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Dietetic evaluation of meals provided to workers of a company registered in the Workers' Food Program

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Abstract

Objective: Evaluating dietary aspects of meals provided to the employees of a civil construction company registered in the Workers' Food Program (PAT). *Method*: The meals served for lunch were assessed, and the variables analyzed were: total energy value, percentage of macronutrients, and saturated and polyunsaturated fat, as well as the amount of cholesterol (mg), sodium (mg) and dietary fiber (g). It was also calculated the Net Dietary Protein Calories and the amount of fruitsand vegetables (FV). *Results*: The values found were compared with current nutritional parameters recommended by the program. Cholesterol values, polyunsaturated fatty acids and the amount of FV were compared with those recommended by WHO (2003). It was found that the meals provided to the workers were above the recommended levels of energy, protein, sodium and cholesterol. On the other hand, it was provided an adequate supply of dietary fiber and FV. *Conclusion*: Lunch provided by the assessed foodservice does not satisfy every nutritional parameters recommended by PAT. So, health promotion programs focusing on the adoption of healthy eating habits should be developed.

Keywords: Programs and policies of food and nutrition. Worker's Health. Collective Feeding. Nutrients. Dietetic.

Introduction

The need to feed the Brazilian working class properly has often been associated with their productivity at work. In this context, food and nutrition policies for workers emerged in the 1930s, based on the need they had to be well nourished to perform their job activities.[1]

With the evolution of food and nutrition public policies, the Worker's Food Program (PAT) was created in 1976, seeking to encourage employers to provide nutritionally adequate food to workers. Tax incentives were granted to the companies, with the priority of serving low-income workers.[2] PAT aims to improve the workers' health condition, increase their productivity and reduce absenteeism and accidents in the workplace.[3]

Over the years, there were several changes in the program, both involving the internal subsidies system and the requirements to meet the nutritional needs of employees of companies registered in the program. Such changes in the nutritional parameters were made mainly because of the nutritional transition of the Brazilian population. Earlier, requirements were restricted to energy and protein recommendations, currently considered inadequate to the epidemiological profile of the Brazilian population.[4]

In 2006, the nutritional parameters contained in PAT were changed after the publication of Inter-Ministerial Ordinance no. 66 and joint efforts of the Ministries of Labor and Employment, Treasury, Health, Social Security, and Social Development and Fight against Hunger, with an approach to food and nutrition security. With the implementation of this regulation, recommended daily macro and micro nutrient values were set forth, in order to provide workers with balanced, nutritional, and high-energy foods and ensure their good health.[5]

Due to the large number of workers benefitted by PAT and taking into account that they spend most of their time in the workplace, the program can be considered strategic in promoting healthy eating, thus improving the worker's quality of life. In this context, the dietetic assessment of the meals consumed by the employees of companies registered at PAT is all-important.

Materials and Methods

Exploratory study based on direct observation of the portioning of lunch served to the employees of two construction companies, both parties of a consortium for the construction of the Petrochemical Complex in the state of Rio de Janeiro (COMPERJ), located in Itaboraí, in the metropolitan area of the state of Rio de Janeiro. The consortium, with approximately 1,800 employees, operates in the construction sector, and its population is comprised of welders, scaffolders, constructors and helpers, administrative staff, technicians, operators, drivers, among others. These employees perform light, moderate or heavy activities.

The employees have a small meal (breakfast) and a larger one (lunch) eaten at the workplace. Lunch consists of the following: rice and beans, side dishes, main course with options, salads (three options), dessert (fruit or sweet) and juice. It is a self-service type of foodservice, except for the main course and dessert, which are portioned by an employee of the foodservice.

The subjects of the study were employees who accepted to participate in the research and signed the Free Informed Consent Form. The research was approved by the Research Ethics Committee of the School of Medicine of the "Antônio Pedro" University Hospital, under CAAE no. 0256.0.258.000-11. The period of the study was from November 2011 to June 2012.

