



## Emotional appetite in negative situations and dietary patterns of adult women

### *Apetite emocional em situações negativas e padrão alimentar de mulheres adultas*

### *Apetito emocional en situaciones negativas y el patrón alimentario de mujeres adultas*

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#### ABSTRACT

**Objective:** To check whether and what dietary patterns may be associated with emotional appetite in women served by the Brazilian Unified Health System (Sistema Único de Saúde – SUS). **Methods:** This quantitative analytical cross-sectional study was conducted in 20 SUS Family Health Centers between 2016 and 2017 with literate women aged 19 to 59 years at reproductive age. Data on weight, height, and waist circumference were collected and the Emotional Appetite Questionnaire (Questionário de Appetite Emocional – QUEAPEM) was applied to assess emotional appetite. The Food Frequency Questionnaire was used to assess food intake in the form of dietary patterns derived from factor analysis using Barlett's and Kayse-Meyer-Olkin sphericity tests. The relationship between dietary patterns and emotional appetite dimension was checked by the Spearman's test with significant values set at  $p < 0.05$ . **Results:** Participants were 149 women with a mean age of  $34.3 \pm 8.6$  years. Most women ( $n = 88$ , 59%) exhibited excess weight, with 25.5% ( $n = 38$ ) of them being obese. Three dietary patterns were identified and together explained 16.8% of the variability of the diet. They were labelled "energy dense", "healthy" and "traditional". There was a correlation between the "traditional" dietary pattern and presence of emotional appetite in negative situations ( $p < 0.05$ ), with no correlation with the other patterns. **Conclusion:** The identification of three dietary patterns allowed a better understanding of the diet of the studied women and detected an inverse, although weak, association between the "traditional" dietary pattern and emotional appetite in negative situations.

**Descriptors:** Appetite; Eating Behavior; Food Consumption.

#### RESUMO

**Objetivo:** Verificar se e quais padrões alimentares podem estar associados ao apetite emocional em mulheres acompanhadas pelo Sistema Único de Saúde (SUS). **Métodos:** Estudo quantitativo, transversal e analítico realizado em 20 Centros de Saúde da Família do SUS, entre 2016 e 2017, com mulheres de 19 a 59 anos, em idade reprodutiva e alfabetizadas. Coletaram-se dados de peso, altura e circunferência da cintura, e aplicou-se o Questionário de Appetite Emocional (QUEAPEM), para avaliar o apetite emocional, e o Questionário de Frequência Alimentar, para avaliar o consumo alimentar, analisado na forma de padrões alimentares derivados por análise fatorial por meio de testes de esfericidade de Barlett e Kayse-Meyer-Olkin. Verificou-se relação entre os padrões alimentares e a dimensão do apetite emocional pelo teste de Spearman, considerando significativos os valores de  $p < 0,05$ . **Resultados:** Ao total, 149 mulheres participaram do estudo, com idade média de  $34,3 \pm 8,6$  anos. A maioria das



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Received on: 04/24/2020

Accepted on: 10/30/2020

mulheres (n= 88; 59%) encontra-se com excesso de peso, sendo 25,5% (n=38) com obesidade. Identificaram-se três padrões alimentares que juntos explicaram 16,8% da variabilidade da dieta, denominados de “denso em energia”, “saúdável” e “tradicional”. Houve correlação entre o padrão alimentar “tradicional” e a presença de apetite emocional em situações negativas ( $p<0,05$ ), não havendo correlação com os demais padrões. **Conclusão:** A identificação de três padrões alimentares permitiu um melhor entendimento da alimentação das mulheres estudadas, além de detectar uma associação inversa, embora fraca, entre o padrão alimentar “tradicional” e o apetite emocional em situações negativas.

