REVISTA O MUNDO DA SAÚDE

Analysis of the quality indicators of diets offered to cancer patients

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Abstract

Individuals undergoing cancer treatment often have poor appetite and reduced food acceptance, and it is important to monitor consumption indicators and diet acceptability. The objective of this study was to evaluate quality (efficacy) indicators by means of the satisfaction index, the acceptability of the diet's (sensory) characteristics and the service offered, the waste-consumption ratio, and the portion sizes of meals served to cancer patients at a referral hospital in Belém, PA. Data were collected from January to March/2019, during lunch and dinner at the mastology, urology, thoracic surgery, gynecology and nephrology clinics of a public hospital in Belém, PA. 45 patients, of both genders, between 20 and 89 years old participated. 55.6% were from the interior of the State, 77.8% were surgical patients, and 66.7% had more than one correlated risk factor. Satisfaction was assessed based upon the acceptability of the prepared food using a self-administered questionnaire. For the analysis of waste-consumption and diet portion sizes, the weight of the meals before and after consumption was used. The satisfaction rate was 75.6% and the waste-consumption ratio 37%. There was a lack of standardization in the portion sizes of meals. Regarding sensory aspects, "flavor" was the worst rated item, and in relation to the service, "politeness" was the best rated. The results showed that satisfaction was considered "regular", the waste-consumption index was classified as "very bad", and some aspects were negatively evaluated. This indicates the need for further studies and the establishment of strategies for improving the service and, thus, improving the quality indicators of diets offered to cancer patients.

Keywords: Patient satisfaction. Food waste. Hospital Nutrition Service. Oncology.

INTRODUCTION

Institutional food and nutrition services are responsible for offering adequate meals that are nutritionally balanced and safe from the point of view of hygienic-sanitary quality, aiming at prevention, recovery or maintenance and health promotion of employees and patients[1]. To address different groups, the menu is shown to be a highly relevant tool for meal planning[2], aiming to serve both the sick public, with the demands of their clinical profile, and the healthy public, through healthy eating.

Several pathologies influence the patient's food consumption, requiring extra attention from the team in relation to menu planning, trying to guarantee an adequate

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nutritional supply. It is known that cancer, which is characterized by uncontrolled, rapid, and invasive growth of cells with changes in their genetic material[3], is one of these pathologies. The disease is associated with external and internal factors, mostly related to eating habits or lifestyle habits, such as: alcoholism, obesity, low intake of fruits and vegetables, high consumption of red meats and processed foods, smoking, physical inactivity, among others[4].

During treatment, the cancer patient may have no appetite. The side effects caused by chemotherapy or radiotherapy mainly affect the perception of taste, due to the influence of the medications that tends to alter the production of saliva and the taste. In addition, bitter, sweet and salty foods can taste differently than before treatment, and it is common for the patient to feel a metallic or chemical taste in their mouth, especially after consuming red meat or other protein-rich foods[5].

Individuals undergoing cancer treatment also have gastrointestinal complaints, such as nausea, vomiting, mucositis and episodes of constipation and/or diarrhea, which can decrease menu acceptance and, consequently, lead to compromised nutritional status[6]. Because of this, it is common to observe malnutrition among hospitalized individuals, and this implication is three times more frequent in patients diagnosed with cancer than those who do not have this diagnosis[7]. In cancer patients, malnutrition is associated with increased morbidity, mortality, and adverse reactions to treatment, decreased quality of life, less response to treatment, and reduced survival. Weight loss associated with the disease also leads to depletion of body reserves, worsening its severity[8].

The reduction in food intake may be associated with disease, treatment, changes in eating habits, and dissatisfaction with the food served, whether in terms of quantity and/or quality[9,10]. The patient's appetite can be persuaded by the quality, form of presentation of the food, and by the sensory characteristics, such as taste, presentation, appearance, aroma, diversity of the menu, temperature, texture, and type of preparation[11].

Therefore, the assessment of food consumption among patients should be routine, as food is considered an important part of therapy, not only for its nutritional aspects, but also for its symbolic and subjective dimension[9, 10]. The analysis of the rest of the meals indicates the adequacy needs for food consumption in prepared quantities, portion sizes, and acceptance of the menu distribution[12].

Therefore, studying the indicators that allow the characteristics of products and processes to be represented quantitatively, using them to monitor and improve results over time, is an interesting alternative to monitor the acceptability of meals served to cancer patients and, thus, adopt modifications capable of achieving more effective results.

