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Protective food consumption and risk for cancer development among health students

Consumo de alimentos protetores e risco para desenvolvimento de câncer entre estudantes da saúde

Abstract

Objective: To verify the trend of consumption of protective and risk foods for cancer development among health students from the Federal University of Pará. ***Methods:*** Cross-sectional, descriptive and analytical study with 261 Health students. Data collection was conducted from January to July 2016, through an online form developed on Google Drive, with information about identification, lifestyle and eating frequency. Beef, sausages, cassava flour, frying oils, pizza, fried and roasted snacks, sandwiches, processed juices and soft drinks were considered risky foods; and fish, raw salad, fruit, natural juices and acai, protective foods. BioEstat 8.0 software was used to construct the database and perform statistical tests; and Excel 2010 for tables and charts. ***Results:*** The population studied was between 17 and 47 years old, mostly female (81.61%), single (73.95%), with income of 1-3 minimum wages (52.49%) and lived with parents (82.76%). Among the eutrophic, 77.63% reported consuming fish; most reported consuming acai with sugar and / or cassava / tapioca flour, typical foods of the region, as well as beef 1-2 times a week. ***Conclusion:*** The

tendency of the consumption of protective foods for the development of cancer was vegetables, fruits and fruits; and risky foods, cassava flour, oils and soft drinks.

Keywords: Food consumption. Neoplasia. Chronic disease. Healthy diet. Students.

Resumo

Objetivo: Verificar a tendência do consumo de alimentos protetores e de risco para desenvolvimento de câncer entre estudantes da área da saúde da Universidade Federal do Pará. ***Métodos:*** Estudo transversal, descritivo e analítico, com 261 acadêmicos da área da Saúde. A coleta de dados foi realizada de janeiro a julho de 2016, através de formulário ***online*** desenvolvido no Google Drive, com informação sobre identificação, estilo de vida e frequência alimentar. Carne bovina, embutidos, farinha de mandioca, óleos em frituras, pizza, salgadinhos fritos e assados, sanduíches, sucos industrializados e refrigerantes foram considerados alimentos de risco; e peixes, salada crua, fruta, sucos naturais e açaí, alimentos protetores. Utilizaram-se o ***software*** BioEstat 8.0 para construção do banco de dados e realização dos testes estatísticos; e Excel 2010 para tabelas e gráficos. ***Resultados:*** A população estudada tinha idade entre 17 e 47 anos, maioria do gênero feminino (81,61%), solteiro (73,95%), com renda de 1-3 salários mínimos (52,49%) e moravam com os pais (82,76%). Entre os eutróficos, 77,63% declararam consumir peixe; a maioria declarou consumir açaí com açúcar e/ou com farinha de mandioca/tapioca, alimentos típicos da região, assim como carne bovina, 1-2 vezes na semana. ***Conclusão:*** A tendência do consumo de alimentos protetores para o desenvolvimento de câncer foi de verduras, legumes e frutas; e a de alimentos de risco, farinha de mandioca, óleos e refrigerantes.

Palavras-chave: Consumo alimentar. Neoplasia. Doença crônica. Dieta saudável. Estudantes.

INTRODUCTION

Cancer is a collection of over 100 diseases characterized by disordered and rapid cell growth that affects organs or tissues; metastasis may occur when the disease spreads to other regions of the body.[1] The estimate for 2018/2019 in Brazil is 324,580 new cases of cancer for men and 310,300 for women. In Pará, the estimate for the same period is 4,540 new cases among men, and 4,720 among women.[2]

The most common types of cancer in Brazil include: oral cavity, colon and rectum, esophagus, stomach, breast, melanoma and non-melanoma skin cancer, prostate, lung, cervix and leukemia.[3] In Pará, the most prevalent types of cancer estimated for 2018/2019 are prostate and stomach cancers in men and breast and cervical cancers in women.[2]

According to the National Cancer Institute (INCA), inadequate diet and nutrition are considered the second cause of cancer, accounting for up to 20% of cases in developing countries and approximately 35% of deaths from the disease. May contribute to the development and spread of malignant tumors, but if carried out healthily, may reduce or block the onset of cancer.[2]

Flavonoids, vitamin C, beta-carotene, fiber, lycopene and selenium, found in fruits, vegetables, whole foods and oilseeds, are nutrients related to cancer prevention.[4] Processed meats and foods industrialized products, such as sausages, which contain nitrites and nitrates, considered as carcinogenic agents. Red meat should be eaten in moderation, and preference should be given to white meat such as poultry and fish. Food preparation can also be a risk factor for disease development, such as fried foods and barbecues.[5]