**Descritores:** *Apetite; Comportamento Alimentar; Consumo Alimentar.*

## RESUMEN

**Objetivo:** Verificar si y cuáles son los patrones alimentarios que se puede asociar con el apetito emocional de mujeres asistidas en el Sistema Único de Salud (SUS). **Métodos:** Estudio cuantitativo, transversal y analítico realizado en 20 Centros de Salud de la Familia del SUS entre 2016 y 2017 con mujeres entre 19 y 59 años con edad reproductiva y alfabetizadas. Se recogieron los datos del peso, la altura y la circunferencia de la cintura y se ha aplicado el Cuestionario de Apetito Emocional para evaluar el apetito emocional y el Cuestionario de Frecuencia Alimentaria para evaluar el consumo alimentario analizado en forma de patrones alimentarios derivados por el análisis factorial a través de las pruebas de Barlett y de Kayse-Meyer-Olkin. Se ha verificado la relación entre los patrones alimentarios y la dimensión del apetito emocional por la prueba de Spearman considerándose significativos los valores de  $p<0,05$ . **Resultados:** En total, 149 mujeres con edad media de  $34,3 \pm 8,6$  años participaron del estudio. La mayoría de las mujeres (n= 88; 59%) tiene exceso de peso y el 25,5% (n=38) son obesas. Se ha identificado tres patrones alimentarios que juntos han explicado el 16,8% de la variabilidad de la dieta los cuales se les han nombrado de “denso en energía”, “saludable” y “tradicional”. Hubo correlación entre el patrón alimentario “tradicional” y la presencia del apetito emocional en situaciones negativas ( $p<0,05$ ) sin correlación con los demás patrones. **Conclusión:** La identificación de tres patrones alimentarios ha permitido una mejor comprensión de la alimentación de las mujeres estudiadas además de identificar una asociación inversa, aunque débil, entre el patrón alimentario “tradicional” y el apetito emocional en situaciones negativas.

**Descritores:** *Apetito; Conducta Alimentaria; Consumo Alimentario.*

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## INTRODUCTION

According to 2015 data from the Global Burden of Disease (GBD), there are 603.7 million obese adults, which represent approximately one third of the world population<sup>(1)</sup>. In Brazil, according to the System for Surveillance of Risk and Protective Factors for Chronic Diseases through Telephone-based Survey (Vigitel), there was a 26.3% increase in excess weight in the last ten years, and in 2016 more than half of the adult Brazilian population presented excess weight<sup>(2)</sup>.

Excess weight is related to the increased risk of developing a wide range of diseases, mainly cardiovascular diseases, type 2 diabetes mellitus, hypertension, dyslipidemia, and several types of cancer<sup>(3)</sup>. Its development is multifactorial and can be influenced by individual issues or even by social and behavioral characteristics, such as mood swings, low self-esteem, anxiety, depression, and emotional appetite<sup>(4)</sup>.

Emotional appetite is herein defined as a tendency to increase eating behavior in response to emotional triggers, that is, when there is no real physiological need for food<sup>(5)</sup>. When individuals with emotional appetite are exposed to situations of intense emotion they respond with increased intake of food with no reduction or suppression of hunger and no satiety, which is biologically expected<sup>(6)</sup>.

Studies show that emotional dysregulation is defined as an inability to recognize and control intense emotional responses. Individuals with high levels of stress become indifferent to their own biological signs of hunger and satiety, thereby confusing emotional arousal and hunger and thus generating a compensatory mechanism<sup>(7-9)</sup>.

The assessment of food intake is relevant to understand the relationship between diet and obesity, but the traditional analysis of food intake is focused on the intake of nutrients or isolated foods, which generates a reductionist view of the diet. The analysis of dietary patterns allows a holistic view of the diet as people consume a set of varied foods in complex meals. Thus, the analysis of dietary patterns favors the understanding of disease prevention and treatment processes and has been a fundamental tool for nutritional intervention programs<sup>(10)</sup>.

Bearing in mind that individuals who have an emotional appetite are more prone to the development of overweight and obesity<sup>(11,12)</sup> and that database searches yielded no studies on dietary patterns and emotional appetite, it is necessary to study this topic in an attempt to understand possible associated factors and seek new tools to assess associations with emotional appetite. Currently, this type of analysis has not been highlighted in

public health policies in Brazil, which demonstrates that the present study will contribute to facilitate the adoption of more evidence-based intervention strategies for health promotion. Thus, this study aimed to assess whether and what dietary patterns may be associated with emotional appetite in women monitored by the Unified Health System (*Sistema Único de Saúde – SUS*).