Dietary assessment of the meal (lunch) was performed by direct observation of the portioning, or serving sizes, of the preparations served to the workers. First, the average weight of the preparations in the respective utensils used by the workers was standardized and measured before the Foodservice Unit (FS) was open to the public. Three serving sizes of each preparation were taken, with three different measures: full, standard and small cook's serving spoons. The servings were weighed on an electronic scale with 2-kg maximum capacity. This process was observed carefully for all foods and servings, and the collected data was written down in a previously developed form.

The analysis for determination of the nutritional composition of the meals served was made using the Table of Foods Composition;[6] and when some food was not present, the Table of Home Measures for Assessment of Food Consumption was used.[7] However, when some food was not included in any of the tables, the nutritional information described in the labels were used.

The collected data were entered into Microsoft Excel spreadsheets for the statistical analysis of the results. The following data was determined: total energy value; percentage of macronutrients, saturated and polyunsaturated fat, as well as quantities of cholesterol (g), sodium (mg) and dietary fibers (g), NDPcal% (Net Dietary Protein Calories), which is the ratio of liquid protein to the total energy value of the menu, and the amount of fruits and vegetables (FV) (g). Descriptive statistics was used (mean, standard deviation, coefficient of variation) to compare the dietetic data. The values found were compared to the nutritional parameters prescribed by PAT;[5] and for the amount of FV, cholesterol and polyunsaturated fat, 40% of the values recommended by the World Health Organization (OMS).[8]

As PAT's nutritional parameters do not allow for a variation margin for macronutrients (carbohydrate, protein and total fats), according to other recommendations the following values were used to determine the foods adequacy: for carbohydrate, protein and total fats, the recommended values were considered, added by 0.9, i.e., 60-60.9%, 15-15.9% and 25-25.9%, respectively. For saturated fats, the menus with this nutrient falling below or equal to 10% were considered appropriate. For nutrients having variation margin, namely, polyunsaturated fatty acids, dietary fiber, sodium and NDPcal, those which were in the range of 600 to 800 Kcal, and with an additional of 400 Kcal, as allowed by PAT, depending on the type of activity performed, the upper limit plus 0.9 was considered. Regarding the energy content, the menus that were considered appropriate were in the range of 600 to 800 Kcal and an additional of 400 Kcal, as allowed by PAT, depending on the type of the job performed.

The determination of the sample was based on the model for discrete data, considering a prevalence of malnutrition of 1.4% and 3.1% for men and women, respectively, and analogously, for obesity of 13% and 17.5%, according to the Household Budget Survey (HBS), with 95% confidence interval and 5% precision, considering infinite population.[9]

Results

A total of 150 workers participated in the study, 86.5% male and 13.4% female. Table 1 shows a comparison between the nutritional parameters of the meals served at lunch and those recommended by PAT[5] and WHO.[8] It was found that the meals offered to the employees were above the recommended parameters for energy, protein, sodium and cholesterol.

Table 1 indicates that the total energy value was higher than that recommended by PAT (600 to 800 Kcal and additional of 400 Kcal upon justification). It was also found that only 33% of the workers had adequate mean energy consumption (Table 2). Regarding macronutrients, the

supply of carbohydrates in the meals analyzed were close to the recommended parameter (Table 1), but only 18% of the meals presented the recommended amount of carbohydrates (Table 2). The protein contribution in relation to TEV was above the level recommended by PAT. With regard to the meal supplied to each employee, 22% of the meals had the recommended amount of this nutrient. With respect to the amount of energy from proteins (NDPCal) only, it was found that the weekly average of the menus was in accordance with PAT's recommendations.

The results of this study were in conformity with PAT's recommendations regarding total fats (Table 1), but when one analyzes the meal provided to each employee, it was found that only 11.3% of the meals met the program requirements (Table 2). Other findings include low supply of polyunsaturated fats, adequate supply of saturated fats and high supply of cholesterol when compared to WHO's recommendations[8] (Table 1). Sodium contents in the meals offered were also very high (Table 1), and only 5.3% of the meals had the recommended amount of sodium (Table 2).

