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Aspects of the cooking autonomy of university students before and during the Covid-19 pandemic

Aspectos da autonomia culinária de universitários antes e durante a pandemia da Covid-19

Abstract

Introduction: The pandemic resulting from the spread of coronavirus (Covid-19) forced countries to implement strict health policies, including social isolation measures. ***Objective***: This original study evaluated aspects of the cooking autonomy of university students before and during the social isolation resulting from the Covid-19 pandemic. ***Method***: A descriptive cross-sectional study was developed, and conducted between June and July 2020, with the application of an online questionnaire focussing on aspects of cooking autonomy before and during isolation for comparison and evaluation, as well as socio-demographic data. The association between the variables of interest was assessed using Pearson's chi-square test. ***Results***: 233 university students participated in the research, most of them female (71.2%) and aged between 20 and 25 years (74.6%). During the isolation period, the frequency with which these students cooked increased, as did their use of a pressure cooker (an indicator of confidence in the kitchen), the division of tasks in the kitchen and the consumption of natural or minimally processed foods, although access and going to street markets decreased. ***Conclusion***: Among the participants, the period of isolation seems to have contributed, at an individual level, to the development of cooking autonomy. Whether in times of a pandemic or not, this development is necessary for people to create ways to economize and to prepare their own meals. The findings therefore contribute to the dialogue on the promotion of health and quality of life through home cooking.

Keywords: Cooking. Students. Covid-19. Quarantine.

Resumo

Introdução: A pandemia decorrente da contaminação por coronavírus (Covid-19) forçou países a implementarem regimes sanitários rígidos, incluindo medidas de isolamento social. ***Objetivo***: Este estudo original avaliou aspectos da autonomia culinária de universitários antes e durante o isolamento social decorrente da pandemia da Covid-19. ***Método***: Desenvolveu-se um estudo transversal descritivo, conduzido entre junho e julho de 2020, com a aplicação de um questionário *on-line* sobre dados sociodemográficos, aspectos da autonomia culinária antes e durante o isolamento, para comparação e avaliação. A associação entre as variáveis de interesse foi avaliada por meio do teste Qui-quadrado de Pearson. ***Resultados***: Participaram da pesquisa 233 universitários, a maioria do sexo feminino (71,2%) e com idade entre 20 e 25 anos (74,6%). Durante o período de isolamento, a frequência com que esses estudantes cozinhavam aumentou, assim como a utilização da panela de pressão (um indicador de confiança na cozinha), a divisão de tarefas nesse espaço e o consumo de alimentos *in natura* ou minimamente processados, embora o acesso e idas às feiras tenha diminuído. ***Conclusão***: Nesta população, o período de isolamento parece ter

contribuído, em nível individual, para o desenvolvimento da autonomia culinária. Em tempos de pandemia ou não, esse desenvolvimento é necessário para que o agente crie maneiras de economizar e preparar suas próprias refeições. Nesse sentido, os achados contribuem para o diálogo sobre a promoção da saúde e qualidade de vida por meio da culinária caseira.

Palavras-chave: Culinária. Estudantes. Covid-19. Quarentena

INTRODUCTION

In December 2019, the outbreak of the disease induced by the SARS-CoV-2 virus, Covid-19, began in China, subsequently spreading around the world, until in March 2020 the World Health Organization (WHO) classified it as a pandemic.[1] Since then, mandatory social isolation has caused several changes to people's routines, as well as in their physical and psychological conditions.[2]

With regard to food during the period of restrictions, the situation seems to have promoted changes in food consumption[2-5] and in the involvement with domestic cooking worldwide.[4,6-8] These changes can be considered positive - with an increase in the consumption of fresh foods, such as fruits and vegetables,[3,4,6,7] and greater involvement with the preparation of meals at home,[4,6-8] but also negative – with a high consumption of snacks, sweets, ultra-processed foods[3,4] and saturated fats[6] , and a decrease in the overall nutritional quality of the diet.[8] One of the obstacles to the purchase of fresh food such as fruits and vegetables among young Spanish university students during the period of social isolation was the lack of contact with local street markets or the difficulty of accessing them, places where fresh food is often sold.[9]

When analysing the changes in nutrition resulting from the pandemic, young people, including those studying at university cannot be neglected. Starting university is already a time of life when many acquire new eating habits, usually marked by a high intake of sweet and fatty foods and a low consumption of fruits and vegetables, habits that can last until adulthood. In addition to leaving the parental home, a lack of time, culinary skills or confidence, the difficulty of accessing healthy foods that are within their budget, and the substitution of large meals for the practicality and speed attributed to snacks are other factors that result in a lower quality of food consumed among this group.[9-12]