## METHODS

This quantitative analytical cross-sectional study uses data from a larger study titled “Project Prevendo - Health, Aging, Diet and Inflammation: development, validation and standardization of instruments for health promotion and prevention of noncommunicable diseases”. Project Prevendo aims to standardize the use of indicators within the SUS care routine and hence lead to greater success in promoting health and tackling non-communicable diseases (NCDs). The aforementioned study was carried out in 20 Primary Health Care Centers (*Unidades de Atenção Primária à Saúde – UAPS*) belonging to the Primary Health Care System of the Municipal Health Secretariat of the Municipality of Fortaleza, located in the state of Ceará, Northeastern Brazil. These UAPS provide care through SUS in the city of Fortaleza. The UAPS were selected by drawing lots considering the UAPS in all administrative regions of the city and ensuring at least two UAPS from each of the six regional administrative offices of Fortaleza.

The population who participated in the Project Prevendo study consisted of women served by SUS and registered at the selected UAPS. According to the literature, women are more prone to changes in the regulation of emotional control, which lead to behavioral compensation related to eating<sup>(9)</sup>. Thus, only women were included in the study. Project Prevendo used a convenience sample of 450 women followed up at the UAPS and randomly selected while waiting for care.

Thus, the study inclusion criteria were: literate adult women ( $\geq 20$  and  $<60$  years old) at reproductive age receiving care at the respective UAPS without mental and physical restrictions that could either hinder understanding of the questionnaire and interview or compromise anthropometric measurement. Exclusion criteria were: menopausal women and those who did not provide all the data necessary for the study. After exclusion, the final sample included in this study comprised 149 women.

Data were collected between 2016 and 2017 in two stages. In the first stage, identification (age), socioeconomic (education, income, self-declared race and marital status) and clinical (smoking and drinking patterns) data were collected. In addition, the emotional appetite questionnaire (*questionário de apetite emocional – QUEAPEM*)<sup>(13)</sup> was administered, anthropometric measurements of weight, height, and waist circumference (WC) were performed, and the body mass index (BMI) ( $\text{kg}/\text{m}^2$ ) was calculated. BMI and WC classifications were performed according to recommendations from the World Health Organization (WHO)<sup>(14)</sup>. WC of women was considered adequate, that is, without risk of complications, when less than 80 cm. The obesity categories, grouped into one category, resulted in: BMI less than  $18.50 \text{ kg}/\text{m}^2$  - thinness; BMI of  $18.50 \text{ kg}/\text{m}^2$  to  $24.99 \text{ kg}/\text{m}^2$  - normal weight; of  $25.0 \text{ kg}/\text{m}^2$  to  $29.99 \text{ kg}/\text{m}^2$  - overweight;  $\geq 30 \text{ kg}/\text{m}^2$  - obesity.

Emotional appetite was assessed using the Emotional Appetite Questionnaire (*Questionário de Apetite Emocional – QUEAPEM*)<sup>(13)</sup>, a questionnaire adapted for Brazilian Portuguese based on the Emotional Appetite Questionnaire (EMAQ)<sup>(13)</sup>. QUEAPEM<sup>(13)</sup> consists of 22 questions about the tendency to eat in response to positive and negative emotions (14 items), 9 of which are negative (sad, bored, angry, anxious, frustrated, tired, depressed, scared, lonely) and 5 are positive (confident, happy, relaxed, playful, enthusiastic), in addition to positive and negative situations (8 items), 5 being negative (under pressure, after a heated discussion, after a tragedy with someone, after the end of a relationship, after losing money or assets) and 3 positive (when falling in love, when involved in a pleasant pastime, after receiving good news). Each item is scored on a “Likert” scale in response to the amount of food eaten. The score ranges from 1 point (much less) to 9 points (much more), with 5 points indicating “the same”. For each item, there are also the response options “does not apply” or “I don’t know”. There is no cut-off point, and negative and positive emotions and situations are assessed as a continuous variable.