The implementation of indicators in the management of food and nutrition services brings, in essence, the intention to contribute to continuous improvement, in enhancing service and in achieving the proposed goals. The indicators provide relevant information about the activities developed, and have defining characteristics: Objectivity: having a clear objective, increasing the reliability of what is sought; Specificity: being able to identify only the cases in which there is a problem; Validity: fulfilling the purpose of identifying situations in which the quality must be

improved; Sensitivity: being able to identify all cases in which there are problems; Simplicity: demonstrating simple search, calculation, and analysis mechanisms to increase the chances and opportunities for use; and Low cost: being economically viable, allowing its routine use, without risks of discontinuity of execution[13].

Among the main types of indicators, we highlight: (1) Strategic Indicators: which inform "how much" the organization is in the direction of achieving its vision and reflect the performance in relation to critical success factors; (2) Productivity Indicators (efficiency): which measure the proportion of resources consumed in relation to process outputs; (3) Quality Indicators (effectiveness): which focus on customer satisfaction measures and product/service characteristics; (4) Effectiveness Indicators (impact): which focus on the consequences of products/services (doing the right thing in the right way); and (5) Capacity Indicators: which measure the responsiveness of a process through the relationship between outputs produced per unit of time[14].

As the quality of the final product depends directly on the performance of the available labor, national hospital food services operate with many difficulties caused by the constant demand for production in a limited amount of time due to inflexible meal distribution schedules, high patient turnover, in addition to the need for more qualified and committed employees to comply with the legislation. On the other hand, the involvement of nutritionists in the meal production process, with all the complexity that surrounds it (material, personnel, costs, production policy, among others), makes it difficult, but does not prevent, the implementation of food and more effective and humanized nutritional care[15].

Thus, the present study aimed to evaluate the quality indicators (efficacy) through acceptability, the Waste-Consumption Ratio (WCR) and the (sensory) characteristics of the diets and the service offered to cancer patients admitted to a referral hospital in Belém, PA.

MATERIAL AND METHODS

This was an exploratory study with a descriptive, quantitative, qualitative and transversal design carried out in the food and nutrition service of a public hospital in the city of Belém, PA, which offers a highly complex service and is a reference in cancer care in the State, and exclusively receives patients coming from the Public Health System.

The study was approved by the Ethics and Research Committee of Hospital Ophir Loyola under No. 80819917.0.0000.5550 and opinion No. 3.011.100. Data collection took place from January to March 2019, totaling 18 non-consecutive working days and, with the participation of patients of both sexes admitted to the specialty oncology clinics of Urology, Mastology, Thoracic Surgery, Gynecology, and Nephrology.

For the sample calculation, the software Epi-Info version 7.1.4.3 for Android was used, considering the total of 60 beds in the clinics,

an expected prevalence equal to 50%, and a confidence level of 99.99%, a minimum sample number was defined to be 44 individuals. Considering the turnover of beds, at some moments a number smaller than the defined sample size was reached.

The food and nutrition service studied provides an average of 1,960 meals daily considering breakfast, morning snack, lunch, afternoon snack, dinner and supper, serving menus for a general diet and modified consistency among patients, companions, employees, and residents. For this study, the soft diets offered at lunch and dinner were chosen, as they are the most prevalent type of diet in the service, and can be composed of cooked salad or pureed vegetables, side dish (rice or pasta and beans with vegetables), main course (beef, chicken, or fish), farofa and dessert (fruit or an elaborate dessert).

The study included patients over 18 years of age, admitted to one of the studied clinics, eating orally and with a mild diet prescription, who agreed to participate in the study by signing the Informed Consent Form (ICF). Patients who were fasting for procedures or who were consuming another type of diet were excluded.

The profile of the patients was identified in the first interview using semi-structured socio-demographic (marital status, age, gender, place of origin, profession and family income) and clinical data (family history, length of stay, reason for admission, exposure to risk factors and bowel habits), right after signing the informed consent form.

The evaluation of the factors that influenced the acceptance of diets took place through a self-administered questionnaire applied 30 minutes before meals and collected 30 minutes after consumption, which evaluated the following sensory characteristics: appearance, aroma, color, flavor, temperature, and food texture; as well as the characteristics of the service provided: courtesy of the maid, form of diets' distribution, hygiene, schedule, quantity, respect for choice/preference and variety, in which patients indicated the options that matched their level of satisfaction: poor, regular, good, or great. It is noteworthy that the same patient could have had the opportunity to evaluate the menu/meal offered more than once because of their hospitalization period.