Upon entering university, students can change their eating habits, because some they leave their parent's homes to live in other cities. With academic activities, students often replace full meals with snacks, usually more caloric, as they do not have time to prepare and complete the full meals. This can lead to being overweight, which in itself is a factor that may be directly related to the onset of 13 different cancers such as colorectal, breast, gallbladder, kidney, liver, esophagus, ovary, pancreas, stomach, endometrium, meningioma, thyroid and multiple myeloma.[6,7]

Given this scenario, the present study aims to verify the trend of consumption of protective foods and risk for cancer development among health students from Universidade Federal do Pará (UFPA) (Federal University of Pará).

MATERIALS AND METHODS

The survey was conducted at UFPA and is a subproject of the research "nutritional profile, perception of body image and frequency of risk and protective factors for chronic non-

-communicable undergraduate students of UFPA." This was submitted to the Ethics Committee on Human Research of the Health Sciences Institute of the UFPA Beings and approved under protocol number 1.389.197.

This is a cross-sectional, descriptive and analytical study conducted with undergraduate students from Belém campus of undergraduate health courses: Biomedicine, Physical Education, Nursing, Physical Therapy, Medicine, Nutrition, Dentistry, Psychology and Occupational Therapy. Data collection was conducted from January to July 2016, through an online questionnaire, developed through Google Drive, whose answers were automatically forwarded to an exclusive access spreadsheet of the researchers. The link to access the questionnaire was sent via e-mail, or posted on the UFPA website and official social networks of the institution. The participant could only answer the questionnaire by signing the Termo de Consentimento Livre e Esclarecido (Informed Consent Form – ICF), which was also made available online. Students from other undergraduate courses were excluded from the study.

Participants provided anthropometric (weight and height) and sociodemographic (gender, age, undergraduate, occupation, with whom they live, family income, marital status) data. Informed about eating habits (number of meals per day, place of meals - at home, university restaurant, ver-o-pesinho (university cafeteria) or others types of meals taken, food frequency), in addition to alcohol and tobacco consumption.

For the nutritional diagnosis, the Body Mass Index (IMC) was calculated from the anthropometric data, followed by the classification into malnutrition, eutrophy, overweight and obesity, according to the parameters established by the World Health Organization (OMS).[8]

For the analysis of food frequency, foods were grouped into categories (meat and eggs, cereals and legumes, oils and fats, snacks and vegetables, fruits and processed foods), and in each category foods were identified as risk for cancer development. The following were considered as risky foods: beef and sausages (meat and eggs group), cassava flour (cereals and pulses group), frying oils (oils and fats group), pizza, fried and roasted snacks and sandwiches (snacks and meat group). snacks) and industrialized juices and soda (industrialized group). Fish (meat and egg group), raw salad (vegetables and fruits group), fruits, natural juices and acai (fruit group) were considered as protective foods.

In the data analysis, descriptive and inferential statistics methods were used. Data description was performed using tables, graphs, measures of variability and central tendency, using Excel 2010 software. Food frequency data were analyzed considering the classification of the nutritional status of the participants.

BioEstat 8.0 software was used to form the database and perform the x^2-Square adhesion tests for one sample and the G-Wilian test for two samples, considering a significance level of 5%.

RESULTS

The study included 261 students aged 17 to 47 years, and 183 participants (70.11%) were aged 20 to 25 years, with confidence interval [mean ± SD: 23 ± 3.51]. It was found that most were female (81.61%), single (73.95%), reported receiving from 1 to 3 minimum wages (52.49%) and living with parents (82.76%), according to table 1.

Table 1. Profile of college students (n = 261). Belém, Pará, 2016.

Variable	Category	Quantity	Percentage	*p-value*
Genre				<0.0001
	Female*	213	81.61	
	Male	48	18.39	
Age range (years)				<0.0001
	17 to 19	36	13.79	
	20 to 25*	183	70.11	
	26 to 29	30	11.49	
	≥ 30	12	4.60	
Marital status				<0.0001
	Single*	193	73.95	
	Married/Stable union	68	26.05	
Occupation				<0.0001
	Just study*	132	50.57	
	Study and do internship	104	39.85	
	Study and work	25	9.58	
Family income (R$)				<0.0001
	To 1	27	10.34	
	From 1 to 3*	137	52.49	
	From 3 to 6	64	24.52	
	From 6 to 10	24	9.20	
	More of 10	9	3.45	
Live with				<0.0001
	With parents, spouse relatives*	216	82.76	
	Alone	23	8.81	
	With friends or student republic	22	8.43	

Source: Protocolo de Pesquisa, October/2017.