In the second stage of the study, data on food consumption were collected through the Food Frequency Questionnaire (FFQ) developed and validated for the Longitudinal Study on Adult Health (*Estudo Longitudinal de Saúde do Adulto – LSA-Brasil*)<sup>(15)</sup>: the FFQ-Elsa. This instrument has 114 items divided into 7 food groups: bread, cereals and tubers; fruits, dried fruits and fruits in syrup; vegetables and legumes; eggs, meat, milk and dairy products; pasta; sweets and beverages. The FFQ-Elsa was applied by telephone contact with women participating in the first stage of the study. The reported foods were transformed into grams and milliliters<sup>(16)</sup>.

In an attempt to minimize the number of variables related to food intake, foods were divided into food groups. Initially, they were grouped according to their nutritional composition, but foods whose frequency of intake was less than 5% were excluded, such as light mayonnaise, *acarajé* and wine. At the end, there were 27 food groups (Table I).

The identification of dietary patterns occurred through factor analysis, using the principal component estimation method (PCA), with the factors obtained being rotated using orthogonal varimax rotation, as it is the most used method for data reduction with minimal loss of information, with linear combinations between food groups that explain most of the variation in the individuals' diet<sup>(10)</sup>.

To test the applicability of factor analysis to food consumption data, the Barlett and Kayse-Meyer-Olkin (KMO) sphericity tests were performed. Eigenvalue values >1 were used as criteria for the retention of the factors according to the Cattel graph, in which the eigenvalue represents the amount of variance that can be explained by a factor. Food groups with a factor load value greater than or equal to +0.3 and less than or equal to -0.3 were considered as important components for each dietary pattern<sup>(10)</sup>. The naming of dietary patterns occurred according to the nutritional composition of the foods in each component and based on nomenclatures already used in other studies in which the composition of the patterns was similar.

Spearman's correlation test was used to check for associations of the eating patterns obtained through the measurement of emotional appetite with emotions and situations (both positive and negative). The analyses were performed using SPSS version 22.0 and considering  $p < 0.05$  significant.

This study followed the recommendations of Resolution No. 466/12 of the National Health Council and, as previously mentioned, integrates "Project Prevendo - Health, Aging, Diet and Inflammation: development, validation and standardization of instruments for health promotion and prevention of non-communicable diseases". The project was approved by the Human Research Ethics Committee of the Ceará State University (Approval No. 314.351). All the participants signed an Informed Consent Form and were informed tacitly about the research objectives.

## RESULTS

Of the 450 women assessed in Project Prevendo, only 149 presented full data on food consumption and emotional appetite. The mean age of the group was  $34.3 \pm 8.6$  years, with 65.1% (n=97) of the women being 30 years of age or older, 69.1% (n=103) having nine or more years of study, 73.2% (n=109) being self-declared *pardas* (mixed-race Brazilians), 89.9% (n=134) reporting a household income of one to three minimum wages, 96.6% (n=144) being non-smokers, 91.3% (n=136) being non-drinkers, and 51% (n=76) being married. There was a predominance of women with increased waist circumference (82.6%; n=123) and excess weight, with 33.5% (n=50) being overweight and 25.5% (n=38) being obese (Table I).

After confirming the adequacy of the data by the KMO coefficient (0.645) and by Bartlett's sphericity test ( $p < 0.001$ ), the 27 food groups were included in the analysis (Table I), thus resulting in three dietary patterns which were called "Energy-dense", "healthy" and "traditional", which together explained 33.8% of the total dietary variability in the women analyzed (Table II).

