FOOD FOR COLLECTIVES

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This manuscript comes from the conclusion of an undergraduate course in Nutrition "*Fatores interferentes no consumo alimentar de pacientes que recebem dieta DM em um hospital público universitário*", authored by Ana Eloísa Machado Rigo and supervised by professor Virgílio J. Strasburg, presented in July 2019 at the Universidade Federal do Rio Grande do Sul. Porto Alegre, RS, Brasil.

Acceptability and factors associated with dietary consumption in diabetic patients of a public university hospital

Aceitabilidade e fatores associados ao consumo dietético em pacientes diabéticos de um hospital público universitário

Abstract

Diet therapy is essential for hospitalized patients. This study aimed to evaluate the acceptability of lunch meals in patients who received diet for diabetes mellitus (DM) and to verify aspects that may interfere with this consumption, such as seasons. This is a quantitative, descriptive study. The consumption of lunch meal in patients who received dietary DM in summer and a winter period in 2019 was evaluated. The data were verified in absolute frequencies, percentages, means, and the statistical test was the logistic regression with the association data at a 95% significance level ($p < 0.05$) using the SPSS® 18.0 software. Two inpatient units were selected, with a sample of 49 individuals (63.3% males). Out of the 115 lunch meals served, 55.7% were partially consumed or not consumed. The plate waste for the lunch meals showed a mean per capita of 64.15 g (intake of 310.89g) in the summer and of 135.99g (intake of 248.12g) in winter. The menu pattern was similar for both seasons. It was found $p < 0.05$ in relation to the season in the association of univariable odds ratio. This typo of research is important to assist in the patient's prognosis.

Keywords: Food Preferences. Dietetics. Food Consumption. Food Services. Hospital

Resumo

A dietoterapia é essencial para pacientes hospitalizados. O objetivo deste estudo foi avaliar a aceitabilidade das refeições do almoço de pacientes que receberam a dietética para Diabetes Mellitus (DM) e verificar aspectos que podem interferir nesse consumo, como as estações do ano. Estudo quantitativo descritivo que avaliou o consumo da refeição almoço dos pacientes que receberam dietética DM em um período de verão e outro de inverno no ano de 2019. Os dados foram verificados em frequências absolutas, porcentagens, médias, e o teste estatístico foi o de regressão logística com a correlação de dados a um nível de significância de 95% ($p < 0,05$) usando o *software* SPSS® 18.0. Foram selecionadas duas unidades de internação, com amostra de 49 indivíduos (63,3% do sexo masculino). Das 115 refeições servidas, 55,7% foram parcialmente consumidas ou não consumidas. O desperdício de pratos nas refeições do almoço apresentou média *per capita* de 64,15 g (consumo de 310,89g) no verão e de 135,99g (consumo de 248,12g) no inverno. O padrão do cardápio foi semelhante nas duas estações. Encontrou-se $p < 0,05$ em relação à temporada na associação do *odds ratio* univariável. Pesquisas dessa natureza são importantes para auxiliar no prognóstico do paciente.

Palavras-chave: Preferências Alimentares. Dietética. Consumo de Alimentos. Serviços de Alimentação. Hospital.

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INTRODUCTION

In the hospital context, food aims to preserve an individual's nutritional status, reducing hospital stay, and alleviating the suffering caused by the disease. Therefore, the hospital diet aims to meet the patient's nutritional needs, taking into account sex, weight, age and height.[1]

Among the most common pathologies and which have a specific recommendation the dietary prescription for diabetes mellitus (DM) aims to control glucose in the patient's blood, to prevent or treat pathological damage.[2] Thus, this diet encourages the intake of fiber, fruits and vegetables.[3]

There is evidence that the seasons, especially summer and winter, have an influence on behavior and food choices and can impact the individual's lifestyle, dietary patterns and health,[4] as well as gender, age,[5,6] pathology,[7] education[8] and the menu offered by the establishment can influence the patient's acceptance of the meal.[9]