(*) Test of X^2 of homogeneity – Significance level (p-value <0.005)

The descriptive level obtained for the studied sample indicates that the variables "gender", "age range", "marital status", "occupation", "income" and "with whom you live" were significant at the 5% level.

Most (60.54%) students reported using alcohol and seven (2.68%) reported cigarette use (Table 2). The descriptive level obtained for the studied sample was significant at 5%.

Table 2. College student lifestyle (n = 261). Belém, Pará, 2016.

Variable	Category	Quantity	Percentage	*p-value*
Alcohol consumption				<0.0008
	Yes*	158	60.54	
	No	103	39.46	
Cigarette use				<0.0001
	No*	254	97.32	
	Yes	7	2.68	

Source: Protocolo de Pesquisa, October/2017.

(*) Test X^2 of homogeneity – Significance level (p-value <0.005)

Table 3 shows that 182 (70%) students declared themselves eutrophic and 188 (72.03%) reported having 4 to 5 meals / day. The average IMC among women was 22.30kg / m^2, and among men, 23.24kg / m^2, thus presenting low variability [standard deviation - M / H: 3.83 / 3.65].

It was found that 233 (89.27%) students reported having breakfast at home, and 111 (42.53%) reported having breakfast elsewhere. Regarding lunch, 144 (55.17%) students reported eating at the university restaurant (UK), and most reported having afternoon snack, dinner, supper / evening snack at home (Table 3).

Table 3. Distribution of variables related to nutritional status of health students at UFPA (n = 261). Belém, Pará, 2016.

Variable	Category	Quantity	Percentage
Nutricional status (IMC)	Innutrition	29	11.11
	Eutrophy	182	69.73
	Overweight	37	24.18
	Obesity	13	4.98
Number of meals/day	1 to 3	34	13.3
	4 to 5	188	72.03
	≥ 6	39	14.94

Source: Protocolo de Pesquisa, October/2017.

Table 3. Distribution of variables related to nutritional status of health students at UFPA (n = 261). Belém, Pará, 2016. (cont.)

Variable	Category	Quantity	Percentage
Breakfast	At home	233	89.27
	"Ver-o-pesinho"	5	1.92
	University Restaurant	3	1.15
	Another Place	9	3.45
	Don't eat this mealt	11	4.21
Morning Snack	At home	33	12.64
	"Ver-o-pesinho"	5	1.92
	University Restaurant	6	2.30
	Another Place	111	42.53
	Don't eat this mealt	97	37.16
Lunch	At home	71	27.20
	"Ver-o-pesinho"	5	1.92
	University Restaurant	144	55.17
	Another Place	40	15.33
	Don't eat this mealt	1	0.38
Afternoon Snack	At home	101	38.70
	"Ver-o-pesinho"	23	8.81
	University Restaurant	7	2.68
	Another Place	96	36.78
	Don't eat this mealt	34	13.03
Dinner	At home	222	85.06
	University Restaurant	16	6.13
	Another Place	5	1.92
	Don't eat this mealt	18	6.90
Supper / Evening snack	At home	165	63.22
	Another Place	1	0.38
	Don't eat this mealt	95	36.40

Source: Protocolo de Pesquisa, October/2017.

Table 4 shows the consumption of protective foods according to nutritional status. Among eutrophic students, 77.63% reported fish consumption 1-2 times / week. Regarding the malnourished group, two (50%) reported not eating fish, and among obese people, seven (9.33%) reported eating fish rarely.

Among malnourished college students, 13.33% reported eating vegetables 3-4 times a week. Among the eutrophic, consumption 1-2 times / week was 64 (35.16%). Among those with obesity, eight (61.54%) report consumption 3-4 times a week and / or daily.

Students with innutrition (9-31.03%) consume acai 1-2 times a week. Already 33.52% of eutrophic students reported consuming it 1-2 times / month. Among the obese, 46.15% reported this consumption rarely. It is also noteworthy that most students consume acai with sugar and / or cassava / tapioca flour for all nutritional states.

When asked if they consumed açaí as side dish (fish, shrimp, jerky ...), most eutrophic and overweight students reported fruit consumption as side dish. Among those with malnutrition and obesity, most reported not consuming it with complement.

Table 4. Distribution of protective food consumption by health students at UFPA Belém, Pará, 2016.