Also in this questionnaire, there was a space for the patient to optionally express their opinion by answering the questions "what did you like the most", "what did you like least", and "suggestion" in relation to that menu offered on the day. This helps to keep the nutritionist up to date with food habits and preferences and, through this, to improve meal intake, within the limits of patient safety and the food and nutrition service provided.

The data collected were tabulated in the Microsoft Office Excel® 2016 program, and the following variables were evaluated: sensory and service aspects, waste-consumption, weight of the percaptum diet, and waste rate in averages and percentages. To assess the sensory aspects of the diets and the service provided, the data were subdivided, according to the type of protein offered, into menus with red meat and menus with white meat, allowing to observe if there was variation in the evaluation of each type of menu, mainly in relation to sensory characteristics.

To determine the Waste-Consumption Ratio (WCR), the formula proposed by Castro and Queiroz[16] was used, which establishes a percentage relationship between the weight of the rejected meal (RM) and the weight of the distributed meal (WDM) represented by the expression: % waste-consumption = RM x 100 / WDM. In determining the RM, the weight of all foods collected in the clinics after consumption was taken into account, after removing the bones and shells and, discounting the weight of the lunchboxes and their lids (12 g). And to determine the WDM, the weight of all ready

preparations was considered. The individualized weight of the lunch boxes was measured by weighing them after being portioned and properly closed[17]. A digital kitchen scale (Imperial-Houseware) with a capacity of 1 g to 5 kg and two decimal places was used for weighing.

The criterion used to assess the waste rate was also based on Castro and Queiroz[16], who classify the remains as follows: from 0 to 5% as excellent, from 5 to 10% as regular, from 10 to 15% as poor and above 15% as lousy. As for the satisfaction index, all aspects evaluated in each menu were added and the evaluations with "great" and "good" scores were considered satisfactory, and unsatisfactory with "regular" and "bad" scores. Lima *et al.*[18] determined good acceptability as above 90%, regular satisfaction between 60% and 90%, and insufficient below 60%.

Statistical analysis was performed using the Bioestat 5.0 software, using the G Test to verify the degree of dependence between categorical variables, considering a level of significance ≤ 0.05. The G test is a non-parametric statistical test for n samples whose proportions of the different modalities are arranged in contingency tables l x c. For the purposes of this study, the test was used to determine whether the proportions observed in the different categories of the menu acceptability index are independent or are associated.

RESULTS

45 patients participated in the study, 60% female and 40% male, aged between 20 and 89 years old. Most were married or lived in a stable union (53.3%), from the interior of the state (55.6%), had a paid activity (48.9%), and reported family income of up to 1 minimum wage (68.9%). As for the clinical profile, most were surgical patients (77.8%), had been hospitalized for less than 1 month (86.7%), reported not having a family history of the disease (51.1%), and had more than one correlated risk factor (66.7%). Regarding bowel habits, 11.1% had constipation at the time of the survey.

In the 18 days of the research, 212 evaluations of the eight preparations offered in the period were carried out: pan steak, roasted meat, meat cubes in sauce, meat cubes with vegetables, minced meat with vegetables, roasted chicken, stewed chicken, or cooked chicken, which were all considered as white meat (poultry) or red meat (bovine). The menus "minced meat with vegetables" and "roasted chicken" were more frequent in the period surveyed, being offered 5 and 4 times, respectively. The data about the acceptability of the sensory aspects and the service can be seen in Tables 1 and 2. Among the results, the temperature stood out, an aspect that was less rated as "great", and courtesy, which was the most rated as "great", both on white and red meat menus. Respect for choice and taste were the aspects most rated as poor, considering the 2 groups of menus.

The analysis of the acceptability of the menus (Tables 1 and 2) indicated, regarding the sensory aspects, that the items "appearance", "color", and "texture" were the best evaluated when adding the responses "great" and "good" together. On the other hand, the item "flavor" was the worst rated, when adding together the answers "regular" and "bad", both in the white meat menus and in the red meat menus.

The analysis of the variables showed that there was a statistically significant difference between the assessments attributed to each characteristic evaluated in the meals ($p < 0.05$).

While analyzing the satisfaction index, it was observed that the menus were considered satisfactory, obtaining a result greater than 70% in all evaluated menus, with an average

index of 75.6% (Table 3).

In the "suggestion" item, there were some criticisms related to negative evaluations. Many patients reported repetitions of salads and their composition, including vegetables that they were not used to eating or that did not like the taste; rice was always reported as "tasteless" due to the reduction in salt, and chicken as "raw" due to its color caused by the reduction of condiments and cooking method.

