










FOOD CONSUMPTION OF MACRONUTRIENTS AND NUTRITIONAL STATUS OF PEOPLE WITH OSTOMY

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ABSTRACT

Objective: To evaluate the food intake of macronutrients and nutritional status of people with ostomy in the Amazonian context. **Method:** Quantitative cross-sectional study carried out in the specialized reference unit for people with ostomy, in the period from January to March 2020. The sample consisted of 77 people with ostomies, aged 21 to 88 years old, of both genders. We used sociodemographic information, clinical and behavioral aspects, anthropometric measurements and 24-hour recall. Statistical analysis was performed using BioEstat 5.0 and EpiInfo 3.5.1 software. **Results:** Most were male, aged between 35 and 50 years old. The most frequent types of ostomy were: colostomy (69%) and ileostomy (21%), with a temporary nature (43%), with neoplastic etiology in both sexes (60%). As for the nutritional status, most presented eutrophy according to the body mass index, but waist circumference showed increased metabolic risk in females, and the triceps skinfold thickness indicated excess adiposity in males (<0.0001). Regarding food consumption, there was inadequacy of energy and macronutrients. **Conclusion:** Eating habits in the Amazonian context may be related to inadequate food consumption and changes in nutritional status.

DESCRIPTORS: Ostomy. Eating. Nutrients. Nutritional status. Enterostomal therapy.

CONSUMO ALIMENTAR DE MACRONUTRIENTES E ESTADO NUTRICIONAL DE PESSOAS COM ESTOMIA

RESUMO

Objetivo: Avaliar o consumo alimentar de macronutrientes e o estado nutricional de pessoas com estomia no contexto amazônico. **Método:** Estudo transversal quantitativo realizado na unidade de referência especializada às pessoas com estomia, no período de janeiro a março de 2020. A amostra foi constituída de 77 pessoas com estomias, com idade de 21 a 88 anos, de ambos os sexos. Foram utilizados informações sociodemográficas, aspectos clínicos e comportamentais, medidas antropométricas e recordatório 24 h. A análise estatística foi realizada por meio dos softwares BioEstat 5.0 e EpiInfo 3.5.1. **Resultados:** A maioria era do sexo masculino, com faixa etária entre 35 e 50 anos. Os tipos mais frequentes de estomia foram: colostomia (69%) e ileostomia (21%), com caráter temporário (43%), tendo em ambos os sexos a etiologia neoplásica (60%). Quanto ao estado nutricional, a maioria apresentou eutrofia segundo o índice de massa corporal, no entanto a circunferência da cintura demonstrou risco metabólico aumentado no sexo feminino, e a prega cutânea tricípital indicou obesidade no sexo masculino e eutrofia no sexo feminino (<0,0001). Com relação ao consumo alimentar, observou-se inadequação de energia e de macronutrientes. **Conclusão:** Os hábitos alimentares no contexto amazônico podem estar relacionados ao consumo alimentar inadequado e às alterações no estado nutricional.

DESCRIPTORIOS: Estomia. Ingestão de alimentos. Nutrientes. Estado nutricional. Estomaterapia.

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CONSUMO ALIMENTARIO DE MACRONUTRIENTES Y ESTADO NUTRICIONAL DE PERSONAS CON OSTOMÍA

RESUMEN

Objetivo: Evaluar el consumo alimentario de macronutrientes y el estado nutricional de personas con estoma en el contexto amazónico. **Método:** Estudio transversal cuantitativo, realizado en la Unidad de Referencia Especializada en personas con ostomía durante el periodo de enero a marzo del 2020. La muestra estuvo constituida por 77 personas con estoma. Entre los 21 y los 88 años, de los dos sexos. Se usó información sociodemográfica, aspectos clínicos, comportamentales, medidas antropométricas y recordatorio de 24 horas. El análisis estadístico se realizó con los programas BioEstat 5.0 y EpiInfo 3.5.1. **Resultados:** La mayoría eran de sexo masculino, con un grupo etario de 35 a 50 años. Los tipos de ostomía más frecuentes fueron: colostomía (69%) e ileostomía (21%), de carácter temporal (43%), con etiología neoplásica en ambos sexos (60%). Por otro lado, con relación al estado nutricional, la mayoría presentó eutrofia según el índice de masa corporal. Sin embargo, la circunferencia de cintura demostró riesgo metabólico más grande en el sexo femenino y el pliegue cutáneo tricípital indicó exceso de adiposidad en el sexo masculino y eutrofia en femenino ($<0,0001$). Con relación al consumo alimentario, se observó la inadecuación de energía y macronutrientes. **Conclusión:** Los hábitos alimentarios en el contexto amazónico pueden estar relacionados con el consumo inadecuado de alimentos y cambios en el estado nutricional.