Protective foods	Frequency	Nutritional Status								Total		p-value*
		Innutrition		Eutrophy		Overweight		Obesity				
		n=29	%	n=182	%	n=37	%	n=13	%	n=261	%	
Meat and eggs [fish]	1 a 2 times/ month	9	31.03	64	35.16	14	37.84	3	23.08	90	127.11	0.4952
	1 a 2 times/week	8	27.59	59	32.42	6	16.22	3	23.08	76	99.30	
	3 a 4 times/week	1	3.45	7	3.85	4	10.81	0	0.00	12	18.11	
	Daily	1	3.45	3	1.65	0	0.00	0	0.00	4	5.10	
	Rarely	8	27.59	47	25.82	13	35.14	7	53.85	75	142.39	
	Never	2	6.90	2	1.10	0	0.00	0	0.00	4	8.00	
Vegetables [raw salad] (lettuce, chard, cabbage, carrot, beet...]	1 a 2 times/ month	0	0.00	9	4.95	1	2.70	0	0.00	10	7.65	0.3506
	1 a 2 times/week	9	31.03	64	35.16	14	37.84	2	15.38	89	119.42	
	3 a 4 times/week	10	34.48	50	27.47	11	29.73	4	30.77	75	122.45	
	Daily	7	24.14	52	28.57	7	18.92	4	30.77	70	102.40	
	Rarely	2	6.90	4	2.20	1	2.70	2	15.38	9	27.18	
	Never	1	3.45	3	1.65	3	8.11	1	7.69	8	20.90	
Fruits [fruits]	1 a 2 times/ month	1	3.45	5	2.75	0	0.00	1	7.69	7	13.89	0.0818
	1 a 2 times/week	9	31.03	34	18.68	13	35.14	6	46.15	62	131.00	
	3 a 4 times/week	10	34.48	57	31.32	11	29.73	1	7.69	79	103.22	
	Daily	8	27.59	77	42.31	12	32.43	3	23.08	100	125.40	
	Rarely	1	3.45	8	4.40	0	0.00	2	15.38	11	23.23	
	Never	0	0.00	1	0.55	1	2.70	0	0.00	2	3.25	

Source: Protocolo de Pesquisa, October/2017.

Table 4. Distribution of protective food consumption by health students at UFPA Belém, Pará, 2016. (cont.)

Protective foods	Frequency	Nutritional Status								Total		p-value*
		Innutrition		Eutrophy		Overweight		Obesity				
		n=29	%	n=182	%	n=37	%	n=13	%	n=261	%	
Fruits [Natural juice]	1 a 2 times/ month	1	3.45	11	6.04	5	13.51	0	0.00	17	23.01	0.5607
	1 a 2 times/week	13	44.83	75	41.21	12	32.43	4	30.77	104	149.24	
	3 a 4 times/week	6	20.69	44	24.18	13	35.14	6	46.15	69	126.15	
	Daily	7	24.14	40	21.98	4	10.81	1	7.69	52	64.62	
	Rarely	2	6.90	12	6.59	3	8.11	2	15.38	19	36.98	
	Never	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	
Açaí [açaí]	1 a 2 times/ month	4	13.79	61	33.52	14	37.84	5	38.46	84	123.61	0.0382
	1 a 2 times/week	9	31.03	28	15.38	7	18.92	1	7.69	45	73.03	
	3 a 4 times/week	1	3.45	12	6.59	1	2.70	0	0.00	14	12.74	
	Daily	3	10.34	15	8.24	0	0.00	0	0.00	18	18.59	
	Rarely	7	24.14	58	31.87	11	29.73	6	46.15	82	131.89	
	Never	5	17.24	8	4.40	4	10.81	1	7.69	18	40.14	
Do you eat Açaí	I don't eat açaí	5	17.24	11	6.04	4	10.81	1	7.69	21	41.79	0.0463
	Yes, WITH (a) and WITH (b)	15	51.72	93	51.10	23	62.16	6	46.15	137	211.14	
	Yes, WITH (a) and WHITHOUT (b)	4	13.79	15	8.24	2	5.41	2	15.38	23	42.82	
	Yes, WITHOUT (a) and WITH (b)	4	13.79	58	31.87	7	18.92	4	30.77	73	95.35	
	Yes, WITHOUT (a) and WITHOUT (b)	1	3.45	5	2.75	1	2.70	0	0.00	7	8.90	
Do you eat Açaí as side dish[1]	No	19	65.52	88	48.35	14	37.84	7	53.85	128	205.55	0.0155
	Yes	10	34.48	94	51.65	23	62.16	6	46.15	133	194.45	

Source: Protocolo de Pesquisa, October/2017.