The Food Guide for the Brazilian Population (GAPB) focuses on food safety and the health of the population, and emphasizes in its recommendations the importance of the habit of cooking, and of the autonomy to make food choices. Home-made food is associated in the guide with a healthier diet, higher intake of fresh or minimally processed foods and lower consumption of ultra-processed foods.[13]

Adding to these recommendations, and with the aim of bringing together discussions on collective health, healthy eating, empowerment and culinary skills in the home environment, Oliveira and Castro[14] developed the concept of cooking autonomy, defined as the "ability to think, decide and act to prepare meals in the home, using mostly natural or minimally processed foods, including the influence of interpersonal relationships, the environment, cultural values, access to opportunities and the guarantee of rights". This concept is illustrated by a multilevel conceptual model and encompasses 28 components, ranging from personal characteristics to societal values that together influence the development of cooking autonomy.

Taking the concept of cooking autonomy[14] as a theoretical reference, given that domestic cooking is related to other levels in addition to individual skills, and adopting the hypothesis that isolation changed individuals' eating habits, not only by limiting access to food but also because many have started to produce their own meals, the present study aimed to evaluate the influence that social isolation caused by Covid-19, and the consequent increase in availability to prepare their own meals, had on aspects of cooking autonomy among students from three public universities in the city of Macaé, located in the state of Rio de Janeiro (RJ).

MATERIALS AND METHODS

This is a descriptive, cross-sectional pilot study, developed during the period of social isolation resulting from the Covid-19 pandemic, from June to July 2020. Students from different courses in the university city of Macaé-RJ participated in the research, where two federal universities are located, Universidade Federal do

Rio de Janeiro (UFRJ) and Universidade Federal Fluminense (UFF), as well as the municipal university Faculdade Professor Miguel Ângelo da Silva Santos (FeMASS). Participation in the study was anonymous, and all students from the university city were eligible, with the sole inclusion criterion being enrolled in a course at one of the three institutions of higher education.

Due to the absence of an appropriate instrument for the objective at the time, the first version of a structured questionnaire was developed for data collection. A free online platform for internet research - *Google Forms* - was used, which allows the creation of forms and the downloading of results in Excel format, which are easily exported to the most used statistical programs.

The theoretical framework that supported the development of the questions was the concept of cooking autonomy,[14] which consists of a conceptual model (MCAC) of 28 components divided into six levels, namely: the chronosystem, the level that refers to values of the time in which you live; macrosystem, which encompasses cultural and political values; exosystem, that of public policies; mesosystem, that of interactions between microsystems; microsystem, the environment where you share and use the same stove; and the agent, that individual capable of changing his or her food environment. Of these, a more specific analysis was conducted of the aspects of only five components that make up the MCAC, included in three of the six levels of the model. At the agent level: culinary skills, willingness to cook, and interest in cooking; at the microsystem level, sharing cooking activities; and at the mesosystem level, the availability of fresh or minimally processed foods and access to them.

The questionnaire consisted of 43 questions, divided into four parts: a) socio-demographic data; b) knowledge and practice of healthy eating; c) culinary practices normally adopted in the period before social isolation; and d) culinary practices adopted during social isolation. In order to record possible changes in culinary practices resulting from isolation, parts “c” and “d” presented similar issues.

Table 1. Questions and answer options on the form, according to the levels and components of cooking autonomy investigated. University city, Macaé-RJ, 2020.

Level (C.A)	Component	Questions	Answer options	Questions	Answer options
Mesosystem	Availability and access to natural or minimally processed foods	"Did you have easy access to street markets?"	"Yes" "No"	"Where you are isolating, are the street markets still open?"	"Yes" "No"
		"Were you, or someone who lives with you, in the habit of shopping in street markets?"	"Always" "Often" "Sometimes" "Rarely" "Never"	"Did you have easy access to street markets?"	"Yes" "No"
				"Did you or someone who lives with you often go shopping in street markets?	"Always" "Often" "Sometimes" "Rarely" "Never"
Microsystem	Sharing cooking tasks	"In your house, are the cooking tasks shared?"	"Always" "Often" "Sometimes" "Rarely" "Never" "No, I live alone"	"In your house, are the cooking tasks being shared?"	"Always" "Often" "Sometimes" "Rarely" "Never" "No, I live alone"
		"If yes, the kitchen tasks are shared by:"	"Exclusively women" "Men and women "Exclusively men"	"If yes, the kitchen tasks are being shared by:"	"Exclusively women" "Men and women" "Exclusively men"

Table 1. Questions and answer options on the form, according to the levels and components of cooking autonomy investigated. University city, Macaé-RJ, 2020.(Continues.)