In addition to the criticisms, there were many requests to reduce the amount of rice being served, and to increase the frequency of meat-based preparations. There were also requests to serve local/cultural foods such as açaí, flour, and fried fish, which are part of the eating habits of many residents of the interior of the state, the prevalent population in the study.

Regarding the portion sizes of meals, Graph 1 presents the results found in the study. The standardization analysis was performed only with the foods that were served more than once in the evaluated period. The results showed that the service does not have a standard portion size, with variation between portions of the same food served on different days, and in some cases this variation was greater than 100g, as is the case with diets "Chopped meat with Vegetables" (532 to 381g) and "Roasted Chicken" (503 to 365g) evaluated in the present study.

The analysis of the waste-consumption ratio (Graph 2) indicated an average value of 37%, and it is possible to observe very high rates for the food options "Roasted Chicken" (48%) and "Pan Steak" (43%).

Meat and beans were the most cited foods in response to the question "What did you like the most?", and salad, rice, and chicken were the most cited foods in response to the question "What did you like least?".

Table 1– Acceptability index of the sensory characteristics of white meat diets and the service offered to patients admitted to the Mastology, Urology and Thoracic Surgery, Gynecology, and Nephrology Clinics of a public hospital in Belém, PA, 2019.

	Great		Good		Regular		Bad		
Characteristics	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**p-value***
Sensory									
Appearance	13	17.3	39	52.0	16	21.3	7	9.3	
Aroma	10	13.3	36	48.0	19	25.3	10	13.3	
Color	10	13.3	43	57.3	17	22.7	5	6.7	< 0.0001
Flavor	16	21.3	28	37.3	17	22.7	14	18.7	
Temperature	4	5.3	46	61.3	22	29.3	3	4.0	
Texture	11	14.7	41	54.7	17	22.7	6	8.0	
Service									
Courtesy	36	48.0	29	38.7	8	10.7	2	2.7	
Distribution Form	16	21.3	53	70.7	5	6.7	1	1.3	
Hygiene	18	24.0	51	68.0	6	8.0	0	0.0	< 0.0001
Schedule	20	26.7	49	65.3	6	8.0	0	0.0	
Amount	19	25.3	42	56.0	10	13.3	4	5.3	
Respect of Choice	7	9.3	36	48.0	15	20.0	17	22.7	
Variety	14	18.7	31	41.3	20	26.7	10	13.3	

Source: research data, 2019. *G test

Table 2– Acceptability index of the sensory characteristics of red meat diets and the service offered to patients admitted to the Mastology, Urology and Thoracic Surgery, Gynecology, and Nephrology Clinics of a public hospital in Belém, PA, 2019.

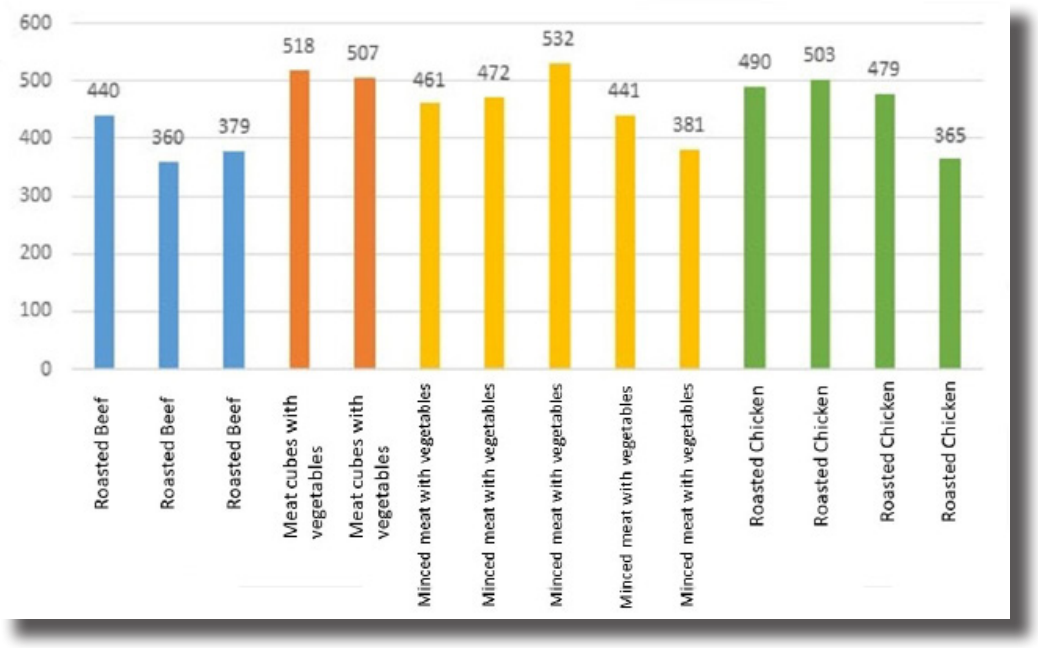
	Great		Good		Regular		Bad		
Characteristic	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**p-value***
Sensory									
Appearance	27	19.7	79	57.7	28	20.4	3	2.2	
Aroma	25	18.2	81	59.1	25	18.2	6	4.4	
Color	32	23.4	76	55.5	25	18.2	4	2.9	< 0.0001
Flavor	42	30.7	45	32.8	37	27.0	13	9.5	
Temperature	13	9.5	85	62.0	29	21.2	10	7.3	
Texture	35	25.5	67	48.9	31	22.6	4	2.9	
Service									
Courtesy	61	44.5	57	41.6	15	10.9	4	2.9	
Distribution Form	30	21.9	98	71.5	7	5.1	2	1.5	
Hygiene	37	27.0	92	67.2	6	4.4	2	1.5	< 0.0001
Schedule	30	21.9	93	67.9	11	8.0	3	2.2	
Amount	36	26.3	68	49.6	29	21.2	4	2.9	
Respect of Choice	26	19.0	70	51.1	24	17.5	17	12.4	
Variety	29	21.2	78	56.9	19	13.9	11	8.0	