(a): Sugar (b): Cassava flour/tapioca

[1](fish, shrimp, beef jerky...)

* Test G-Wilians – Significance level (p-value <0.005)

Table 5 shows the consumption of risky foods. Most students reported eating beef 1-2 times / week for all nutritional states.

Regarding the consumption of snacks and fast foods (fried and baked snacks), 69 (37.91%) and 15 (40.54%) of students among the eutrophic and overweight groups, respectively, reported never doing it.

Table 5. Consumption of risky foods by nutritional status made by health students at UFPA (n = 261). Belém, Pará, 2016.

Risk Food	Frequency	Nutritional Status								*p-value**
		Innutrition		Eutrophy		Overweight		Obesity		
		n	%	n	%	n	%	n	%	
Meat and eggs	1 to 2 times/ month	0	0	5	2.75	0	0	0	0	0.4411
	1 to 2 times/week	21	72.41	81	44.51	17	45.95	7	53.85	
	3 to 4 times/week	4	13.79	67	36.81	16	43.24	4	30.77	
	Daily	4	13.79	21	11.54	4	10.81	1	7.69	
	Rarely	0	0	5	2.75	0	0	1	7.69	
	Never	0	0	3	1.65	0	0	0	0	
Meat and Eggs (sausage)	1 to 2 times/ month	7	24.14	32	17.58	4	10.81	3	23.08	0.0465
	1 to 2 times/week	2	6.9	36	19.78	9	24.32	4	30.77	
	3 to 4 times/week	0	0	9	4.95	3	8.108	0	0	
	Daily	0	0	3	1.65	1	2.703	2	15.38	
	Rarely	14	48.28	86	47.25	18	48.65	4	30.77	
	Never	6	20.69	16	8.79	2	5.405	0	0	
Cereais and vegetables (Cassava flour)	1 to 2 times/ month	1	3.45	10	5,49	4	10.81	0	0	0.1647
	1 to 2 times/week	6	20.69	24	13.19	9	24.32	1	7,69	
	3 to 4 times/week	1	3.45	25	13.74	7	18.92	2	15.38	
	Daily	8	27.59	63	34.62	8	21.62	2	15.38	
	Rarely	8	27.59	47	25.82	7	18.92	7	53.85	
	Never	5	17.24	13	7.14	2	5.405	1	7.69	
Oil and fat (Frying oils)	1 to 2 times/ month	7	24.14	21	11.54	4	10.81	1	7.69	0.0068
	1 to 2 times/week	9	31.03	62	34.07	6	16.22	4	30.77	
	3 to 4 times/week	4	13.79	39	21.43	9	24.32	3	23.08	
	Daily	6	20.69	21	11.54	1	2.703	2	15.38	
	Rarely	2	6.9	37	20.33	13	35.14	1	7.69	
	Never	1	3.45	2	1.1	4	10.81	2	15.38	
Snacks and fast foods (pizza)	1 to 2 times/ month	18	62.07	84	46.15	14	37.84	4	30.77	0.6463
	1 to 2 times/week	2	6,9	21	11.54	6	16.22	4	30.77	
	3 to 4 times/week	3	10.34	12	6.59	3	8.11	3	23.08	
	Daily	0	0	0	0	0	0	0	0	
	Rarely	9	31.03	73	40.11	14	37.84	5	38.46	
	Never	0	0	2	1.1	2	5.41	0	0	

Source: Protocolo de Pesquisa, October/2017.

Table 5. Consumption of risky foods by nutritional status made by health students at UFPA (n = 261). Belém, Pará, 2016. (cont.)

