ABSTRACT

Objective: to evaluate menu acceptance and the rest-intake rate in a hospital nutrition service in Recife (PE). Method: this is a cross-sectional study with an evaluation of the rest-intake in 17 days. The data were tabulated in electronic spreadsheets Microsoft Office Excel (2007), obtaining the means and percentages of all values found. To evaluate the results we used equations and formulas available in the literature. Results: the average daily number of diners was 560 and the per capita consumption was 660 grams. The preparation that obtained the highest percentage of acceptability and the lowest rejection rate was feijoada. For all preparations, the percentage of the rest-intake index was classified as satisfactory (7.5%) and the acceptance of the meals classified the FNU as great. Conclusion: the good results found are influenced by the daily practice of the nutritionist in using indicators as a tool to help in the management of the unit.

Descriptors: Food Waste; Leftover Meals; Menu; Food Service; Hospital Service; Nutrition

RESUMO

Objetivo: avaliar a aceitação do cardápio e o índice de resto-ingesta em um serviço hospitalar de nutrição em Recife (PE). Método: trata-se de um estudo transversal com avaliação do resto-ingesta no período de 17 dias. Os dados foram tabulados em planilhas eletrônicas Microsoft Office Excel (2007), obtendo-se as médias e percentuais de todos os valores encontrados. Para a avaliação dos resultados utilizaram-se equações e as fórmulas disponíveis na literatura. Resultados: a média diária de comensais foi de 560 e o consumo per capita foi de 660 gramas. A preparação que obteve o maior percentual de aceitabilidade e menor índice de rejeito foi a feijoada. Para todas as preparações o percentual do índice de resto-ingesta ficou classificado na faixa de satisfatório (7,5%) e a aceitação das refeições classificou a UAN como ótima. Conclusão: os bons resultados encontrados são influenciados pela prática diária do nutricionista na utilização de indicadores como ferramentas para auxiliar na gestão da unidade.

Descritores: Desperdício de Alimentos; Sobras das Refeições; Cardápio; Serviço de Alimentação; Serviço Hospitalar; Nutrição.
INTRODUCTION

Worldwide, the consumption of food outside the home has increased in recent decades as a result of accelerating socioeconomic cultural, and environmental changes. These changes, combined with the distance between the workplace and the home, in addition to the needs linked to lifestyle, such as the lack of time to prepare meals, favor the growth of the number of places that offer collective food, known as Food and Nutrition Units (FNUs).\(^1\)

The FNUs are work units or organ of a company, which perform activities related to food and nutrition, regardless of the situation it occupies in the hierarchical scale of the entity, and can be managed in the form of self-management or concession, inserted in companies and institutions, hotels, maritime hotels, commissaries, prison units, hospitals, clinics in general, day hospital, among others.\(^1\)

According to Resolution no. 600/2018, an FNU is characterized as a managerial unit where all the necessary activities are developed for the production of meals, up to their distribution to healthy and sick groups, to contribute to maintaining, improving, or recovering the health of the clientele served.\(^2,3\)

In the management of an FNU, a very relevant aspect is food waste, since it is not given the importance it deserves, once this parameter allows the manager to know what is being produced and what is being consumed, besides being a technical and social-political concern.\(^4\)

More recent data indicate that Brazil is among the 10 countries that most waste food, equivalent to approximately 35\% of the annual food production, composing an alarming statistic, impacting hunger, and consequently, its development. In terms of quantity, it is estimated that 39 million tons of food are wasted every day, an amount enough to feed 78\% of the 50 million people, who still go hungry in the country, with breakfast, lunch, and dinner.\(^5\)

The managerial process control of the production of meals becomes essential to ensure total quality, and the indicators of menu acceptability and the rest-intake index can be used.\(^6\) The use of menu acceptability indicator is used to measure user satisfaction of food services regarding the preparations provided in the meals of the FNU, as well as to show what needs to be adjusted and redefined. Regarding the evaluation of waste, the use of the indicator rest-intake for healthy community has been of great relevance as an administrative tool to know and evaluate the waste in the FNU, taking the criteria...
established by the Resolution of the Federal Council of Nutritionists (CFN no. 600/2018). Food waste occurs at various stages in the production chain, from production, transport, and storage, to preparation and sales; the research development in this area is thus relevant, acknowledging that the FNUs are largely responsible for this waste at the end of the chain, such as the waste from food leftovers.

The rest-intake index varies according to the portioning, type of preparation offered, target audience (sex, age, type of physical activity performed), eating habits, nutritional education, customer satisfaction, temperature and organoleptic quality of the preparation, size of the utensil and plate. Knowing that the rest-ingest is the ratio between the rest returned on the trays by the diner and the amount of food and food preparations offered, expressed as a percentage, this study is justified by contributing to the analysis of the acceptability of the menu preparations and the amount of leftovers on the plate by the diner, intending to improve the quality of service and reduce waste.

**OBJECTIVE**

To evaluate the menu acceptance and the rest-intake index of a hospital FNU in Recife (PE).