The variations in food intake depend not only on the sex and age of the individuals but also on their usual diet. Furthermore, in the hospital environment, the patient is exposed to several situations and events, such as vomiting, nausea, infections, surgery, among other conditions that can modify their energy expenditure. As a result, the pathological and physiological states of the individuals directly interfere in increasing or decreasing their nutritional and energetic needs.[7]

Assessing food consumption is an important resource to be observed in patients' care. Through these evaluations, results on the quality of the meal served can be obtained, in addition to helping define the menus. [10]

Given the importance of hospital food intake for nutritional status in the prognosis and appetite, diet therapy is essential for hospitalized patients. This study was carried out to assess the acceptability and waste of the lunch meal of patients who received the dietary supplement for diabetes mellitus (DM) in a Brazilian public university hospital and to characterize the aspects that may interfere with this consumption.

MATERIALS AND METHODS

Methodological choice

This research is a quantitative descriptive study with application purpose and uses secondary data.[11]

Inclusion and exclusion criteria

Inclusion criteria considered the following aspects: a) being a male or a female adult or elderly (18 years old or older); b) having the prescription of oral DM diet; c) being hospitalized by the Brazilian Unified Health System (SUS - *Sistema Único de Saúde*).

For the exclusion criteria, patients with DM diet prescription associated with another diet therapy that adjusted consistency or restriction (for instance, bland, pasty, low-sodium, and low potassium diet), were not part of this study.

Data collection and evaluation instrument

This study was divided into two stages, carried out in 2019, with the aim of assessing consumption and aspects that interfere whit the acceptance of lunch. The first evaluated, one week (Monday to Friday) in the summer (February), and the second stage collected data for another week in winter (July).

Two hospital units with the highest number of patients were selected by convenience, and the participants were patients with a prescription of normal consistency diet for DM. Then some characteristics of the patient were evaluated, such as gender, age, and education, as well as the associated pathology, menu, and the consumption of participants.

The following formulas were used to determine:

a) Plate waste (PW)

PW = Weight before consumption - weight after consumption

b) Plate waste percentage (PW%):

PW% = Total weight after consumption x 100 / total weight after consumption

c) Mean meal weight before and after consumption:

Weight before consumption / number of participants

Weight after consumption / number of participants

Meals were placed by food handlers on disposable plates in the Nutrition Centralization sector and afterward served to patients. Packaging weight was deducted from the values of served

and consumed meals. Avanutri® scale with a maximum capacity of 5,000 grams (g) and precision of 1 g was used. All steps related to weighing described above were performed by the authors.

The plate waste calculation was intended to show the patient's acceptance of the meal served for further comparison and verification of the interfering factors in food acceptance (hospital menu, associated pathologies, gender, age, schooling level, the period of stay and season). The salad portion was served in a separate package and, therefore, was not counted in the consumption of the hot meal.

To assess the patient characteristic information the hospital operating system was used to check the patient's records.

Data use and analysis

The results were transcribed to the Microsoft Excel © 2010 software. The data were verified in absolute frequencies, percentages, means, and standard deviation of information collected. The exploratory variables for results comparison were: a) gender, age, education, length of stay, and pathology of patients; b) season, and c) menu. The specific statistical test of the logistic regression model was used for data correlation, using an autoregressive association structure 1 (AR1). It was applied at 95% significance level ($p < 0.05$) using the 18.0 version of the Statistical Package for the Social Sciences for Windows® (SPSS) software.

Ethical issues

There was no direct intervention with patients, so the use of the Free and Informed Consent Form – ICF was not required. The fulfillment of this study was linked to project number 36676/2019 registered at *Plataforma Brasil* and approved by the Research Committee of the School of Medicine of the Universidade Federal do Rio Grande do Sul.