Risk Food	Frequency	Nutritional Status								*p-value**
		Innutrition		Eutrophy		Overweight		Obesity		
		n	%	n	%	n	%	n	%	
Snacks and fast foods (friend and baked snacks)	1 to 2 times/ month	10	34.48	58	31.87	5	13.51	1	7.69	0.0384
	1 to 2 times/week	10	34.48	37	20.33	10	27.03	5	38.46	
	3 to 4 times/week	3	10.34	12	6.59	3	8.11	3	23.08	
	Daily	0	0	2	1.1	1	2.7	0	0	
	Rarely	0	0	4	2,2	3	8.11	0	0	
	Never	6	20.69	69	37.91	15	40.54	4	30.77	
Snacks and Fast food (sandwiches)	1 to 2 times/ month	10	34.48	61	33.52	10	27.03	4	30.77	0.7958
	1 to 2 times/week	6	20.69	37	20.33	6	16.22	3	23.08	
	3 to 4 times/week	2	6.9	12	6.59	3	8.11	3	23.08	
	Daily	0	0	3	1.65	0	0	0	0	
	Rarely	11	37.93	63	34.62	16	43.24	3	23.08	
	Never	0	0	6	3.3	2	5.41	0	0	
Industrialized (Industrialized juice)	1 to 2 times/ month	7	24.14	31	17.03	2	5.41	2	15.38	0.0002
	1 to 2 times/week	5	17.24	28	15.38	3	8.11	3	23.08	
	3 to 4 times/week	1	3.45	12	6.59	1	2.7	2	15.38	
	Daily	1	3.45	1	0.55	2	5.41	3	23.08	
	Rarely	4	13.79	78	42.86	18	48.65	3	23.08	
	Never	11	37.93	32	17.58	11	29.73	0	0	
Industrialized (Soda/ soft drink)	1 to 2 times/ month	7	24.14	29	15.93	3	8.11	1	7.69	0.0264
	1 to 2 times/week	2	6.9	37	20.33	11	29.73	3	23.08	
	3 to 4 times/week	0	0	9	4.95	1	2.7	3	23.08	
	Daily	0	0	2	1.1	0	0	1	7.69	
	Rarely	14	48.28	53	29.12	14	37.84	1	7.69	
	Never	6	20.69	52	28.57	8	21.62	4	30.77	

Source: Protocolo de Pesquisa, October/2017.

* Test G-Wilians – Significance level (p-valor <0.005).

Regarding the consumption of snacks and sandwiches, most students with malnutrition, eutrophy and overweight rarely eat this type of snack. Most malnourished and eutrophic students reported eating snacks and pizza 1-2 times a week, while most overweight students rarely did so.

When asked about the consumption of processed foods (juices), most eutrophic and overweight students rarely reported consuming this product. Regarding the malnourished,

37.93% reported never consuming industrialized juices. Regarding the consumption of processed foods (soft drinks), it is observed that 48.28%, 29.12% and 37.84% of students with malnutrition, eutrophic and overweight, respectively, reported consuming them only rarely.

DISCUSSION

The predominance of females among the research participants is similar to the data found in the literature. The work of Busato et al.,[9] which sought to know the perceptions of health university students about environment, food and eating practices, was characterized by the prevalence of female students corroborating the findings of this research. The same occurred in the study by Aquino, Pereira & Reis,[10] that, in assessing the eating habits of Nutrition students in Minas Gerais, found that most participants were female. The predominance of females in health courses is related to the fact that women care more about health than men about health maintenance, promotion and prevention.[9]

Most participants reported an age range of up to 25 years, similar to the findings by Aquino, Pereira & Reis,[10] and Oliveira et al.,[11] that found an average of 24 years. At this age, the individual is already in college, and all of his or her dietary choices can positively and negatively influence their health over the years.[10]

Of the 261 students, most reported being single, as in the Baumgarten study., Gomes & Fonseca,[12] whose prevalence reached 86%. The major concern regarding this fact is the excessive consumption of alcohol widely observed in this population, since its excess may contribute to the development of cancer.[12]

Half of the participants reported only studying, similarly to the findings by Oliveira et al.,[11] according to which only two students were not doing internships, which means that most of their activities were carried out within the university. It is worth mentionig that this may be an influencing factor in food choices.[11]

Most participants reported having a family income of up to three basic salary and living with parents, spouses or relatives, as in the study by Aquino, Pereira & Reis,[10] which pointed out the prevalence of participants in this income range (81%). In the study by Busato et al.,[9] Most reported no income and financial help from their parents. For the author, this fact may impact on the dietary conditions of the studied population, since the financial situation and the presence of the family at the time of choosing and preparing meals may interfere with the choices and the food perception of each one. Other studies point out that income is an important factor in food choice, as in the study by Defante, Nascimento & Lima-Filho,[13] which objectfied to analyze the eating habits of low-income families, demonstrating a very frequent

consumption (2x or more per day) of cultural foods such as rice and beans, and a frequent consumption (1x per day) of beef, pork, chicken, egg, milk, fish, vegetables, fruits, fried foods and pasta. For the author, the choice of these foods is due to their more accessible price.