Source: research data, 2019. *G test

Table 3– Satisfaction and dissatisfaction index of the menus served to patients admitted to the Mastology, Urology and Thoracic Surgery, Gynecology and Nephrology Clinics of a public hospital in Belém, PA, 2019.

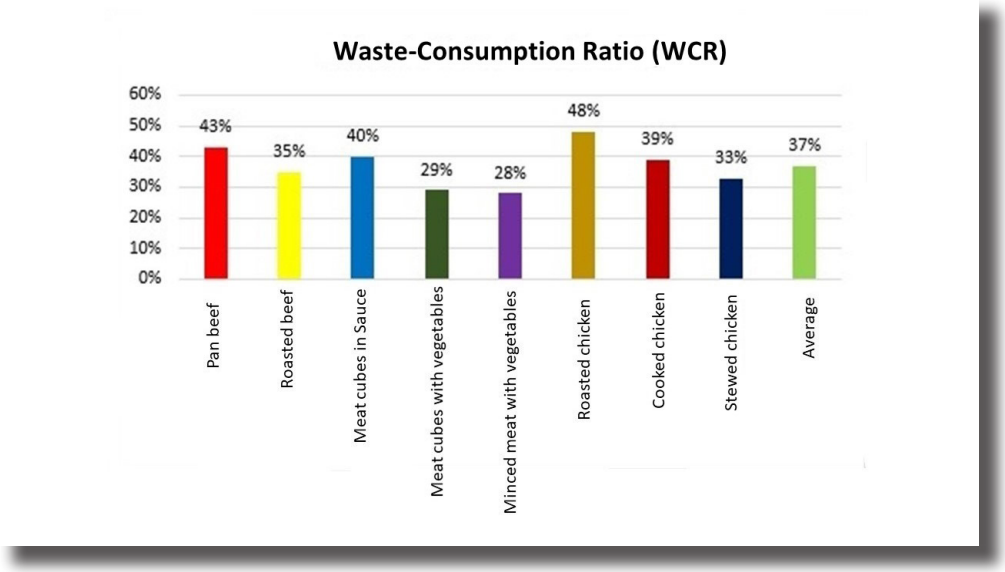
Type	Meal Preparation	Satisfactory (%)	Unsatisfactory (%)
	Pan steak	74.5	25.5
	Roasted beef	84.8	15.2
Red meat	Meat cubes with sauce	70.0	30.0
	Meat cubes with vegetables	73.1	26.9
	Minced meat with vegetables	80.6	19.4
	Roasted Chicken	73.2	26.8
White meat	Cooked chicken	76.9	23.1
	Stewed chicken	72.0	28.0
Mean		75.6%	24.4%

Source: research data, 2019.



*Source: research data, 2019.

Figure 1– Portion sizes, in grams (g), of the diets served for patients admitted to the Mastology, Urology and Thoracic Surgery, Gynecology, and Nephrology Clinics of a public hospital in Belém, PA, 2019.