DESCRIPTORES: Estomía. Ingestión de alimentos. Nutrientes. Estado nutricional. Estomaterapia.

INTRODUCTION

The making of a stoma with the function of elimination consists of an emergency or an elective surgical procedure, with the purpose of excreting residues, which can be temporary or permanent¹. According to the externalized segment, the stoma receives a specific denomination. Among them, the most common are: ileostomy and colostomy, depending on the exteriorized segment, located in the small and large intestine, respectively^{2,3}.

The indication of ostomy may result from several factors, among them trauma, congenital diseases, intestinal obstruction and inflammatory diseases, such as Crohn's, ulcerative rectocolitis and diverticulitis, besides malignant neoplasms⁴. Colorectal cancer is one of the most prevalent types in Brazil and in the world, in both sexes, and one of the main causes of ostomy⁵.

With the making of a stoma, the use of the collecting bag becomes necessary, which requires correct management in self-care, with different adaptations, which can interfere directly in the quality of life, from the physiological conditions to the lifestyle, with new hygiene and eating habits aimed at the control of elimination functions^{2,6,7}. In addition, it can affect social issues, through interpersonal relationships, body image and self-esteem, due to the complexity of ostomy^{7,8}.

Regarding dietary changes, many people restrict certain foods in order to reduce gastrointestinal symptoms, such as foul odor, excessive gas, constipation, diarrhea, abdominal distension, and even to prevent leakage in the collecting system. However, this behavior may generate negative repercussions, so as to cause nutritional deviations, such as malnutrition, lack of essential nutrients, such as vitamins, minerals, water, proteins, carbohydrates, and fats⁴. On the other hand, excessive consumption can cause overweight and obesity, which are also risk factors for the development of other comorbidities⁶. Thus, inadequate eating habits can cause significant changes in nutritional status and increase the risk of complications such as peristomal hernias, prolapse, stenosis and granulomas^{9,10}.

In the context of the Amazonian diet, there is a dietary pattern with high consumption of carbohydrates, derived from cassava flour, associated with high-calorie foods and low intake of vegetables and legumes¹¹. Thus, it is possible to infer that these inappropriate eating habits can be risk factors and cause nutritional changes in people with stoma.

Given the above, this study aimed to evaluate the food intake of macronutrients and the nutritional status of people with stoma in the Amazon context.

METHODS

This is a quantitative cross-sectional study whose data collection was performed by the executors of this research, through a structured form, in the nutrition office of a reference unit specialized in attention to people with stoma in the city of Belém, state of Pará. Seventy-seven participants of both genders were included. Their ages ranged from 21 to 88 years, and they were invited to integrate the research according to the inclusion criteria: having a stoma (ileostomy and colostomy) and age equal to or greater than 18 years. Among the exclusion criteria were people with neurological diseases or with some physical disability that made the anthropometric evaluation impossible. The participants signed the Free and Informed Consent Form.

Data were collected from January to March 2020. The participants were submitted to the application of a form with socioeconomic data, with the variables: sex, age, clinical and behavioral aspects and anthropometric evaluation – weight (kg), height (m), body mass index (BMI) (kg/m^2), arm circumference (AC) (cm), waist circumference (WC) (cm) and triceps skinfold thickness (TSF) (mm). Weight was measured by a platform-type scale, with a capacity of 150 kg and precision of 100 g. Height was measured with a stadiometer attached to the scale with a capacity of 1.90 m. Both weight and height were used to evaluate the BMI, classified according to the World Health Organization¹². In addition, an inelastic tape with graduation in centimeters, with capacity to measure 2 m, and also a Sanny scientific adipometer were used to measure the TSF.