The "energy-dense" pattern was the one that most represented the food consumption of these women, explaining 16.4% of the total variability of the diet. It comprised bakery products, such as cakes and cookies, pasta, tubers, eggs, skimmed dairy products, fats, meat, sausages, snacks, regional foods, such as couscous, manioc flour, *pirão* and *vatapá*, sweets, soft drinks, alcoholic beverages and *feijoada*. The "healthy" pattern included cereals, fruits, vegetables, oilseeds, poultry, fish, soups, and sushi. This pattern explained 9.3% of the total variability of the diet. The foods retained in the "traditional" pattern were rice, bread, biscuits and cakes, legumes, whole dairy products and juices, with negative charges for whole grains, low-fat dairy products and alcoholic beverages. This explained 8.0% of the total variability of the diet (Table II).

The results regarding the emotional appetite questionnaire were obtained by the mean of continuous variables divided into negative emotions and situations for the presence of emotional appetite and positive emotions and situations for the absence of emotional appetite. There was a higher prevalence of responses to positive emotions and situations (Table III).

When the relationship between emotional appetite and eating patterns was analyzed, an inverse correlation of emotional appetite with negative situations and a "traditional" eating pattern was observed ( $r = -0.18$ ;  $p < 0.05$ ). However, the "energy-dense" and "healthy" patterns were not significantly associated with the emotional appetite scale (Table IV).

Chart I - Groups of foods reported by the women who participated in the study. Fortaleza, Brazil, 2020.

Groups of foods	Description
Rice	White rice
Cereals	Brown rice, oat, brown bread, light bread
Bread	Bread roll, sugary bread
Cookies and cakes	Cake, crackers, biscuits, filled cookies
Pasta	Spaghetti, noodles
Tubers	Mashed potato, sweet potato
Fruits, Vegetables and Legumes (FVL)	All fruits, vegetables, and legumes
Legumes	Beans, chickpea, string bean
Oilseeds	Cashew nut
Egg	Boiled eggs, fried eggs
Skimmied dairy products	Skimmed milk, fresh minas cheese, light cream cheese, light yogurt
Whole dairy products	Whole milk, semi-skimmed milk, mozzarella cheese, cream cheese, whole yogurt
Fats	Margarine, mayonnaise
Meat	Bone-in meat, roast beef, pork, stroganoff, liver, tripe stew
Poultry	Chicken breast, fried chicken, chicken stew
Cured meat	Sausage, hamburger, turkey breast, ham, bacon
Fish	Fish stew, fried fish, sardine, shrimp, crab
Snacks	Savory mini pies, pastel, hot dog, popcorn, French fries, cheese bread, pizza
Soup	Veggie soup, instant soup
Regional	Vatapá, pirão, couscous, manioc flour
Sweets	Ice cream, Ice pop, toffee, jelly, chocolate powder, chocolate, pudding, marmalade, honey, cereal bar, sugar, sweet pie, full fruit salad
Soft drinks	Regular soft drink, light soft drink
Tea and Coffee	Coffee, tea
Juices	Fresh juice, processed juice, artificial juice
Alcoholic beverages	Beer, red wine, sugar cane distilled drink
Sushi	Sushi
Feijoada	Feijoada

Table I - Distribution of women served by the Brazilian Unified System assessed in this study (n=149) according to socioeconomic and anthropometric characteristics. Fortaleza, Brazil, 2020.

Variables	n	%
<b>Age</b>		
< 30 years	52	34.9
≥ 30 years	97	65.1
<b>Years of study</b>		
< 9 years	46	30.9
≥ 9 years	103	69.1
<b>Self-declared race</b>		
White	31	20.8
Black	9	6.0
<i>Parda</i>	109	73.2
<b>Marital status</b>		
Single	68	45.6
Married	76	51.0
Divorced	5	3.4
<b>Household income</b>		
< 1 minimum wage	15	10.1
1-3 minimum wages	134	89.9
<b>Smoking</b>		
No	144	96.6
Yes	5	3.4
<b>Drinking</b>		
No	136	91.3
Yes	13	8.7
<b>Waist circumference</b>		
Adequate	26	17.4
Increased	123	82.6
<b>Nutritional status</b>		
Underweight	4	2.7
Normal weight	57	38.3
Overweight	50	33.5
Obesity	38	25.5

Table II - Distribution of the factorial loads of the identified dietary patterns. Fortaleza, Brazil, 2020.