*Source: research data, 2019.

Figure 2– Waste-Consumption Ratio (%) served for patients admitted to diets of the Mastology, Urology and Thoracic Surgery, Gynecology, and Nephrology Clinics of a public hospital in Belém, PA, 2019.

DISCUSSION

Hospitals are complex structures, which, driven by the competitive atmosphere, have tried to adapt to the new reality, seeking to improve care through the implementation of improved processes. The food and nutrition service is considered an integral part of the organization, which must seek to modernize its management model in order to obtain a competitive advantage[15].

In the pursuit of improving care and reducing hospital stay, the use of tools that allow identifying the degree of patient satisfaction in relation to diets is of great importance and allows us to have a more realistic and current view of the studied public[19]. Although different tools can be used in this process, satisfaction questionnaires have been widely used. Satisfaction surveys provide support for improving the quality of service[20].

Regarding the frequency of the menu, it is known that the repetition of foods can negatively influence the acceptability of the menu, as well as other aspects related to variety, flavor, color (monotony), and cooking methods. Leonhardt *et al.*[21] state that monotonous and unattractive menus, with repetition and little variety of preparations, impact customer satisfaction with the service. Giving importance to proper menu planning avoids flaws that can interfere with the quality of meals, which can result in monotonous, nutritionally unbalanced, and unattractive meals due to repetitions[22].

The study by Santos *et al.*[23] pointed out that the use of gastronomic techniques provided greater intake of meals by patients by improving the quality of sensory attributes and temperature, which can contribute to improving the nutritional status of hospitalized patients and reducing costs associated with the waste of meals.

The study by Lopes *et al.*[6], which verified the acceptance of menus at a referral cancer hospital in Paraíba, found no statistical difference when comparing the acceptability of patients and companions. In the study, the aspects of taste, quantity, presentation, variety, temperature, and service of the maid received an approval above 80%, both for patients and companions; however the authors found that the flavor, diversity, and inadequate temperature were the intrinsic factors that most contributed negatively to meal approval.

In the study by Herezais *et al.*[20], which analyzed the satisfaction of the hospital diet in two public hospitals in Paraná, flavor and seasoning were the intrinsic factors that most contributed negatively to the acceptance of meals. Among the extrinsic factors, the study pointed out the time and quantity as responsible for a negative evaluation.

In the present study, it is highlighted that the item "temperature" was poorly evaluated by 33.3% and 28.5% of the participants in the menus based on white and red meat, respectively, by adding together the answers "regular" and "bad". Although the cars used to distribute meals are closed, which could contribute to the maintenance of temperature, there are other factors that may have contributed to the fact that meals did not reach patients at an ideal temperature. Some factors could be the distance between the wards and the food and nutrition service, and the size of the sectors, since the sector where the Mastology, Urology, and Thoracic Surgery clinics are located is one of the largest in the institution and corresponds to 50% of the beds considered in the sample. Lopes *et al.*[6] believe that the use of non-thermal cars, the distance, and the number of beds may have contributed negatively to the temperature assessment. In the study by Ribas *et al.*[24] carried

out at Pedro Ernesto University Hospital (HUPE) of the State University of Rio de Janeiro with 145 patients, temperature also negatively influenced the acceptance of the diet.

Regarding the evaluation of aspects of the service provided, the courtesy of the maid (kindness and attention on the part of the maid who delivers the meal) was the most cited as "excellent", having been assessed as "excellent or good" by more than 85% of the participants, who considered the team of maids "kind" and "fun", representing a source of distraction, friendship, and solidarity in the hospital environment. As in this study, Herezais *et al.*[20] also found a high percentage of satisfaction with regard to contact with the nutrition team and/or maids. In the study by Lopes *et al.*[6], the positive assessment of the service of the maid was attributed to personal presentation and the fact that they represent a source of support, security, and solidarity at the time of the meal.

Still on the evaluation of the service provided, the variety and respect for choice/preference were the worst items evaluated considering the "regular or bad" responses both in the menus with white meat and with red meat. Some patients claimed to "dislike" the offered option, a fact directly related to the negative evaluation of the "respect for choice/preference" aspect, which was the most poorly evaluated in relation to service's aspects. Ferreira *et al.*[25] also analyzed the factors for non-acceptance of the offered diet, the most mentioned of which were: lack of flavor (40%), repetition of meals (33%), excessive quantity (29%), lack of appetite (26%), and inadequate meal temperature (24%).