The amount of dietary fibers in the meals served exceeded the level established by the program, and most of the meals showed adequate levels of dietary fibers (Table 2). The supply of fruits, vegetables and greens was close to the amount recommended by WHO.[8]

Table 1. Comparison of the nutritional parameters of meals served to the workers in a food-service with those recommended by PAT[5] and WHO[8]. Itaboraí-RJ, 2012.

Nutritional Parameters	Mean	Standard Deviation	Coefficient of Variation	Recommended
Energy (kcal)	1372	380.1	0.27	600-800*
Carbohydrate (%)	56.7	8.6	0.15	60*
Protein (%)	18	3.7	0.20	15*
Total fats (%)	25.2	8	0.32	25*
Saturated fat (%)	7.2	2.7	0.37	<10*
Dietary fiber (g)	23.1	7.6	0.33	7-10*
NDPCal (%)	10.91	5.17	0.47	6-10*
Sodium (mg)	2426.4	872.2	0.35	720-960*
Cholesterol (mg)	160.7	50.4	0.3	120**
Polyunsaturated fats (%)	5.7	2.7	0.4	6-10**
FV (g)	166	119.1	0.7	160**

n=150 *PAT; **WHO (2003)

Table 2. Percentage of the meals served to employees that met the recommendations established by PAT[5] and WHO[8]. Itaboraí-RJ, 2012.

Nutritional parameters	n	Meals adequacy %
Energy (kcal)	49.5	33
Carbohydrate	27	18
Protein	33	22
Total fats	16.9	11.3
Saturated fat	115.9	77.3
Dietary fiber	148	98.67
NDPCal	16.4	10.97
Sodium	7.9	5.3
Cholesterol	15.9	10.6
Polyunsaturated fat	124.5	83
FLV	75	50

n=150 *PAT; **WHO (2003).

Discussion

In the present study, the energy provided by the meals was inadequate (1372 kcal), when an addition of 400 Kcal was considered, as allowed by the program, if necessary. These results are similar to the study by Mattos,[10] who analyzed the lunch menu of a company located in the state of Rio de Janeiro and concluded that the TEV was above the recommendations. The supply of energy considered excessive in a single meal was also found in studies carried out in some petrochemical companies registered at PAT in the state of Bahia, in which the meals almost totally met the individual's daily energy needs.[11]

Energy intake above the individual's needs is one of the main causes of the increased prevalence of overweight, obesity and associated non-communicable, chronic diseases (NCDs), such as diabetes *mellitus*, high blood pressure and cardiovascular diseases.[12]

With respect to the supply of carbohydrates, it was observed that it was similar to the levels recommended by PAT, although only 18% of the meals had shown an adequate provision of this macronutrient. The percentage of carbohydrates was higher than that found by Bandoni et al.,[4] an average of 50.9%, when they examined the menu of 72 companies participating in PAT in São Paulo city. In the study conducted by Vanin et al.,[13] consumption of carbohydrates exceeded the recommended level, indicating an average of 63.3% that was consumed by the customers.

Regarding the supply of proteins, it was found that it was above the value established by PAT. Similar results were reported by Souza et al.,[14] who, when they examined the menus of five companies located in Caruaru-PE, found a high percentage of protein in the meals. High-protein meals were also observed by Amorim et al.,[15] who analyzed the lunch served to the participants of PAT in a company located in Santa Luzia-MG.

Excessive protein intake may cause an overload of renal function and the development of chronic diseases due to the consumption of saturated fat and cholesterol found in foods of animal origin. For this reason, consumption of proteins should be limited to the recommended amounts, sufficient to ensure the provision of protein needs.[16]

Regarding the quantity of calories from proteins (NDPCal), it was observed that the meals served are in conformity with PAT's recommendations. These values are lower than those found by Rocha et al.,[17] who analyzed the menus of three companies in the ABC region, state of São Paulo, and found an average percentage of 14.9% for NDPCal. Souza et al.,[14] also found similar results, of 22.5%.