Food consumption was evaluated by means of a single 24-h or previous day's recall, considering the size and volume of the ingested portion, the forms of preparation, the place of consumption, and the supplements. The data obtained from the 24 h recall were entered into software DietSmart version 12.1.2 and converted into energy and nutrients. For analysis, macronutrients based on the parameters of the Institute of Medicine¹³ were used, with intake recommendation values for carbohydrate 45 to 65%, protein 10 to 35% and lipids 20 to 35%.

The data were included in Microsoft Office Excel version 2010, expressed in descriptive statistics, presented as tables. Statistical analysis was performed using BioEstat 5.0 and EpiInfo 3.5.1.

The D'Agostino–Pearson test was used to evaluate the normality of the data. The variables presented here revealed sometimes with normal distribution, sometimes with non-normal distribution, making it necessary to use parametric and nonparametric tests for the statistical analysis of this study.

Categorical variables were presented as frequencies and numerical variables as measures of central tendency and dispersion. In the comparison of independent samples, the significance of the data was evaluated by the G-test (independence) and the t-test. In the multivariate analysis, the multiple linear regression test was performed. A significance level of 5% ($p \leq 0.05$) was adopted.

The study was approved by the Ethics Committee on Research Involving Human Beings of the University Center of the State of Pará (Cesupa), with opinion no. 3,761,150, dated December 11, 2019.

RESULTS

This study was composed of 77 people with stomas assisted in a specialized reference service. Through the sociodemographic aspects, it was found that 53% were males, with a mean age of 48.80 ± 16.50 years, and 47% were females, with a mean age of 52.72 ± 16.46 years, with no statistical difference ($p = 0.30$). Regarding marital status, most of them (43%) were in a stable union or married. Regarding the level of education, it was observed that most had incomplete elementary school (32%) or complete high school (31%).

Regarding lifestyle habits, in both genders most did not consume alcoholic beverages. Among those who did drink, most were male (37%), and the frequency was weekly. Moreover, neither gender was a smoker (84%), and 69% of the participants did not practice physical activity. Among those who smoked, most were male, with significant results ($p = 0.04$). As for water intake, most (32%) ingested about 2 L per day.

When the characteristics of the stomas were observed, the most frequent types were colostomy (69%) and ileostomy (21%), having in both genders the neoplastic etiology (60%). Most had the character of temporary stoma (43%), followed by permanent (42%) and undefined (16%).

As for the nutritional state, through the relationship between body mass and height of the individual, the results presented as adequate (eutrophic) in both genders. Moreover, the AC also indicated eutrophy in the sum of body constitutions; however, increased metabolic and cardiovascular risks were observed in females through the WC, which is an indicator parameter of central obesity.

Moreover, there was a significant difference between genders (< 0.0001) in the TSF, pointing to excess subcutaneous fat layer, with most males classified as obese and females as eutrophic, as shown in Table 1.

Table 1. Distribution of the nutritional status, total and stratified by sex of individuals with stoma, Belém, Pará, 2020.

Variables	Male (n = 41)	Female (n=36)	p-value	Total (n=77)
	N (%)	N (%)		N (%)
BMI (kg/m²)				
Low weight	4 (10%)	4 (11%)	^a 0,61	8 (10%)
Eutrophy	17 (41%)	12 (33%)		29 (38%)
Overweight	9 (22%)	9 (25%)		18 (23%)
Class I obesity	9 (22%)	7 (19%)		16 (21%)
Class II obesity	1 (2%)	4 (11%)		5 (6%)
Class III obesity	1 (2%)	-		1 (1%)
AC (cm)				
Severe malnutrition	-	-	^a 1	-
Moderate malnutrition	5 (12%)	2 (6%)		7 (9%)
Mild malnutrition	7 (17%)	3 (8%)		10 (13%)
Eutrophy	24 (59%)	21 (58%)		45 (58%)
Overweight	3 (7%)	6 (17%)		9 (12%)
Obesity	2 (5%)	4 (11%)		6 (8%)
TSF (mm)				
Severe malnutrition	2 (5%)	6 (17%)	^a <0,0001*	8 (10%)
Moderate malnutrition	2 (5%)	2 (6%)		4 (5%)
Mild malnutrition	4 (10%)	5 (14%)		9 (12%)
Eutrophy	3 (7%)	12 (33%)		15 (19%)
Overweight	1 (2%)	6 (17%)		7 (9%)
Obesity	29 (71%)	5 (14%)		34 (44%)
WC (cm)				
Without risk	21 (51%)	12 (33%)	^b 0,06	33 (43%)
Increased risk	10 (24%)	6 (17%)		16 (21%)
Highly increased risk	10 (24%)	18 (50%)		28 (36%)