Food group	Dietary pattern		
	Energy dense	Healthy	Traditional
Snacks	<b>0.657</b>	-0.036	0.143
Feijoada	<b>0.634</b>	0.123	-0.103
Sweets	<b>0.624</b>	0.205	0.260
Tubers	<b>0.563</b>	0.153	-0.035
Fat	<b>0.559</b>	-0.114	0.103
Pasta	<b>0.537</b>	0.053	0.236
Egg	<b>0.519</b>	0.290	-0.074
Soft drinks	<b>0.507</b>	-0.269	0.011
Cookies and cakes	<b>0.475</b>	0.065	<b>0.550</b>
Meat	<b>0.448</b>	-0.067	-0.128
Regional	<b>0.448</b>	0.262	0.215
Cured meat	<b>0.393</b>	0.052	0.108
Skimmed dairy products	<b>0.310</b>	<b>0.327</b>	<b>-0.422</b>
Alcoholic beverages	<b>0.300</b>	-0.066	<b>-0.310</b>
Fish	0.185	<b>0.735</b>	0.029
FVL	-0.009	<b>0.651</b>	0.232
Sushi	-0.196	<b>0.635</b>	0.185
Soup	-0.020	<b>0.433</b>	-0.012
Poultry	0.106	<b>0.429</b>	0.063
Oilseeds	0.060	<b>0.408</b>	-0.270
Whole cereal bar	0.093	<b>0.404</b>	<b>-0.311</b>
Bread	0.091	0.136	<b>0.688</b>
Rice	0.042	-0.296	<b>0.663</b>
Whole dairy products	-0.002	0.024	<b>0.506</b>
Legumes	0.272	0.138	<b>0.336</b>
Juices	0.209	0.071	<b>0.318</b>

Bold: important factor load greater than 0.3 (indicating correlation with the pattern) and less than -0.3 (indicating inverse correlation with the pattern)

Table III - Presence of emotional appetite in the women assessed. Fortaleza, Brazil, 2020.

Emotional appetite	Mean	SD
Negative emotions	3.84	1.15
Positive emotions	5.32	1.08
Negative situations	2.87	1.27
Positive situations	5.04	1.18

SD: standard deviation

Table IV - Correlation between emotional appetite and dietary patterns found in the women assessed. Fortaleza, Brazil, 2020.

Emotional appetite	Energy dense		Healthy		Traditional	
	r	p*	r	p*	r	p*
Negative emotions	0.055	0.502	-0.005	0.948	-0.071	0.387
Positive emotions	0.043	0.601	-0.102	0.214	0.038	0.645
Negative situations	-0.045	0.585	0.062	0.453	<b>-0.185</b>	<b>0.024</b>
Positive situations	0.029	0.724	0.039	0.636	0.049	0.549

\*Spearman's correlation

## DISCUSSION

After searching the databases, we found that this is the first study to assess the relationship between emotional appetite and derived eating patterns using factor analysis. In the present study, three dietary patterns were found to explain 33.8% of the total dietary variability of the women analyzed. The “energy-dense” dietary pattern, composed primarily of high-energy and highly processed foods, such as bakery products, fast-food snacks, soft drinks, alcoholic beverages and *feijoada*, is similar to that found in the literature<sup>(17)</sup>. The “healthy” pattern, consisting of cereals, fruits, vegetables, oilseeds, poultry, fish, soups and sushi is a pattern similar to that found in other studies that also called it “healthy”<sup>(17,18)</sup>. Finally, there was the “traditional” dietary pattern, composed of foods widely consumed by the Brazilian population, such as rice, beans, bread, and juices<sup>(17,19)</sup>.