The meals offered were appropriate regarding total fats, but when examining individual servings, only 11.3% of the users met what the program prescribes (Figure 1). Castro et al.,[12] when they evaluated the dietary pattern of a metallurgical industry in Rio de Janeiro, found a mean value of 21.8% of lipids. Regarding the supply of fats, the average intake of saturated fats was 7.2%, within the limits stipulated by PAT, which should be less than 10%. The adequacy of the lipid percentage in the present study is due to the low rate of fried foods in the menus offered. It is worth noting that when there were fried foods offered in the main protein dish, options always included cooked, baked or grilled preparations, and the employees many times prefer these options.

There was low supply of polyunsaturated fats (5.7 mg) and high levels of cholesterol (160.7 mg), when compared to the recommendations prescribed by WHO[8] (Table 1). Similar results were reported by Bandoni et al.,[4] who found the presence of polyunsaturated fats below the adequate levels (3.87 mg). According to Amorim et al.,[18] lipid contents should be maintained at the recommended levels, preferably using vegetable oils, rich in polyunsaturated acids, and reducing the consumption of animal fats, sources of saturated fatty acids and cholesterol.

Epidemiological studies have given evidence of the key role of diets as a risk factor for cardiovascular diseases. Various foods and nutrients have been associated with the occurrence of chronic diseases in diverse populations, with emphasis on excessive intake of cholesterol and saturated fats, which are nutrients conducive to the onset of cardiovascular diseases.[18]

The amount of sodium was more than twice that recommended by PAT, and only 5.3% of the meals had the recommended amount (Figure 1). These results are similar to the findings of Salas et al.,[19] who evaluated the contents of sodium in a Foodservice in Suzano-SP, and found that the average intake of sodium was 2,435mg. Similar results were found by Martins et al.,[20] who also analyzed the amount of sodium in lunch preparations in a Hospital Foodservice (HFS). The *per capita* amount of sodium offered at lunch was very high, a total of 2,000mg of sodium. Excessive sodium intake has long been considered a key factor in the development and intensity of high blood pressure. Sarno et al.[21] found prevalence of high blood pressure in approximately 30% of workers benefitted by PAT in the city of São Paulo.

Frantz et al.[22] developed a salt and sodium control method in meals production. The use of this method may contribute to the supply of nutritional and tasteful meals regarding salt and sodium contents, enabling actions to prevent NCDs.

Regarding the provision of dietary fibers, it was observed that it was higher than that established by the program. In studies by Savio et al.[23] and Amorim et al.,[15] they found values of 7.1g and 10g, respectively. Vanin et al.[14] reported that the users consumed only 26% of the amount of dietary fiber recommended by PAT. In the present study, it was found that most of the meals served had adequate amounts of dietary fibers (Table 2). Such adequacy can be explained by the intake of beans and daily supply of leafy greens in the meals, which offered three different kinds of salads to the employees.

As can be seen on Table 1, consumption of fruits and vegetables was in agreement with WHO's recommendations.[8] Some studies have found low consumption of fruits and vegetables, as the one by Bandoni et al.,[4] where 63.9% of the menus were inadequate with respect to the provision of fruits and vegetables. In the present study, in the meals served to each employee, 50% of adequacy was observed.

Scientific evidences have shown that fruits and vegetables are major components of a healthy diet and may help in the prevention of NCDs. According to the 2002 Report of World Health Organization, low consumption of these foods may be associated with higher risk of chronic, non-communicable diseases. Estimates indicate that more than 2.7 million of lives could be potentially saved every year if fruits and vegetables intake would be increased.[16]

Conclusion

The results of the present study showed that the meals served are in disagreement with PAT's recommendations regarding some nutrients. It should be emphasized that all nutrients must be present in all meals, in the recommended amounts and percentages, aiming to promote healthy eating in the workplace.

Therefore, educational actions should be developed, focusing on lifestyle changes and raising the employees' awareness about the importance of heathy eating habits and serving sizes control, once they themselves serve the preparations.

Taking into account that the workplace is a social setting where the workers' behavior regarding health may be encouraged and maintained, it is vital that companies and managers of the foodservices registered at PAT be sensitized on the opportunity that such environment offers to promote workers' health.

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