Agent	Culinary skills	"On a scale of 0 to 10, how well do you think you could cook?"	"0: I don't know how to cook "10: I am an excellent cook"	"On a scale of 0 to 10, how well do you think you can now cook?"	"0: I don't know how to cook "10: I am an excellent cook"
		"Did you usually cook with a pressure cooker?"	"Always" "Often" "Sometimes" "Rarely" "Never"	"Have you been usually cooking with a pressure cooker?"	"Always" "Often" "Sometimes" "Rarely" "Never"
		"Your lunch and dinner were usually prepared:"	"By me" "By someone who lives with me"; "By a restaurant" "No, they were bought pre-prepared/frozen"	"Your lunch and dinner have usually been prepared:"	"By me" "By someone who lives with me" "By a restaurant" No, they have been bought pre-prepared/frozen"
		"Were you usually in the habit of planning your meals?"	"Always" "Often" "Sometimes" "Rarely" "Never"	"Have you been planning your meals?""	"Always" "Often" "Sometimes" "Rarely" "Never"
	Willingness to cook	"Were you usually in the habit of cooking?"	"Every day" "5 or 6 days a week" "3 or 4 days a week" "1 or 2 days a week "Never"	"How frequently have you been cooking?"	"Every day" "5 or 6 days a week" "3 or 4 days a week" "1 or 2 days a week "Never"
	Interest in cooking	"Were you in the habit of trying out new recipes?"	"Always" "Often" "Sometimes" "Rarely" "Never"	"Have you been trying out new recipes?"	"Always" "Often" "Sometimes" "Rarely" "Never"

Participants were contacted through the online groups of different courses and institutions created by the students themselves, as they were already widely used for their communication, by way of an instant messaging application for cell phones – WhatsApp® - and received the link to the electronic form with explanations about the survey.

For the description of the sample, information was collected on: gender (man, woman, I prefer not to say); age (under 20, 20-25, 26-30, over 30); number of residents in the same house (I live alone, 2 people, 3 people, 4 people or more); who the residents of the house were (father and/or mother, other family member(s), friend(s), students in a dorm, partner, children under or over 5 years old), college (UFRJ, UFF , FeMASS), courses (Nutrition, Nursing, Medicine, Pharmacy, Biology, other course), full-time course (yes, no), whether they received a scholarship or financial support (yes, no), paid work (yes, no), whether the pandemic impacted on their family income (yes, no). We chose to present means (± standard deviation) of continuous variables, and absolute and relative frequencies of categorical variables. During the analyses, the student participants on courses related to health were evaluated separately, and the other courses (Business Administration, Accounting Sciences, Production Engineering, Mathematics, Chemistry and Information Systems) were grouped in the category "other courses", as they did not include subjects related to health in their curricula. The association between the variables of interest was evaluated both before and during isolation using Pearson's Chi-square test (Pearson's χ^2), based on the questions contained in parts "c" and "d", taking the students' perception of their own culinary skills as a starting and reference point. For this, the respondents' scores for the questions “On a scale of 0 to 10, how well do you think you knew how to cook?” and “On a scale of 0 to 10, how well do you think you can cook now?” were grouped into “<7” and “≥7” to stratify those who had greater or lesser skills and knowledge in the kitchen. Grade 7 was chosen due to the familiarity of university students with this numerical parameter, since the average pass rate in most of the universities is 7. The level of statistical significance adopted was $p<0.05$, and the analyses were performed using the statistical program *SAS® OnDemand for Academics*.

The study followed the guidelines of Resolution No. 466/2012 of the National Health Council (CNS),[15] and the project was subsequently submitted to the Research Ethics Committee (CEP) of UFRJ (CAAE:78647017.2.0000.5699), by whom it was approved. The participants in the research were informed about the procedures foreseen in the study by way of the Informed Consent Form.

RESULTS

The sample consisted of 233 university students, mostly women (71.2%), aged between 20 and 25 years (74.6%). Almost all (91.9%) shared a house, especially with their parents (67.8%). More than half (55.8%) were enrolled in courses related to health and were studying full-time (77.7%). In addition, the majority (76.8%) were not receiving any type of scholarship or financial aid from the university, or doing any kind of paid work (75.5%), and the vast majority stated that they had stayed in quarantine (94.4%) (Table 2).