BMI: body mass index; AC: arm circumference; TSF: triceps skin fold; WC: waist circumference; -: numerical data equal to zero; G-test (contingency); chi-square test; *statistically significant result ($p \leq 0.05$).

Regarding food consumption, it can be observed that the energy variable was higher among men when compared to that among women. Regarding carbohydrate consumption, it was also higher among men, but the percentage of lipid consumption among women was higher compared to men (Table 2).

Table 2. Mean and standard deviation of macronutrient intake stratified by sex of individuals with stoma, Belém, Pará, 2020.

Macronutrients	Mean±SD		p-value	Mean±SD Total (N=77)
	Male (n=41)	Female (n=36)		
Energy (Kcal)	2,508.41 ± 1,342.45	1,873.94 ± 796.67	0.01*	2,211.77 ± 1.158.59
Proteins (%)	3.50 ± 2.72	4.41 ± 2.84	0.15	3.93 ± 2.80
Carbohydrates (%)	59.27 ± 12.32	51.63 ± 14.15	0.01*	55.70 ± 13.67
Lipids (%)	23.09 ± 9.07	28.25 ± 12.82	0.04*	25.50 ± 11.21

SD: standard deviation; *statistically significant result, t test (independence) $p \leq 0.05$.

Table 3 shows the distribution of macronutrient consumption, where protein consumption with no statistical difference and higher carbohydrate consumption by men ($p = 0.04$) can be observed. According to the IOM (Institute of Medicine), most are adequate and above the recommendations. In contrast, women are mostly with adequate consumption and below recommendations. For lipids, a significant result was also observed ($p = 0.04$): men are with adequate intake, and among women most are adequate and above recommendations.

Table 3. Classification of macronutrient intake stratified by sex of individuals with stoma, Belém, Pará, 2020.

Macronutrients	Male (n=41)	Female (n=36)	p-value	Total (n=77)
	N (%)	N (%)		N (%)
Protein				
Below recommendations	23 (56.1)	16 (44.4)	0.39	39 (50.6)
Appropriate	18 (43.9)	19 (52.8)		37 (48.1)
Above recommendations	-	1 (2.8)		1 (1.3)
Carbohydrates				
Below recommendations	5 (12.2)	12 (33.3)	0.04*	17 (22.1)
Appropriate	22 (53.7)	18 (50)		40 (51.9)
Above recommendations	14 (34.1)	6 (16.7)		20 (26)
Lipids				
Below recommendations	2 (4.9)	1 (2.8)	0.04*	3 (3.9)
Appropriate	35 (85.4)	23 (63.9)		58 (75.3)
Above recommendations	4 (9.8)	12 (33.3)		16 (20.8)

*Statistically significant result, G-test (independence) $p \leq 0.05$.

Furthermore, the correlation between the consumption of macronutrients – proteins, carbohydrates, and lipids – and the anthropometric variables was performed, but no significant correlation was observed between these variables ($p \geq 0.05$) (Table 4).

Table 4. Correlation between macronutrient intake and nutritional status, total and stratified by sex of individuals with stoma, Belém, Pará, 2020*.

Macronutrients	Anthropometric variables			
	BMI	AC	WC	TSF
Proteins	F = 1.32	F = 0.84	F = 2.46	F = 1.18
Carbohydrates	P = 0.27	P = 0.52	P = 0.06	P = 0.31
Lipids				
Men				
Proteins	F = 2.44	F = 0.98	F = 2.39	F = 1.88
Carbohydrates	P = 0.07	P = 0.58	P = 0.08	P = 0.14
Lipids				
Women				
Proteins	F = 2.03	F = 0.58	F = 2.82	F = 0.57
Carbohydrates	P = 0.12	P = 0.63	P = 0.056	P = 0.63
Lipids				

BMI: body mass index; AC: arm circumference; TSF: triceps skinfold; WC: waist circumference; *multiple linear regression test ($p \leq 0.05$).