**METHOD**

This research is a cross-sectional study developed in a hospital FNU, located in Recife (PE), which provides its employees with an average of 560 lunch meals daily. The aforementioned FNU has self-management service and has a menu consisting of a starter (salad), protein option, basic dish (beans and rice), side dish, and fruit juice, being the distribution method portioned in the distribution line by the employees of the FNU. The data collection period occurred over 17 days in March 2022, and all days were eligible for assessments.

To obtain the quantity of food produced, the quantity of food distributed, and rest-intake, a Toledo® stainless steel electronic digital scale was used, with a 300kg maximum capacity and 0.05kg precision. The data was tabulated in electronic spreadsheets using the Microsoft Office Excel (2007) software, obtaining the averages and percentages of all values found. For the evaluation of the results, equations and formulas were used, as described below:
To obtain the quantity of food produced, the ready-made meals were weighed and the equation was applied: Amount produced (Kg) = weight of the prepared foods - weight of the Gastronorms table pan.

The tabulated weight of the distributed meals was obtained by the following equation: Distributed meal (kg) = preparation taken to the thermal distribution counter - weight of the Gastronorm table pan.

To calculate the per capita consumption per meal, the following equation was used: 
Per capita consumption per meal (kg) = weight of meal distributed ÷ number of diners.

The rest-intake analysis was measured through the food left over in the area where the dishes and trays were sanitized. The disposable materials and the inedible parts of the food were separated, conditioned, and discarded in separate plastic bags. Then the percentage of leftovers was calculated: % of rest-intake = weight of leftovers x 100 ÷ weight of the distributed meal.

The CFN recommendation no. 600/2018, classifies the % rest-intake into satisfactory <10% and unsatisfactory >10%.³

The calculation of the per capita amount of rest-intake was performed using the equation: Per capita rest-intake (kg) = weight of rest ÷ number of meals served.

Using the per capita consumption per meal, the number of people who could be fed with the accumulated leftovers was calculated using the equation: People fed with the day's leftovers = day's leftovers ÷ per capita consumption per meal.

And, to calculate the acceptability of the menu, the following equations were used:¹¹
- Volume distributed = total number of production - total clean leftovers.
- Ingested volume = distributed volume - total of clean leftovers.
- % Acceptance = ingested volume x 100 ÷ total production.

To assess suitability, the following acceptability values were used: < 60% - poor acceptance, 60% to 80% - good acceptance, and 80% to 100% - excellent acceptance.¹¹

RESULTS

The quantity and the preparations served during the research period are described in table 1.
Table 1 - Preparations served at lunch and the number of diners in a hospital FNU in Recife (PE), 2022.

<table>
<thead>
<tr>
<th>Days of the study</th>
<th>Meals served</th>
<th>Number of diners</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Meatball</td>
<td>554</td>
</tr>
<tr>
<td>2</td>
<td><strong>Arrumadinho de charque</strong> (Jerked beef with green beans)</td>
<td>571</td>
</tr>
<tr>
<td>3</td>
<td>Pork chops</td>
<td>601</td>
</tr>
<tr>
<td>4</td>
<td>Jerked beef dumpling</td>
<td>584</td>
</tr>
<tr>
<td>5</td>
<td>Steamed ribs</td>
<td>662</td>
</tr>
<tr>
<td>6</td>
<td>Chicken croquette</td>
<td>476</td>
</tr>
<tr>
<td>7</td>
<td><strong>Dobradinha</strong> (Bovine stomach with beans stew)</td>
<td>557</td>
</tr>
<tr>
<td>8</td>
<td>Jerked beef shepherd’s pie</td>
<td>537</td>
</tr>
<tr>
<td>9</td>
<td><strong>Feijoada</strong> (Black beans with pork stew)</td>
<td>565</td>
</tr>
<tr>
<td>10</td>
<td>Liver on onions</td>
<td>540</td>
</tr>
<tr>
<td>11</td>
<td>Grilled chicken</td>
<td>584</td>
</tr>
<tr>
<td>12</td>
<td>Chicken with sausage</td>
<td>534</td>
</tr>
<tr>
<td>13</td>
<td>Kang pao chicken</td>
<td>578</td>
</tr>
<tr>
<td>14</td>
<td>Mixed stew</td>
<td>530</td>
</tr>
<tr>
<td>15</td>
<td>Pork loin</td>
<td>545</td>
</tr>
<tr>
<td>16</td>
<td>Minced meat pancake</td>
<td>542</td>
</tr>
<tr>
<td>17</td>
<td>Chicken pancake</td>
<td>554</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td></td>
<td><strong>560</strong></td>
</tr>
</tbody>
</table>

The highest number of diners was concentrated on the days the pork chops and steamed ribs, while the lowest numbers were for the chicken croquettes and mixed stew dishes. The average number of diners over the 17-day study period was 560.

Graph 1 shows the *per capita* consumption by diners per meal and the rest-intake of the meals. It shows that the average *per capita* consumption served at lunch was 660g and the rest of the meal was 50g.
When considering the per capita consumption per meal, the dishes feijoada (Black beans with pork stew, pork loin, and mixed stew) had the highest values, while in the preparations of dumplings and grilled chicken, the lowest values were identified. Regarding the rest-intake *per capita*, the preparations of mixed stew and pork loin had the highest values, while the preparations bovine stomach with beans stew and pork chops had the lowest values.