Table 2. Characteristics of university students consulted remotely during the Covid-19 pandemic. University city, Macaé-RJ, 2020. (n=233)

Characteristics	n	%
Gender		
Man	67	28.8
Woman	166	71.2
Prefer not to say	0	0
Age		
Under 20	26	11.1
20 to 25	174	74.6
26 to 30	21	9
Over 30	12	5.1
Number of residents in the same house		
Live alone	19	8.2
2 people	67	28.8
3 people	66	28.3
4 people or more	81	34.8
Residents in the same house *		
Father and/or mother	145	67.8
Other family member(s)	83	38.8
Friend(s)	14	6.5
Other students	18	8.4
Partner(s)	30	14
Child(ren) under 5 years	9	4.2
Child(ren) over 5 years	23	10.7
Course		
Nutrition	69	29.6
Nursing	17	7.3
Medicine	21	9
Pharmacy	20	8.6
Biology	3	1.3
Other course	103	44.2
Is your course full-time?		
Yes	181	77.7
No	52	22.3
Receiving financial aid or scholarship		
Yes, financial aid	17	7.3
Yes, scholarship	27	11.6
Yes, both	10	4.3
Neither	179	76.8
Paid employment		
Yes	57	24.5
No	176	75.5
Impact on income of social isolation		
Yes	148	63.5
No	85	36.5
Stayed in quarantine		
Yes	220	94.4
No	13	5.6

**For some variables the total number of answers does not add up to 233, due to missing data.*

**Para algumas variáveis, o número total de observações não soma 233 devido a dados faltantes.*

Table 2 presents data on aspects of the cooking autonomy of students in the university city of Macaé, divided into agent, microsystem and mesosystem levels, before and during isolation.

Table 3. Aspects of cooking autonomy of university students, before and during the isolation of the Covid-19 pandemic. University city, Macaé-RJ, 2020. (n=233)

ASPECTS OF COOKING AUTONOMY (Level)	Questions	Before isolation		During isolation	
		n	%	n	%
Culinary Skills (Agent)	**Perception of your own culinary skills *(scale from 0 to 10)***				
	<7	86	36.9	73	31.3
	≥7	147	63.0	160	68.7
	Use of pressure cooker				
	Never	72	30.9	61	26.2
	Rarely	30	12.9	23	9.9
	Sometimes	45	19.3	48	20.6
	Often	44	18.9	53	22.7
	Always	42	18	48	20.6
	Preparation of larger meals				
	By me	101	43.3	90	38.6
	By someone who lives with me	118	50.6	134	57.5
	By a restaurant(s)	12	5.2	8	3.4
	No, they were bought pre-prepared/frozen	2	0.9	1	0.4
	Planning of meals				
	Never	19	8.2	15	6.4
	Rarely	44	18.9	47	20.2
	Sometimes	91	39.1	86	36.9
	Often	53	22.7	55	23.6
	Always	26	11.2	30	12.9

Table 3. Aspects of cooking autonomy of university students, before and during the isolation of the Covid-19 pandemic. University city, Macaé-RJ, 2020. (n=233 (Continues.)

ASPECTS OF COOKING AUTONOMY (Level)	Questions	Before isolation		During isolation	
		n	%	n	%
Willingness to cook (Agent)	**Frequency in the kitchen**				
	Never	26	11.2	15	6.4
	1 or 2 days a week	78	33.5	65	27.9
	3 or 4 days a week	56	24	57	24.5
	5 or 6 days a week	35	15	50	21.5
	Always	38	16.3	46	19.7
Interest in cooking (Agent)	**Trying out new recipes**				
	Never	17	7.3	11	4.7
	Rarely	45	19.3	31	13.3
	Sometimes	78	33.5	64	27.5
	Often	52	22.3	77	33
	Always	41	17.6	50	21.5

Table 3. Aspects of cooking autonomy of university students, before and during the isolation of the Covid-19 pandemic. University city, Macaé-RJ, 2020. (n=233 (Continues.)

ASPECTS OF COOKING AUTONOMY (Level)	Questions	Before isolation		During isolation	
		n	%	n	%
Sharing of cooking tasks (Microsystem)	**Task sharing (frequency)**				
	No, I live alone	16	6.9	70	30
	Never	23	9.9	54	23.2
	Rarely	32	13.7	59	25.3
	Sometimes	57	24.5	29	12.4
	Often	52	22.3	10	4.3
	Always	53	22.7	11	4.7
	Task sharing (gender) *				
	Exclusively women	84	43.1	80	38.3
	Women and men	103	52.8	125	59.8
	Exclusively men	8	4.1	4	1.9
Availability of, and access to, natural or minimally-processed foods (Mesosystem)	**Access to street markets**				
	Yes	128	54.9	70	30
	No	105	45	163	70
	Shopping in street markets				
	Never	44	18.9	135	57.9
	Rarely	52	22.3	53	22.7
	Sometimes	68	29.2	29	12.4
	Often	41	17.6	12	5.2
	Always	28	12	4	1.7

For some variables the total number of answers does not add up to 233, due to missing data.