DISCUSSION

Through the analysis of this study, it was verified that there was no statistically significant difference between the male and female quantitative of people with stoma in the Amazonian context; however, it followed the national trend of the majority being male^{14,15}.

Regarding the marital situation, most were in a stable union or married. Similar data were found in a study with 107 people registered in the care program for people with stoma in Teresina (Piauí), in which 48.6% were married or in a stable union¹⁴. The presence of a spouse in the process of adaptation after the confection of the stoma can help with the new reality, helping in the care and in the well-being¹⁵. On the other hand, the stoma can cause damages in the affective relationships, with feelings of incapacity, denial and low self-esteem due to the changes in the body image¹⁶.

As for the level of education, it was observed that most had incomplete elementary school or complete high school. This low level of education can have a direct impact on the self-care practices, since understanding them can facilitate living with a stoma¹⁷.

It was found that, in both genders, most were not drinkers or smokers. Similarly, in a cohort study conducted in an outpatient clinic of patients with stoma of a public hospital in Pernambuco, most reported not consuming alcoholic beverages or smoking after making the stoma¹⁸. In addition, there was a low adherence to the practice of physical activities. These results are directly associated with the fear of complications and insecurity when performing activities, mainly due to the leakage of the collecting bag³. In this bias, long-term sedentary lifestyle may be associated with the incidence of overweight and obesity in this public¹⁹.

As for water intake, most participants drink about 2 L per day. Corroborating this data, in a study with a similar population, water intake ranged from 1 to 2 L per day³. According to the literature, after making the stoma, the hydric need may be increased due to the decrease in the absorption portion, and in ileostomy there is a greater risk of fluid and electrolyte loss, which can cause dehydration¹.

In addition, the characteristics of the stomas were observed in the research. The most frequent types found were colostomy and ileostomy, of which main cause in both genders was colorectal cancer. Similarly, in a study⁴ with 103

people with stomas, 61.2% had a colostomy and 38.8% had an ileostomy, most of them of neoplastic origin. These data are strongly related to the high incidence of colon and rectal cancer, being among the ten most frequent types of cancer. In the Northern Region of Brazil, colorectal cancer is the third most incident in women and the fourth among men⁵.

In this sense, the study also evidenced that most have temporary stoma condition, followed by permanent. These results differ from those of a cross-sectional research¹⁷ in which the majority (59.5%) had a permanent condition and 40.5% were temporary. In the same study, the correlation between the length of stoma duration and the underlying disease was highlighted, with the definitive stomas associated with colorectal cancer, advanced age, presence of comorbidities and surgical complications being common, and the temporary ones linked to traumatic conditions^{11,15}. Thus, the existence of the stoma can cause different repercussions in the short or long term, with modifications in lifestyle and social relations¹⁵.

Regarding nutritional status, the prevalence in males of overweight or obesity was observed according to the BMI¹². This nutritional state implies metabolic alterations, of multifactorial origin, with chronic and inflammatory characteristics¹⁹. Based on the studies^{6,9,10}, the increase in BMI in people with stoma is directly associated with a higher frequency of peristomal complications, hernias, prolapses, stenosis, leaks, and difficulties in self-care. In this sense, weight control for adequacy of the nutritional state is important in the prevention of complications to the stoma and the emergence of noncommunicable chronic diseases⁹.

The results of the study showed a greater reserve of body fat evaluated by TSF and eutrophy according to AC in males. These results were similar to those presented by a study¹⁹ in which, of the 104 patients with stoma of both genders, 46% were eutrophic according to BMI. According to the WC variable, 53% were eutrophic, and 49% were excessively adipose according to TSF.

In addition, it was possible to identify the greatly increased risk for metabolic complications in women through WC, which is an indicator of abdominal obesity²⁰. In divergence to these findings, other studies do not use WC as an evaluation parameter due to the difficulties in measuring the abdominal region, because the evaluation does not show reliable results due to the presence of the collecting bag or possible parasternal hernias^{4,19}.