In the case of housing, the results found in this study are similar to the results obtained by Oliveira et al.,[11] which analyzing the perception of Nutrition students about the food environment in Rio de Janeiro, they observed that approximately 70% of participants lived with their parents and other family members. In general, the university is far from the residence of most students, so they often have neither the time nor the financial means to return home and have a meal with their families. So they end up having to eat most meals away from home, and their choices are often based on the practicality of a college student's busy routine. For this reason, it is of fundamental importance to choose the where students eat their meals as it directly influences quality of life and future cancer development.[11]

Alcohol consumption is among the top ten health risk behaviors, causing approximately 1.8 million deaths worldwide.[12] The results of this study are similar to those found by Baumgarten, Gomes & Fonseca,[12] where most of the interviewees, also from the health area, had the habit of drinking alcohol. While cigarettes, as in the study by Santos et al.,[14] According to which 80% of the population declared not to use it, the majority of the students evaluated in the present research stated not to use it. Alcohol and drug abuse has a direct influence on the onset of various cancers.[12]

Most students had eutrophy, which may be justified by the young age and the fact that they belong to the health area, thus being more aware of what is healthy.[9] At study of Marconato, Silva & Frasson,[15] 69% of first-graders and 67% of graduating students were diagnosed with eutrophy. And in the study by Maciel et al.,[16] which order to evaluate the variability and frequency of food intake, nutritional status and level of physical activity in a Brazilian university community, there was a difference in the percentage of eutrophy between genders. In the study cited, it was observed that 72.3% of women and 47% of men had eutrophy. In the study by Almeida et al.,[17] most students were overweight.

According to the positioning of INCA (National Cancer Institute) in relation to overweight and obesity, it is estimated that through healthy and correct eating habits, it is possible to prevent about one in three cases of the most common cancer in the country. In Brazil, the overweight and obese population has a higher risk of developing 13 types of cancer due to biological mechanisms such as hyperinsulinemia, insulin resistance, changes in adipokine production, oxidative stress and changes in immune function.[18]

The place where college students eat their meals is extremely important, as external factors contribute to the development of cancer. As for the location, and considering the lunch

meal, most reported eating the meal in the UK, which is a plus, as it was created to provide a diverse and nutritious diet, limiting fried foods and offering fruits daily.[19]

The correct choice of foods that should make up the daily diet is an important factor for health maintenance and disease prevention. Diet can be both a risk and a protective factor for cancer. What differs are the foods present and the way they are prepared.[4]

Vegetables, vegetables, fruits and fish are among the protective foods. Foods that contain bioactive compounds and / or vitamins and minerals, such as anthocyanins, beta-carotene, fiber, flavonoids, lycopene, lutein, selenium, zinc and vitamins C and E, prevent cancer as the vast majority of these have antioxidant function or act in the bowel function. In the proper and healthy diet, the consumption of these foods should be frequent.[4,20,21]

The low fish consumption found in this study and also in de Silva et al.,[22] in which 71% of participants reported low frequent consumption, is a negative factor that the author attributes to the economic issue, since fish is expensive compared to other foods in the same group. Some types of fish contain omega-3 essential fatty acid, which has antioxidant action, reducing the proliferation of cancerous rectal cells and the risk of laryngeal cancer. Not eating this fatty acid through diet can have health consequences as it is not produced by the body.[22]

Diferent from the results finding for Almeida et al.,[17] which observed daily vegetable and vegetable intake in 54% of the participants, in the present study the minority reported eating vegetables daily, with a prevalence, however, of 1-2 and 3-4 times a week. Regarding fruit consumption, most reported daily consumption or 3-4 times a week, similar to the findings by Almeida et al.,[17] where 45% reported daily consumption. Few students reported consuming fruit juices daily, as in the study by Cansian et al.,[23] who found 21.67%. A diet rich in vegetables, fruits and vegetables is recommended and essential in the prevention of cancer and other diseases, as well as having low energy density.[23]

Most participants consume acai with sugar and / or cassava / tapioca flour 1-2 times a month. Açaí is a fruit of the Amazon Region, and because it contains large amounts of fiber and antioxidants, such as vitamin E and anthocyanins, its regular consumption is linked to the prevention of diseases related to oxidative stress, such as neurodegenerative, cardiovascular and cancer.[24] Another study also cited the presence of bioactive compounds such as phenolic acid, flavanol, flavonol, flavone and tannin, which have antioxidant function..[25] On the other hand, a study by Oliveira et al.[26] revealed that the consumption of açaí with side dish (cassava flour or tapioca due to substances such as dyes and healing salts) becomes a risk factor for the development of cancer.