At the agent level, during isolation most college students rated their own cooking skills as "≥7", used the pressure cooker and tried out new recipes more frequently. In the microsystem, despite an overall reduction of frequency during isolation, the division of tasks continued to be performed by both genders. As for the mesosystem, it was observed that the decrease in access to street markets and the purchase of products from them was directly proportional (Table 3).

Table 4 shows the association between the level of perception of culinary skills ("<7" and "≥7"), socio-demographic data, perception of the practice of healthy eating and aspects of cooking autonomy of university students in the university city of Macaé, before and during the isolation resulting from the Covid-19 pandemic.

Table 4. Association between the level of culinary skills perception ("<7" and "≥7"), characteristics of the university students, healthy eating habits and aspects of the cooking autonomy, before and during the isolation of the Covid-19 pandemic. University City, Macaé-RJ, 2020. (n=233)

Variables	Perception of own culinary skills					
	Before isolation			During isolation		
	<7	≥7	p-value	<7	≥7	p-value
Gender	%(n)			%(n)		
Women	34.3(57)	65.6(109)	0.2	28.3(47)	71.6(119)	0.1
Men	43.2(29)	56.7(38)		38.8(26)	61.1(41)	
Course						
Nutrition	24.6(17)	75.3(52)		18.8(13)	81.2(56)	
Medicine	42.9(9)	57.1(12)		38.1(8)	61.9(13)	
Nursing	41.2(7)	58.8(10)	0.11	23.5(4)	76.5(13)	**0.04**
Pharmacy	50(10)	50(10)		45(9)	55(11)	
Other course	41.7(43)	58.3(60)		37.9(39)	62.1(64)	
Impact on family income						
Yes	32.4(48)	67.5(100)	0.06	24.3(36)	75.6(112)	**<0.002**
No	44.7(38)	55.2(47)		43.5(37)	56.4(48)	
Knowledge of healthy eating						
Yes	29.8(43)	70.1(101)	**0.004**	26.8(37)	73.1(101)	0.07
No	48.3(43)	51.6(46)		37.8(36)	62.1(59)	
Use of pressure cooker						
Never	65.3(47)	34.7(25)		54.1(33)	45.9(28)	
Rarely	36.7(11)	63.3(19)		43.5(10)	56.5(13)	
Sometimes	22.2(10)	77.8(35)	**<0.001**	16.7(8)	83.3(40)	**<0.001**
Often	25(11)	75(33)		20.7(11)	79.3(42)	
Always	16.7(7)	83.3(35)		23(11)	77(37)	
Preparation of larger meals						
By me	16.8(17)	83.1(84)		14.4(13)	85.5(77)	
By someone who lives with me	50(59)	50(59)	**<0.001**	42.5(57)	57.5(77)	**<0.001**
By a restaurant	75(9)	25(3)		37.5(3)	62.5(5)	
Bought ready/frozen	50(1)	50(1)		0(0)	100(1)	

Table 4. Association between the level of culinary skills perception ("<7" and "≥7"), characteristics of the university students, healthy eating habits and aspects of the cooking autonomy, before and during the isolation of the Covid-19 pandemic. University City, Macaé-RJ, 2020. (n=233)

Variables	Perception of own culinary skills					
	Before isolation			During isolation		
	<7	≥7	p-value	<7	≥7	p-value
Meal planning						
Never	63.2(12)	36.8(7)		66.7(10)	33.3(5)	
Rarely	56.8(25)	43.2(19)		34(16)	66(31)	
Sometimes	29.7(27)	70.3(64)	**0.001**	34.9(30)	65.1(56)	**0.002**
Often	30.2(16)	69.8(37)		25.5(14)	74.5(41)	
Always	23(6)	77(20)		10(3)	90(27)	
Frequency of cooking						
Never	96.2(25)	3.8(1)		93.3(14)	6.7(1)	
1 or 2 days a week	47.4(37)	52.5(41)		53.8(35)	46.2(30)	
3 or 4 days a week	25(14)	75(42)	**<0.001**	21(12)	79(45)	**<0.001**
5 or 6 days a week	2.9(1)	97.1(34)		20(10)	80(40)	
Always	23.7(9)	76.3(29)		4.3(2)	95.7(44)	
Trying out new recipes						
Never	94.1(16)	5.9(1)		90.9(10)	9.1(1)	
Rarely	71.1(32)	28.9(13)		54.8(17)	45.2(14)	
Sometimes	35.9(28)	64.1(50)	**<0.001**	42.2(27)	57.8(37)	**<0.001**
Often	17,3(9)	82.7(43)		19.5(15)	80.5(62)	
Always	2.4(1)	97.6(40)		8(4)	92(46)	
Task sharing						
Never	60.9(14)	39.1(9)		60(6)	40(4)	
Rarely	59.4(19)	40.6(13)		48.3(14)	51.7(15)	
Sometimes	38.6(22)	61.4(35)	**0.001**	39(23)	61(36)	**0.01**
Often	23.1(12)	76.9(40)		25.9(14)	74.1(40)	
Always	30.2(16)	69.8(37)		22.9(16)	77.1(54)	