RESULTS

The hospital's menu seeks to offer a balanced diet, which provides adequate caloric intake for the patient's evolution. The hospital also offers breakfast, morning snack, lunch, afternoon snack, dinner, and night snack. The standard dishes offered in lunch contain white rice, cooked black beans / cooked lentils, vegetable side dishes, raw salad, and dessert (which can be diet cream and diet gelatin prepared by the hospital or fruit).

This research sought to identify some factors that interfered with the acceptability of the DM diet in two different periods. Table 1 shows the characterization data of patients in the summer and winter periods.

Table 1. Characterization descriptive of patients who received the DM diet

	Summer		Winter	
Rated Item	Men	Women	Men	Women
Amount	20	6	11	12
Age				
Mean (in years)	60.55	61.16	62.5	59.5
Minimum (in years)	23	33	45	44
Maximum (in years)	81	72	80	75
Schooling				
incomplete middle school	11	2	7	6
complete middle school	6	0	2	0
Incomplete/complete high school	3	4	1	3
Incomplete/complete higher education	0	0	1	1
Ignored	0	0	0	2
Energy Requirement				
Mean (Kcal)	2055	1700*	1873	1767
Minimum (Kcal)	1800	1600	1800	1600
Maximum (Kcal)	2400	1900	2000	2000
Standard Deviation	±201.2	±121.3	±96.2	±159.9

Source: elaborated by the authors, 2019.
(*)There was no dietary energy requirement specified on the plate label of one of the women.

Table 2. Characterization of length of hospital stay and associated specialty in study patients

Length of stay	Number of participants	
Day	Summer	Winter
1	8	9
2	9	4
3	2	6
4	5	3
5	2	1
Total	26	23

Source: elaborated by the authors, 2019.

As for education, women had better schooling when compared to men, and 66.6% of the patients had completed secondary or partial education. Also, men obtained the highest percentage of incomplete primary education.

Concerning energy requirement displayed on the participants' plate label, the minimum and maximum daily caloric values were 1,600 kcal and 2,400 kcal, respectively. Caloric density was determined by the clinical nutritionist, considering age, height, body mass index (BMI) and the patient's metabolic condition.

Regarding pathologies, a greater number of patients with diseases related to nephrology (hemodialysis and post-transplant) were identified, followed by cardiovascular surgery, digestive surgery, urology, and others.

In both research periods, 115 meals were served (excluding patients who were on hemodialysis, patients in NPO [nothing by mouth], or who were discharged). Table 3 presents the characteristics of the meal distribution and the consumption among participants, assessed by the difference in weight of the dish before and after consumption (rest-intake).

Table 3. Characterization of meals distributed in a public university hospital

I.U.*	Meals served	Total weight of dishes served (g)	Mean weight of dishes (g)	Minimum dish weight (g)	Maximum dish weight (g)
A	37	3485.47	365.25	216.5	547.5
B	78	11501.77	418.18	279	560

