-calorie (NdPCal) (19.55% and 11.95%, respectively), both had average values above the limits established by the WFP (15% for proteins and 6 % to 10% for NdPCal)⁽⁹⁾. These results can be related to the high amount of meat in meals provided in the assessed FNS (two daily options). Excessive intake of this nutrient can impair the individuals' health, as it is considered the main source of saturated fat and cholesterol, which can increase the risk of atherosclerosis⁽²²⁾.

The average value of total fats (32.3%) exceeded the one recommended by law (25%)⁽⁹⁾. This result can be explained by the customary use of fried foods, high-fat cuts of meat, and other preparations with high lipid content. Excessive fat intake is associated with changes in blood lipid profile, with a consequent increase in risk factors for the development of NCDs⁽²³⁾.

A study held in 72 companies in the city of São Paulo, SP⁽²⁴⁾, when assessing dietary aspects of meals provided to employees, also found that the average total fat was 30%. In order to change such reality, making use of methods of preparation that favor a reduction in the lipid content, such as stews, and roasted or boiled dishes, as well as choosing ingredients with less fat, such as lean meats, are important strategies⁽²⁵⁾.

Sodium supply in the meals (1828.6 mg) was found above the limits set by the WFP (720-960 mg) for the main meals (lunch, dinner and supper)⁽⁹⁾, which may be related to the use of instant sodium-based seasonings (meat broth, tomato paste and soy sauce), encased meats (sausage and others), bacon, and cooking salt. To reduce the consumption of sodium in meals served in food and nutritional services, it is recommended to use Preparation Technical Sheets, since they help in controlling and replacing industrial seasonings (concentrated broths) and table salt by natural seasonings (dried herbs, onions, garlic, spices), marinades, and natural broths that enhance the flavor of food⁽²⁶⁾.

It is also worth mentioning that the amount of sodium found in meals evaluated in this study is close to the value recommended by the WHO for the entire day (2000 mg)⁽²⁷⁾, evidencing that a sole meal is supplying almost all of the daily demand for sodium. That should be modified because excessive consumption of this mineral is associated with increased prevalence of arterial blood pressure, and is considered an important risk factor for increased mortality from cardiovascular diseases⁽²³⁾.

The average amount of fiber found in meals (21.13 g) was high, reaching two to three times the value recommended by the WFP⁽⁹⁾. This result is unsatisfactory because, despite being important for the control of blood glucose, lipid metabolism, and favoring the proper functioning of the intestinal transit, satiety and weight control⁽²⁸⁾, the consumption of fiber, when in excess, may cause problems, such as dehydration, intestinal discomfort, and limited absorption of iron, calcium, and other nutrients, and may result in nutritional deficiencies⁽²⁹⁾.

The percentage of saturated fat in the meals (9.4%) was within the parameters determined by the WFP (<10%)⁽⁹⁾, which is satisfactory, since the consumption of saturated fats above the allowed limit is related to changes in blood

lipid profile and to the progression of diseases such as type 2 diabetes and obesity⁽²²⁾.

It was found that more than half of the employees were overweight or obese. These results are unexpected for workers who perform intense activities, like the ones assessed in this study. Such scenario of overweight and obesity prevalence has also been found in other studies with workers in Brazil^(8,13). These results may be related to inadequate food choices, both within the company and outside, and demonstrate that more effective actions should be taken in order to reduce the impact of the current scenario in the country in relation to these diseases.

Most of the employees were non-smokers or claimed to be former smokers, which is satisfactory, since smoking is considered an important public health problem, due to the high mortality from diseases related to that habit. According to a telephone survey conducted in the country, the number of smokers decreased from 2006 to 2013, when the percentage of 15.6% fell to 11.3%⁽¹⁶⁾, which corroborates the findings of this study and demonstrates that tobacco consumption is declining in the country.

More than half the workers reported the lack of physical activity, which is an inappropriate result. Its practice is recommended and can help to control high blood pressure, maintain body weight and prevent type 2 diabetes mellitus, as well⁽²⁵⁾.

The alcohol consumption was reported as frequent by some workers, who reported consuming it more than twice a week, or daily. These results are similar to that found in Fortaleza, with 156 commercial employees, of which 36.54% reported drinking alcohol frequently⁽³⁰⁾.

In this study, hypertension was reported by all the employees who had some pathology, which can be directly related to the high amount of sodium found in meals and demonstrates its disagreement with the WFP goals and its implementation in the companies.

The WFP is considered an essential program for food and nutrition policies targeted at the working population. Properly applied, it can effectively contribute to the transformation of the current scenario of increasing prevalence of NCDs and obesity in the country. With this intention, actions should be taken to provide increased knowledge by the beneficiary workers, as well as the administrative and technical managers, for its effective implementation and promotion of healthy food to workers.

CONCLUSION

Meals served in the assessed Food and Nutrition Service were inadequate to the parameters established for worker's food, since they had excess calories, inadequacies in some

nutrients (carbohydrates, proteins, total fats, saturated fats, fibers and sodium) and NdPCal. This can impair the health of the beneficiaries, when associated with the main risk factors found, such as overweight, physical inactivity and prevalence of hypertension, in addition to non-compliance with the Brazilian labor legislation.

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