In graph 2 it is possible to observe the percentage of rest-intake and the acceptability of the menu provided.
Graph 2 - Rest-intake rate and acceptability of preparations in a hospital FNU in Recife (PE).

Graph 2 shows that the dishes feijoada and pork chops concomitantly presented the highest acceptability and the lowest rejection rate in the period studied.

Graph 3 shows the number of diners who could have been fed with the food wasted in the rest-intake, where the average found was 36 diners in the period studied.
Graph 3 - Number of diners that could have been fed with the food wasted in the rest-intake in a hospital FNU in Recife (PE).

The highest values of diners fed with the leftovers were sent to the preparations of jerked beef dumpling (n= 62), kang pao chicken (n= 59), and minced meat pancakes (n= 54).

**DISCUSSION**

The average per capita consumption and grams of the rest-intake found in this study were similar to those found by the support group for oncology patients in Passos (MG), with per capita consumption amounts of 676 grams and an average of 56g of rest-intake per employee. In another FNU the average amount per client of the rest-intake was 31.1g, ranging from 16.1g to 43.9g.¹⁵-¹⁸
For all the days analyzed the percentage values of the rest-ingesta were below the maximum limit recommended\(^\text{19}\) and by the CFN 2018, in which rates below 10\% are acceptable for healthy communities. Other data\(^\text{20}\) evaluating the rest-intake of the lunch served to diners in a FNU, located in the municipality of Botucatu (SP), with average values of 8.7\%.

Although the results of the parameters of these units are considered good, they could have been lower, because according to the authors, this result states that the rest found may be due to the fact that the diners have a permanent amount of meals deducted from their salary, leading them to lack of concern about the waste issue.

It can be observed that leftovers depend a lot on the diners' awareness, as in restaurants with meals paid by weight, in which the diner pays for what he or she puts on the plate, the leftovers are nearly nil, indicating that the customer is aware of how much he or she can eat, as opposed to when the meal has a fixed price and is served as all-you-can-eat, the leftover percentage is very high.\(^\text{7}\)

Thus, carrying out campaigns with the diners helps the process of rest-intake control. During a campaign against waste in a restaurant located in the central zone of Rio Grande do Sul with the aim of comparing the results after the awareness campaign of the diners, the data obtained from the rest of the food was 9.1\% pre-campaign to 6.8\% post-campaign.\(^\text{21}\)

The literature points to other factors that interfere with food waste, in addition to the lack of public awareness, such as the preparation temperature, the food quality served, the diner's appetite, the diner's emotional, psychosocial, and economic aspects, food preference, users' daily frequency, the absence of quality indicators, the room temperature, the inadequacy and lack of standardization of the utensils and the lack of choice of smaller portions, since they may be served an amount that they will not consume and consequently, waste is generated.\(^\text{22,23}\)

Some studies show that the daily weighing of food in FNUs is an evaluation of easy control and effective in reducing leftovers, as it shows the overproduction and dissatisfaction of diners. The continuous evaluation of leftovers makes it possible to identify the effectiveness of planning the number of meals to be produced, the dimensioning *per capita*, the adequacy of utensils used in portioning, the standard of the menu offered, as well as the eating habits of diners and the efficiency of food production.\(^\text{14,23}\)

The percentages of acceptance found in this study are divergent from other authors' findings\(^\text{15}\), when evaluating the schoolchildren’s lunches from a child education
center in Campo Grande (MS), with percentages below 80%, characterized as good acceptability. Given the scarcity of studies in the literature conducted with adults, it was necessary to use the comparative work with children, so more research is needed on the acceptability of menus in other age groups in the area of collective feeding.

The dishes feijoada and pork chops presented the highest acceptance, results that may be associated with factors that directly interfere with these, such as diners' food preferences, food quality, diner's appetite, and the acceptance of the dish by the diner, as referenced in the scientific literature, and consequently generated a lower rest-intake rate.\textsuperscript{24,25}

It is noteworthy that the total cost of meal production includes the cost of waste at any stage of production, but to reduce them, the FNU's manager must seek the team's commitment, conduct training, promote educational campaigns with diners, in addition to knowing the processes that need to be improved and enhance the strengths, as well as, develop menus that meet the eating habits, satisfying the public served for better acceptance, lower rejection rate, and cost reduction, thus resulting in the optimization of financial resources available.

**CONCLUSION**

The menu acceptance and the rest-intake rate were within the accepted limits recommended by the literature. Even if these were satisfactory, good menu management is essential, using essential and determining strategies to improve the service quality provided by the FNU, as well as the use of indicators in the nutritionist's daily practice. It is noteworthy the importance of conducting ongoing educational campaigns to raise awareness about waste reduction among diners since they are a fundamental part of the process.

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**REFERÊNCIAS**


Correspondence:

Lidiane Conceição Lopes
E-mail: lidi.lopes@gmail.com

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