Regarding the negative balance in terms of choice/preference, that is, if the nutritionist questioned and respected patients' food preferences, especially for large meals, it was clear that this consideration was not always present and, when present, it was rarely respected. According to Mezomo[26], with due regard for therapeutic and nutritional needs, hospital diets should consider: the patient's eating habits (cooking point, spices, consistency, presentation, varieties); the patient's needs in terms of quantity of food; the right to choose (or an alternative to the patient's option); the patient's right to dialogue with the person responsible for administering the service; and the patient's right to information regarding the food (diet) served. A study carried out at a public university hospital in Cuiabá, MT pointed out eating habits and preferences as one of the most cited reasons for diet rejection[27].

Failures in passing on information about patients' preferences, lack of attention in portioning the diet, changes in the menu caused by failures in the delivery of foods, or even errors in planning may have contributed to the patients not having their preference met, causing dissatisfaction. Qualified listening and efficient communication are important skills in healthcare work. Poor communication between team professionals has been identified as one of the causes of safety incidents related to nutrition[28]. To minimize failures and improve patient satisfaction, it is essential to improve communication between care team and between members of the production team. In this regard, permanent health education emerges as a strategy that can contribute to the transformation of professional practices and work organization, aiming at improving the service and satisfying the clientele[29].

For the nutritionist, standardizing the meal production process facilitates training food and nutrition service employees, who, regardless of the shift, need to carry out activities in the same way. Standardization facilitates the planning of daily tasks, minimizing doubts and the frequency of interventions by the nutritionist, reducing interpersonal tension, and increasing safety in the work environment[30].

For the planning and execution of menus,

the technical preparation forms (TPF) are considered a managerial and operational support instrument that serve mainly to make the recipe reproducible by any employee, regardless of the work shift, the feelings of the handler on the day, the quantities of ingredients available, the time for preparation, or any other factor that may interfere with the final result of the meal[15]. TPF therefore provides meal planning with nutritional value and standardized sensory characteristics (taste, texture, appearance), since there is guidance on the mode and time of preparation, the specifications of the utensils and equipment to be used, among other information[31].

In the case of a hospital service, the use of TPF becomes essential, as the diet must meet the nutritional needs of the patient, who is hospitalized and probably will not have access to other foods during the day[32]. Therefore, it is not enough for the nutritionist to carry out nutritional assessment and food anamnesis, complete the diagnosis and prescribe the diet, it is necessary that the standardized preparations in the diet manual are available at the service. It is inconsistent to plan meals based on their nutritional composition and consistency, if at the time of production the handler does not follow the recommended preparation[15].

A major challenge is to preserve the sensory quality of diets, since the moderate or severe restriction of some nutrients can affect the organoleptic characteristics of foods and preparations, interfering with patient acceptance. Strategies such as providing sauces with different flavors can contribute to improving the acceptance of meals. Another aspect is the control of cooking time to avoid preparations with unpleasant consistency and appearance, factors that negatively interfere with patient satisfaction with hospital food[15].

The present study found a satisfaction index of 75.6% (Table 3) in relation to the menus and services provided to patients. The results indicated a need to establish strategies for improving the service and increasing patient satisfaction with the diets offered by the hospital.

The food and nutrition service studied did not present any standardization in the portion size of the meals (Graph 1). Patients who have reduced food tolerance, as cancer patients, have more difficulty in eating large amounts of food, which directly influences the amount of remains. According to Andrade and Campos[33], the standardization of portion sizes, in addition to collaborating with the preparation of meals, also provides an adjustment in the patient's energy value and operates as a coefficient for the attenuation of food waste.

Kinasz *et al.*[27] emphasize that for portion sizes to be adequate to the patient's needs, it is necessary to train employees and standardize utensils for each type of preparation. In their study, the authors found that, although there were standardized utensils and reports of periodic training, employees did not effectively comply with what was recommended, causing a variation in the portion sizes of meals of the same consistency between the evaluated clinics.

Regarding the WCR (lunch and dinner), the results demonstrated a "very bad" indicator (Graph 2). Similar results were obtained in the study by Sousa and Proença[34] developed in a public referral hospital for the National Humanization Policy in the city of Florianópolis, SC, in which the authors analyzed 1,877 meals in a period of 15 days and observed a waste rate of 36.1%. The authors pointed out that the WCR above 20% in sick communities presumes disharmony in the planning and application of menus or even due to inadequate portion sizes, preparations incompatible with the patient's eating habits, and poor presentation of the served meal.