p-value in bold: statist

Before and during social isolation, those who rated their own cooking skills as "≥7" seem to have participated more actively in the preparation and planning of their larger meals (lunch and dinner). They reported that they cooked, used the pressure cooker, tested recipes and shared tasks more frequently (Table 4).

With regard to knowledge about healthy eating, according to the options offered the foods deemed necessary for an adequate diet were, in descending order: "Fruits and vegetables" (99.6%); "Natural seasoning" (91.8%); "Meat and eggs" (91%); "Whole grains" (78.5%); "Oils and fats" (38.2%); "Foods without lactose and/or gluten" (13.3%); "Diet/light foods" (9%); "Ultra-processed foods (cookies, hamburgers, soft drinks, frozen foods etc.)" (3.4%); and "Industrialized seasoning" (3%) (data not shown).

When evaluating the perception of the consumption of a healthy diet, most university students claimed to have consumed a healthy diet in both periods evaluated (61.8% before and 59.2% during isolation); and 76.6% of those who had previously had a healthy diet maintained it when in isolation. In contrast, 68.5% of those who reported inadequate nutrition before isolation maintained it during isolation ($p<0.001$) (data not shown).

Before social isolation, 31.8% responded that they used to consume ultra-processed foods "1 to 2 days a week"; 25.3% "3 to 4 days a week"; 20.6% "every day"; 13.7% "5 to 6 days a week"; and only 8.6% "never". At the same time, for natural or minimally processed foods, the majority claimed to consume them "every day" (69.1%); 16.3% "5 to 6 days a week"; 7.7% "3 to 4 days a week"; 5.6% "1 to 2 days a week"; and 1.3% "never". During isolation, when asked whether the consumption of ultra-processed foods "decreased", "remained the same" or "increased", regardless of frequency, 39.1% of respondents said that it "decreased"; 31.3% answered that "it remained the same"; and 29.6% indicated that it "increased"; while for natural or minimally processed foods 52.4% stated that their consumption "increased"; 38.6% reported that "it remained the same"; and 9% responded that it "decreased" (data not shown).

Finally, among those who previously had easy access to street markets, only 45.3% continued to have such access during isolation. At the same time, 88.5% of those who had difficulty accessing street markets continued to do so during isolation ($p<0.001$) (data not shown).

DISCUSSION

In this sample of Brazilian university students social isolation seems to have influenced the development of aspects of cooking autonomy, such as culinary skills (which range from mechanical techniques to creativity, planning and culinary knowledge), willingness and interest in cooking (agent level) and sharing of cooking activities (microsystem level). Students reported an improvement in the quality of food consumed during isolation, although negative changes were identified at the mesosystem level (less access to street markets and fewer products from them).

With regard to culinary skills, regardless of their course most university students self-assessed their culinary skills positively, especially during the period of isolation. Those who considered themselves to be more skilled in the kitchen were also the ones who said they felt the most negative impact of isolation on their family income. Most participants lived with their parents, did not work and did not receive a grant or scholarship from the college, and although the preparation of home-made meals is considered a practice to reduce expenses,[13,16,17] the situation in Brazil - characterized by an extremely negative impact on the population's income[18] and by the increase in basic food prices[19] – may have influenced the perception of the change to the family income.

Use of the pressure cooker appeared to be more frequent only among those with better skills in the kitchen. Brazilian food guides[13,20] are known for emphasizing the strategic role of this utensil in daily life in speeding up the preparation of meals, since it cooks food faster than conventional pans, in addition to minimizing the loss of vitamins and minerals and being the best way to cook beans, one of the ingredients that predominate in Brazilian dishes.[21]

Although there are many benefits cited in the literature for the use of this resource on a daily basis, because only those who had more advanced culinary skills used this utensil frequently, it is suspected that this behavior is related to greater culinary practice and consequently to the development of confidence.[22] In addition to being an essential part of cooking autonomy, this confidence involves not only the use of the pressure cooker, but also the belief that one is capable of preparing meals, testing, reproducing and remaking new recipes, and its development is therefore considered important.[14,23,24]

With regard to the relationship between the perception of culinary skills and the preparation of larger meals (lunch and dinner), although most students stated that they are not primarily responsible for preparing their own food, it was found that before social isolation most of those who had culinary skills of "<7" used to have their meals prepared by someone else, whereas those with culinary skills of "≥7" were more involved in the preparation of their own meals, a distinction which continued during isolation. Murray et al.,[25] who evaluated a group of college students from New Jersey (USA), found that the level of confidence in the kitchen and cooking skills (or lack thereof) are important factors that can directly influence the frequency with which students prepare their own food.