Source: elaborated by the authors, 2019.
*I.U. = inpatient unit

Chart 1. Menu offered and respective consumption in patients

Menu		I.U. A			I.U. B		
		Mean weight of the dishes (g)	Mean intake (g)	% intake	Mean weight of the dishes (g)	Mean intake (g)	% intake
Monday:	(*) Raw coleslaw, cooked white rice, cooked black beans, shredded chicken with tomato sauce and boiled carrots sautéed with peas.	359	359	100	391.9	385.1	98.26
	(**) Salad of raw coleslaw, cooked white rice, boiled black beans, shredded chicken with tomato sauce and carrot sautéed with pea.	388.25	306	78.81	454.29	265.86	58.52
Tuesday:	(*) Salad of raw grated carrots, cooked white rice, cooked black beans, chicken escalope in cream sauce and cooked broccoli.	299	201.7	67.45	362.4	343.5	94.78
	(**) Salad of raw carrot, cooked white rice, cooked black beans, chicken escalope in cream sauce and cooked cauliflower.	308.5	227.25	73.66	398.83	207	51.90
Wednesday:	(*) Lettuce salad, cooked white rice, cooked black beans, scallops with rust / sauce and cooked broccoli.	305.3	205.3	67.24	398.2	297.9	74.81
	(**) Salad of lettuce, cooked white rice, boiled black beans, scallops in rust sauce and braised chayote.	372	245.33	65.94	402.33	261.17	64.91
Thursday:	(*) Raw tomatoes salad, cooked white rice, boiled black beans, chopped with sauce and sautéed carrots with chayote.	444.7	336	75.55	399.1	321	80.43
	(**) Raw tomatoes salad, cooked white rice, boiled black beans, chopped with tomato sauce and braised eggplant.	415.6	264.4	63.61	432.6	126	29.12
Friday:	(*) Lettuce salad, cooked white rice, cooked black beans, chicken fricasse and cooked broccoli.	414	331	79.95	377	294	77.98
	(**) Lettuce salad, cooked white rice, cooked black beans, chicken fricasse and cooked broccoli.	357.6	249.2	69.68	402.5	329	81.73

Source: elaborated by the authors, 2019.

*I.U. = inpatient unit; Note: (*) summer menu; (**) winter menu.

Some dishes that resulted in leftovers (partial consumption) were visually analyzed following the protocol of the Nutrition Day program.[12] In the first stage of the research, the least consumed food white rice was cooked, followed by cooked broccoli, cooked black beans and beef; and in the second stage, the least

consumed were beef, chicken, cooked black beans and cooked white rice. The dishes that had the most rejection, that is, those that some patients did not consume, were cooked black beans, cooked broccoli, beef, cooked white rice, eggplant, cooked carrots and chayote.

Table 4. Analysis of the association of variables with patient consumption

	Univariable			Multivariable		
Variable	OR	CI (95%)	p	OR	CI (95%)	p
Woman	1.88	0.71 – 5.01	0.20	0.54	0.17 – 1.76	0.30
Schooling (modality)			0.05			0.20
Incomplete primary education	3.64	- 0.29 – 2.87	0.10	2.04	0.65 – 6.43	
Incomplete/complete high school	3.10	0.08 – 2.18	0.03	2.56	0.62 – 10.60	
Age (in years)			0.20			0.05
> or equal 71	1.87	0.21 – 16.46	0.50	3.50	0.39 – 31.05	
61-70	0.48	0.07 – 4.75	0.60	0.55	0.07 – 4.24	
51-60	0.63	0.06 – 3.80	0.40	0.93	0.10 – 8.73	
length of stay (in days)			0.30			0.11
> 15	0.38	- 2.41 – 0.47	0.10	0.10	0.01 – 1.18	
08 - 14	1.19	- 944 – 1.29	0.70	1.22	0.37 – 4.08	
Patology (type)			0.30			0.50
Cardiovascular surgery	2.76	0.88 – 8.67	0.08	2.15	0.59 – 7.46	
Urology	2.15	0.50 – 9.25	0.30	0.95	0.36 – 2.51	
Digestive Surgery	1.53	0.25 – 9.23	0.60	2.77	0.50 – 15.17	
Winter season	2.53	1.04 – 6.17	0.04	2.46	0.74 – 8.15	0.14

Source: elaborated by the authors, 2019. OR: Odds Ratio; CI: confidence interval

Although all the variables surveyed have a degree of influence on the acceptability of the hospital diet, in this study they were not statistically significant when associated in a multivariate analysis through the odds ratio, possibly due to the small number of participants. When the univariate analysis was conducted, a statistical difference related to the season was observed.

DISCUSSION

The standard DM diet served at the study site aims at a healthy and balanced diet with the main objective of controlling blood glucose and promoting a good recovery. For this reason, it is not only served for patients with diabetes, but also for patients who need greater care with their blood glucose because their metabolic system is compromised. For example, patients with chronic kidney disease (CKD), since some individuals use immunosuppressive drugs, which can cause insulin resistance.[13]

Nephrology stood out in this study. Jimenéz et al.[14] showed in their study that there is a difference in the prevalence and progression of chronic kidney disease (CKD) in relation to gender because there is an important biological difference between the sexes. CKD especially affects women, who generally opt for

conservative treatment. However, the disease progresses more rapidly in men, who generally prefer treatment on hemodialysis.