One factor that may have impacted the result of the present study was the consistency of the studied diet. Although the bland diet has characteristics similar to the normal consistency diet, it has modifications related to the type of heat used and less variety of foods, which may have contributed to the results found in the present study, as was also pointed out by Kinasz *et al.*[27]. The authors observed a higher Waste-Consumption Ratio in the special pasty diet (31.2%) and attributed this fact to the consistency, type of food, way of preparing the diet, which are different from a normal diet, which presented a variety of foods in the preparations, in addition to variations in texture, color, and type of heat used in the preparation. For the authors, this rate impacts not only the acceptability of the diet and the possibility of nutritional deficiencies, but also the generation of trash, the result of waste.

Several studies have elevated WCR in cancer patients, which can be influenced by the decreased response to antineoplastic treatments, side effects produced by the disease's treatment, gastrointestinal symptoms such as nausea, vomiting, change in taste, constipation and/or diarrhea, which can decrease the acceptance of the diet. In addition to aspects related to the hospital environment, which for cancer patients becomes a place of long-term stay, the WCR is influenced by changes in eating habits and dissatisfaction with the meals offered[33,34].

For Maciel *et al.*[35], the acceptability and waste-consumption tests are complementary tools, and if applied together they allow to identify menus with high levels of rejection and waste, as well as the dissatisfaction of patrons. The authors consider such results to be concrete and comprehensive, which can contribute to correct irregularities in the menu and/or production process.

Participants' responses to the questions "What did you like most?" and "What did you like least?" showed a greater preference for red meats and beans, and dislikes for salads, rice, and chicken.

Regarding the food aversions reported by the patients above, salad was the most cited item. This brings us another reflection of the population's eating habits, as the consumption of salads and fruits is low in the healthy population, and when hospitalized, the absence of this habit accompanies and accentuates them. Low fiber consumption, associated with instituted pharmacological therapy and reduced walking, may contribute to the occurrence of intestinal constipation in cancer patients, a result observed in the present study in a small number of participants[36]. The World Health Organization (WHO) recommends the daily intake of at least 400 grams of fruits and vegetables, equivalent to approximately a daily consumption of five portions of these foods[37]. The daily inclusion of fruits and leafy foods in the menu makes it possible to offer the necessary supply of important vitamins, minerals, and fibers to minimize the risk of chronic non-communicable diseases (CNCD) and intestinal constipation, if consumed daily[38].

Among the suggestions, the request for regional foods reflects the origin of most of the participants, coming from the interior of the state, whose eating habits include the consumption of fried fish, açaí, flour, and salty foods. Although it is important to respect their eating habits, caution should be exercised, since these foods can bring pathological risks and health problems to the hospitalized patient, both by cooking, in the case of fried fish, and by the process that the raw material passes through in the extraction of the pulp and even by the presence of possible contaminating vectors, as in the case of açaí and flour.

CONCLUSION

Based on the use of quality indicators, it was possible to assess the acceptability, (sensory) characteristics and aspects of the service (supply) and the Waste-Consumption Ratio (WCR) of the diets served to cancer patients admitted to the studied clinics.

Regarding the acceptability and sensory aspects of the diets offered, it was observed that the appearance, color, and texture of the meal and the courtesy of the maid were the best evaluated aspects. The taste and temperature of the meal, respect for choice and variety, were the most negatively evaluated aspects, causing a significant reaction in the acceptance and ingestion of the diet, which was reflected in the patients' satisfaction index indicating a regular satisfaction.

As for the Waste-Consumption Ratio (WCR), it is above that recommended by the literature, resulting in a terrible index. When this rate is analyzed together with other aspects evaluated, they point to a need for change and implementation of immediate improvements in the menus and service which aim to offer quality diets, appropriate to the need, and to stimulate the cancer patient's taste since, depending on the disease and/or treatment, food consumption and nutritional status may be impaired.

It is known that the existence of variability in the portion size of diets and the repetition of some menu preparations, among other factors observed, may have contributed to the rejection of the meal and increased food waste, making it difficult to monitor and improve the quality of the diets served.

Therefore, the service's nutritionist must recognize the importance and the need to use quality indicators, because from the implementation of these indicators in the food and nutrition service, there will be greater control of the production processes, contributing to the reduction of waste and, consequently, an increase the acceptability of the menus and services provided to hospitalized patients. In addition, they will favor the reduction of costs variations and guarantee the standardization of the diets served, also contributing to environmental sustainability.

Further studies are suggested, using other quality indicators and methods of analyzing the menus, such as comparing the menu with the energy needs of cancer patients.

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