In addition to cooking their own food and planning meals, another constitutive feature of culinary skills[26-28] encompasses capabilities such as being able to shop within your available budget, organizing meals to meet nutritional needs, in addition to having adequate time for food preparation.[14] In the sample investigated, as expected those who had better culinary skills were more likely to plan their meals more often, and during social isolation (which heightened perception of the culinary skills of the respondents), in general the frequency of planning also increased.

Still on an individual level, when analyzing the interest in cooking it was noticed that during isolation there was an increase in the degree of interest in trying out recipes, both among those university students who rated their cooking skills as "<7" and those who rated themselves as "≥7". In terms of willingness to cook, although less than half reported that they cooked frequently at home both before and during isolation, those with greater culinary skills cooked with significantly higher frequency. These aspects of cooking autonomy, which involve the act of finding and testing new recipes, are directly linked to the interest in cooking and may be related to greater confidence in culinary practice.[14]

The increased frequency of cooking among the participants was not an isolated pattern. A study conducted with 1,097 Polish adults during the Covid-19 pandemic revealed that the frequency with which they cooked during quarantine had increased for 62.3% of the respondents, which was primarily due to social isolation and the lock-down in cities, when restaurants, bars and similar establishments were closed, making cooking at home almost unavoidable; and by the increase in pleasure when cooking, since the individuals had more time available to do so. A similar finding was observed in a study developed in New Zealand,[8] which evaluated changes in diet and the consumption of home-made meals during the current pandemic, and found that two out of five participants said they cooked hot food more often. And yet, for 77% of the participants time is no longer considered an impediment to cooking.

With regard to food, Nutrition students were those who most claimed to have a healthy diet before isolation, although during this period the percentage of the same university students who said they had an inadequate diet increased. Among university students from "other courses", during isolation the percentage of those who claimed to have a healthy diet increased. Although it is recognized that knowledge of adequate and healthy eating is essential for the development of cooking autonomy,[14] it is worth noting that social isolation, as it is an extraordinary situation, can be stressful and have a potential effect on dietary patterns, increasing the frequency of snack consumption, associated with a higher caloric intake.[2,29] In this case, the technical knowledge in Nutrition seems not to have been enough to influence their diet and to avoid inappropriate health practices, behavior also observed by Domingues et al.[11]

Nevertheless, both times the participants were evaluated those with greater perception of their abilities represented the majority of those who reported having a healthy diet. This may have been due to the fact that having less advanced cooking skills is one of the possible obstacles to preparing meals from scratch, and may be a reason for the low consumption of fruits and vegetables.[30] Most of the participants knew how to identify healthy foods, and despite the difficulty of accessing local street markets during social isolation, regardless of the level of culinary skills, most realized that their consumption of ultra-processed foods – which is discouraged by GAPB[13] – decreased or remained the same during the pandemic; while the consumption of natural or minimally processed foods – recommended by GAPB[13] and necessary for cooking from scratch – increased or remained the same. This inclination was also observed by Ruiz-Roso et al.,[31] who analyzed the dietary trends of adolescents (n=820) in Italy, Spain, Chile, Colombia and Brazil, and concluded that daily vegetable consumption increased from 35.2% before the pandemic to 43% during isolation. These changes can be attributed to the significant increase in the demand for vegetables in supermarkets,[32] or the association between the closing of food services and the increase in the preparation of meals at home;[3] or even the greater concern with consuming healthier foods in order to increase immune defences in combating a disease against which, at the time the study was carried out, there was still no vaccine or scientifically proven treatment.[3]

In the present study, the greater involvement with domestic cooking may be one of the reflections of a positive assessment of one's own cooking skills, and could even be viewed as a positive point for improving the quality of the food consumed. This is because when you have the ability to cook and understand which techniques are healthier for preparing your meals, the act of preparing food gives the cook control over the ingredients and techniques that will be used to prepare the meal, thus ensuring that it is healthy.[33] The frequency with which the person cooks their own food from scratch can be essential to define a healthy and higher quality diet.[34,35] It is worth mentioning, however, that although the skill and choices of the person cooking are directly related to the quality of meals, if the individual does not have a good awareness of health issues (degree to which health concerns are integrated into a person's daily activities), even if the weekly frequency of their cooking increases, their diet may remain inadequate.[36]