Consumption of risk-predicting foods for cancer development has been very frequent in the university community, due to the practicality and lack of time due to academic activities, a

fact that is worrying because of the high risk of cancer development.[9] Many students replace the three main meals with more practical snacks, which increases the appearance of cancer in college students.[27]

The foods to be avoided are red meat, which should be eaten in moderation, with preference given to the white meat such as poultry and fish; Processed meats and processed foods such as sausages containing carcinogenic agents such as nitrite and nitrate should be avoided. Food preparation, such as fried foods and barbecues, can also be a risk factor for the development of the disease.[28] The most frequently observed frequency of beef consumption was 1-2 times a week, as in the study by Schneider et al.,[29] where the consumption of red meat was 1-3 times a week. This represents 61% of participants, which is considered good as excessive drinking can be a triggering factor for cancer.[29]

In the present study, most reported rarely eating sausages, unlike that found in Almeida et al.,[17] in which its highest consumption was monthly, represented by 62% of the sample. According to the 2014 Food Guide for the Brazilian Population, in the process of manufacturing ultra-processed foods, ingredients such as salt, sugar, oils and fats are added in large quantities, which risk cancer development.[30] Regarding the consumption of sausages, only a small percentage of students reported daily consumption of the product, a result lower than that found in the study by Almeida et al.,[17] in which this value reached 12%.

Almost all reported consuming cassava flour, with daily frequency being the most prevalent, a habit also found by Santana et al,[31] with consumers of a free fair in Salvador, where 68.2% of respondents claimed daily consumption; 22.7%, 2-3 times a week, and only 9.1% said they rarely consumed it. To Oliveira et al,[26] Excessive consumption of cassava flour is a risk factor for the development of cancer, and this relationship is due to the substances present in it, such as aniline, a color commonly found in various types of flour, amine radicals, nitrogen dioxide, nitrite and nitrate. The frequent consumption of cassava flour is justified because it is a low cost regional food.[31]

Among the students evaluated, 32% reported consuming frying oils 3-4 times a week and daily, which is of concern, as frying oils may contain acrolein and peroxides, which are carcinogenic substances.[32] At the study of Busato et al.,[9] more than half of the study population (54%) reported consuming fried foods at least once a week.

Pizza consumption, reported by most college students in this study, is similar to that found in the National Food Survey (INA), according to which 42.5% of people reported eating pizza away from home.[33] Another data similar to that found at INA refers to the consumption of fried and baked snacks, which was reported by most participants. Excessive consumption of these snacks and fast foods may contribute to the development of cancer.[34]

With respect to the consumption of sandwiches, the data found in this research differ from that found by Almeida et al.,[15] who observed 65% prevalence in relation to monthly consumption. Despite the prevalence of rare sandwich consumption, the population that consumes 1-2 times a month is still large, which is a concern because this food is high in animal fat and trans and low in fiber, indicating a higher risk for development of cancer.[16]

The consumption of industrialized juices cited in this research is close to the values found in the National Health Survey (PNS) 2013, in which the prevalence of consumption of artificial juices and soda was 23.4%. Still, this is a worrying situation, as there is a strong relationship between the consumption of sweetened drinks and overweight, which in the long run can cause cancer.[7]

The result of students who did not consume soft drinks (26.82%) was similar to the data found by Munhoz et al.,[35] who observed that 25% of the sample did not consume soda. Regarding weekly consumption these data differ: while in the present study just over 25% of students reported such consumption, in the study mentioned above this percentage reached 47%.

Most participants tended to consume protective foods for cancer development, especially frequent consumption of vegetables, and daily consumption of fruits, which contain fiber and nutrients important in reducing the risk of developing the disease.

Most students have a concern for health and healthy eating, perhaps because they are from health care. As for risky foods, the most frequent ones in the diet were cassava flour, oils and soft drinks, which contain components that are harmful to health and can, if consumed very often, be a factor in triggering cancer.

Thus, the need to invest in actions aimed at health promotion within universities is perceived.

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Contributors

ACF dos Santos participated in the analysis and interpretation of data, writing of the article and its final version; MM Aguiar participated in the analysis and interpretation of data, writing of the article and its final version; VV Lourenço-Costa participated in all stages, from study design to review of the final version of the paper. NNB de Sá participated in the conception, study design and data analysis. WSO Ainett participated in the conception, study design and data analysis. TOCG Santos participated in the interpretation of data, writing of the article and correction of its final version.

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