Regarding the food consumption of people with stoma, there are no specific dietary recommendations available in the scientific literature; however, these people must follow a diet appropriate to individual needs, considering the eating habits and the remaining symptoms of ostomy^{3,4}, since many tend to restrict certain foods in order to alleviate gastrointestinal discomfort²¹. Furthermore, in the general population, the markers of food consumption showed the low consumption of healthy eating pattern, with the frequency of consumption of fruits and vegetables of 22.5%, and other groups of non- or minimally processed foods with the frequency of 31.4%²².

As for the energy value, the consumption of foods with high caloric density results in excessive intake of calories, enabling the risk of obesity²³. According to a research²⁴, the main source of Amazonian food comes from the açaí pulp, accompanied by flour and fried salted fish. In a study conducted in the municipality of Igarapé-Miri, state of Pará, the daily consumption of the fruit in at least three meals – lunch, snack and dinner – stands out, corresponding to most of the caloric intake²⁵.

Furthermore, the food patterns of the Amazonian population based on the global economic system are undergoing changes, associated with increased consumption of processed foods, such as bologna, sardines and canned foods, resulting in higher intake of calories, salt and saturated fats^{11,25}.

With regard to the intake of carbohydrates, the male gender showed intake above the recommended. This intake may be associated with the typical cassava flour and its derivatives, which are highly consumed in the region, having social and cultural influence²⁴. In the North and Northeast regions, it is common to replace rice by flour or as an ingredient in the preparation of farofas and broths, but it is a highly energetic food²³, and this unbalanced diet can favor the development of obesity and other diseases²³.

As for protein consumption, fish is the main source of animal origin, being widely marketed due to local availability. In addition, other protein sources are also consumed, such as salted shrimp, fried beef, chicken and game meats²⁵.

Regarding the consumption of lipids, it was observed that the female gender consumption was above the recommendations, which may be related to ultraprocessed foods, fried foods and fats of animal origin, with saturated fats being predominant²⁴. This consumption differs from the study⁴ in which the intake of fats by people with stoma is lower, due to the fear of causing diarrhea and abdominal pain. According to the guidelines presented in the *Food Guide for the Brazilian Population*, oils and fats must be used in small quantities in the preparations, in order to avoid complications to the stoma and disturbances in lipid metabolism²³.

Finally, the limitation of this research is related to the reapplication of the 24-h recall, which was unfeasible because of the location of the interviewees—many lived in the interior of the state, and it was difficult to have telephone contact. In addition, there were difficulties when measuring the amount of food in home measures.

CONCLUSION

After the completion of this work, it was concluded that among the people with stoma the majority was male, with temporary colostomy and of neoplastic etiology.

Inadequate food consumption above the recommendations for energy and carbohydrates, especially in men, and lipids in women may be associated with the dietary habits of the Amazon region, which presents a high-calorie dietary pattern.

In relation to the nutritional status, changes such as obesity and excess adiposity were observed in males and increased risk for metabolic complications in females. These results may be related to the sedentary lifestyle and food consumption verified in this study, which may increase the chances of developing nontransmissible chronic diseases and complications to the stoma.

Thus, the need for nutritional assistance by a nutritionist with experience in stoma is highlighted, promoting healthy eating habits in the promotion of health and quality of life.

AUTHOR CONTRIBUTION

Substantive scientific and intellectual contributions to the study: Queiroz ST, Costa VVL and Silva AF; **Conception and design:** Queiroz ST, Costa VVL, Silva AF, Santana KB, Cunha RR and Araujo MS; **Data collection, analysis and interpretation:** Queiroz ST, Silva AF, Amaral MPC, Santana KB, Dias LNM and Barreto JTT; **Drafting of the article:** Queiroz ST; **Critical revision:** Queiroz ST, Santana KB, Barreto JTT, Silva AF, Amaral MPC and Dias LNM; **Final approval:** Costa VVL, Queiroz ST, Cunha RR and Araujo MS.

AVAILABILITY OF RESEARCH DATA

The data will be made available upon request.

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