Despite the fact that men and women have a different lifestyle, such as health care and food, with women having a long history of health care than men, there was no important difference in this regard, perhaps due to the small number of participants.[8, 15]

According to Fernandes et al.,[16] the consumption of healthy and unhealthy foods by patients with CKD is the same as individuals without the disease. Mendonça et al.[17] also found that the most influential factors for food consumption were age, education, gender, and above all, income.

The main findings of this study showed prevalence of a higher age group for patients who received DM-type diets, as well as the level of education that predominated in incomplete/complete high school. In the research, one could notice a small difference in the mean age between the sexes. In addition, a higher level of education also reflects healthier lifestyles and greater medical care.[8]

Regarding the consumption of meals, it is important to highlight some aspects. Through cross-analysis, it was observed that patients older than 71 years old and female patients were more likely to reject meals partially or in full. Regarding the period of stay, season and associated pathology, patients with a long period of stay (between 8-14 days) were more likely to eat only part or none of the meals served.

As it was possible to observe, the foods that patients most rejected were those that had a higher frequency, generating food monotony, due to the small variety of foods and preparations.[9] This can be one of the causes of disinterest in the menu and also generate a low availability of micronutrients for the patient. Cooked broccoli was the most frequent food and the most wasted one. Thirteen dishes had leftovers of this vegetable and five patients did not even taste the dish, totaling a waste of 18 times in the survey.

Patients are exposed to various situations and events in the hospital environment, such as vomiting, nausea, infections, surgery, among other conditions that can modify their energy expenditure. As a result, the pathological and physiological state in which individuals find themselves directly interferes with the increase or decrease in their nutritional and energy needs,[7] and can directly influence the acceptance of the food provided by the hospital.

Although in this research the winter season was the one that most influenced the partial consumption of the meal, perhaps due to the menu composition, with high prevalence of vegetables as side dishes, there is evidence of greater intake and/or search for more caloric foods in colder periods. Also, there is a reduction in the intake of fruits and natural fruit juices, one possible justification for mean consumption of 82% in summer and 63% in winter. This shows us that variations in food intake depend not only on the gender and age of individuals but also on their usual diet.[5,6]

In addition, it was observed that patients received more than the recommended standard of the portions defined by the nutrition service (rice 80g, beans 70g, meat 60g, vegetable 80g), which may have contributed to the increased waste. This discrepancy between the amount of food prescribed and what is served may be due to bias of utensils, inadequate training of attendants, or even beliefs of food handlers that the amount of food displayed on the label is low.

CONCLUSION

This study aimed to evaluate the interfering factors in the acceptability of the DM-type diet, in a public hospital in Brazil, since hospital food is extremely important for an adequate recovery and maintenance of

the patients' nutritional status. Also, an intake compatible with the pathology's metabolic demand decreases hospital stay.

Although the sample size of this study was not high, we highlight that several factors interfere with the food consumption of hospitalized patients, such as age, gender, and associated pathology. The factor that showed the most significant result in relation to the patients 'meal intake was that of the season, which showed that the patients' consumption was better in the summer. In addition, the composition of menus must be in line with the habits of the patients to influence more effective consumption. Therefore, more research in this field is relevant for a good understanding and assessment of hospitalized patient's food consumption.

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Contributors

Rigo AEM collected data, analyzed the results; and wrote the manuscript; Strasburg VJ contributed to the study design, coordination of all phases of the study conception and writing of this manuscript; Escobar M, Goularte JF and Jochims AMK contributed to the discussion of the results and the study design. All authors reviewed and approved the final version of this paper.

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