In addition, although it is recognized that the act of cooking is relevant for a healthy diet, studies indicate that it is necessary to invest effort and time for food preparation, and that the lack of the time is one of the main impediments to healthy eating.[9,37,38] In some cases, this lack of available time to cook, together with the absence of culinary skills, can be an obstacle to the practice of healthy eating among university students.[9]

According to the GAPB,[13] one of the ways to manage the time necessary for the preparation of meals in the home environment is through the sharing of food-related tasks. The analysis carried out at the microsystem level showed that although most university students reported that there was a division of tasks between men and women, both before and during isolation, when analyzing the frequency of culinary practice at both times a higher percentage of women were involved with the preparation of meals. It is worth

noting that the representation of women in the kitchen may not be based only on knowledge and familiarity, but may also be influenced by socially imposed male domination and female submission, in which one gender is linked to work outside the home (male); and the other, domestic work (female).[14,39,40] Unlike the participation of women, it seems that men's role in food-related activities is usually limited to shopping in markets, and when they cook, they usually do so on holidays, for leisure or professionally.[41,42] In this way, this study investigated a group of young university students who, regardless of gender, are seeking qualifications to work outside the home. The findings point to the fact that the continuation of this work overload for women among the participants in this study can become a reality if the equitable division of food-related tasks is not implemented.

Finally, with regard to the mesosystem, it was found that due to the restrictive measures of quarantine and social isolation, the easy access to street markets and the purchase of natural or minimally processed food in such places suffered a significant decline. This seems to have contributed to the expansion of areas with low availability of healthy foods, or making it more difficult to access them,[43,44] reinforcing the obstacles to healthy eating among university students.[9] A structuring component of cooking autonomy is public policies, which should for example encourage agroecologically-based family farms to sell their products at street markets,[14] which are places that generally favor shorter food supply chains and are related to sustainable diets.[45]

Limitations of the study that could be highlighted are the fact that a convenience sample was used, with data that cannot be generalized; not analyzing all the components of the concept of cooking autonomy; not using the official means of communication of the universities to recruit the participants, as well as the instrument not going through all the stages of the psychometric evaluation. Such limitations may have influenced the potential to reach students on certain courses, for which fewer responses were obtained, as well as the number of university students recruited for the survey in general, which could have been larger if the official media of the three universities had been used. In addition, the failure to perform some stages of the psychometric assessment may have compromised the accuracy of the data collected, compared to the use of validated instruments. However, it should be noted that this study used the first version of an instrument to assess the cooking autonomy of university students, since there had previously been no validated instruments for this purpose. In addition, the main author of the referenced conceptual model of cooking autonomy participated in the preparation of the instrument, and is also the author of the present study, ensuring that the selected questions correctly represent the components of cooking autonomy.

The results obtained can therefore contribute to greater knowledge of the experience of university students during the Covid-19 pandemic, as well as contribute to the development of culinary practices, research and public policies aimed at this population. It is worth noting that some of the findings may have been influenced by the fact that university students returned to live with their parents during the period of isolation – common behavior among young adults as a result of job loss or the closing of dormitories caused by the pandemic;[46] or due to health restrictions, depending on the indefinite suspension of face-to-face classes. Thus, since cooking autonomy is also a result of the environment in which individuals are living,[14] it is recommended that studies be continued on the subject among university students from this and other cities/regions of the country, in order to obtain an evaluation comparison for the post-pandemic period.

CONCLUSION

In the university population analyzed, social isolation positively influenced four of the five aspects of cooking autonomy which were assessed, namely: culinary skills; willingness and interest to cook at an individual level; and sharing of culinary activities at the microsystem level.

The evidence suggests that students staying at home made it possible for them to make healthy use of their time, cooking or doing household chores. On the other hand, at the mesosystem level the difficulty of accessing street markets and the decrease in the frequency of visits to them were indicators of the effect that isolation had on the availability of natural or minimally processed foods and on their consumption.

Whether in times of pandemic or not, the development of cooking autonomy is necessary for the individual to create ways to prepare their own meals from scratch. As a result, the findings of this study contribute to the dialogue on the promotion of health and quality of life through home cooking, in atypical situations or in more normal times, such as the post-social isolation period. They also reveal that cooking at home, in a healthy way, is a multidimensional event that therefore goes beyond individual practices.

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Contributors

Machado BA, Oliveira MFB and Cabral CFS were responsible for the coordination of the study design; Machado BA and Rocha CMM were responsible for data collection, analysis and interpretation; Machado BA, Oliveira MFB, Cabral CFS, Aguiar MM and Martins CA were responsible for writing and revising the study, and the approval of the manuscript for submission.

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