Regarding emotional appetite, only the “traditional” dietary pattern exhibited a significant correlation. An inverse relationship was observed between this pattern and emotional appetite in negative situations ( $r=0.18$ ;  $p<0.05$ ), that is, women who increased food intake in negative situations tended to exhibit a lower adherence to the traditional dietary pattern. As described in the literature, this pattern is the one that presents the most prevalent foods and preparations in the diet of the country or place of the study<sup>(20)</sup>. In Brazil, the traditional pattern is commonly described as rice and beans, whole-grain dairy products, refined carbohydrates, and fruit-based beverages<sup>(17,19)</sup>. Although it is poor in fruits, vegetables, fibers and rich in saturated fats and cholesterol, it can still be considered healthier than the energy-dense pattern, which is composed primarily of ultra-processed foods, which are rich in sugars and fats<sup>(21)</sup>.

Thus, this would partially explain the reason why women present a low adherence to the traditional pattern in negative situations. According to the literature, individuals facing negative situations tend to increase the intake of snacks, fatty foods, sweets and caloric foods<sup>(22-25)</sup>, characteristics inherent to ultra-processed foods, which were present in the “energy-dense” pattern. Emotional and mood regulation are associated with the intake of hedonic foods, which are those that lead to the tendency to eat due to the pleasant and pleasurable taste, such as chocolates and sweets<sup>(26)</sup>, which are present in the “energy-dense” dietary pattern. However, this hypothesis does not apply to the “healthy” dietary pattern, which, like the “energy-dense”, was not statistically significant.

It should be noted that previous studies have shown links between emotional appetite and increased symptoms of depression<sup>(27)</sup>, anxiety<sup>(28)</sup> and disordered eating behaviors<sup>(29)</sup>. A study with non-obese women who were not following weight loss diets, which used the Dutch Eating Behavior Questionnaire and sought to investigate the effect of the negative affective state on food consumption, found that consumption increased significantly during a negative situation. In addition, the researchers observed that food consumption in negative situations was motivated by

rewards and that individuals with restricted diets exhibited a higher risk of excessive consumption during a negative situation<sup>(30)</sup>. In another study conducted with university students, in which the authors also used the Dutch Eating Behavior Questionnaire<sup>(31)</sup>, the emotional appetite in negative emotions, such as propensity to boredom and difficulties in emotional regulation, independently predicted the likelihood of increased food consumption in response to these negative emotions. However, researchers have not studied the composition of this food consumption pattern.

The present study demonstrated that women experiencing negative situations tend to exhibit a lower adherence to the “traditional” pattern, which is composed of rice, beans, bread, and fruit juices. The increase in food intake is potentiated when they experience negative situations and emotions, with this intake usually consisting of ultra-processed foods, that is, foods rich in sugar, fats and high energy density<sup>(22-25)</sup>. Thus, this study provided an interesting result that supports the hypothesis about the increase in the intake of ultra-processed foods and, consequently, a decrease in the intake of traditional and healthy foods when experiencing negative situations and emotions, even though no statistical differences were found for the “energy-dense” and “healthy” patterns.

Furthermore, it is worth highlighting the relevance of this study in the current situation of the new coronavirus pandemic (COVID-19). In view of the social distancing established in several countries, the population needed to be confined and, because of that, started to have more meals at home. Both the COVID-19 pandemic and the quarantine have become a source of stress, anxiety, depression, and psychosocial suffering, with direct impacts on eating behavior<sup>(32)</sup>. As seen previously, emotions and negative situations can influence individuals’ food intake, leading to an increase in the consumption of ultra-processed foods. Thus, studies are underway to try to measure the impacts of quarantine on the population’s food intake.

A Brazilian study that assessed food intake before and during quarantine found that there was an increase, although simple, in the consumption of healthy foods, such as fruits and vegetables, and a stabilization in the consumption of ultra-processed foods, thus indicating that there was no increase in consumption of ultra-processed during quarantine<sup>(33)</sup>. However, a study carried out in Italy found that there was an increase in the consumption of foods called “comfort foods”, such as chocolates, desserts and ice cream, and a decrease in the consumption of fruits and vegetables during quarantine<sup>(34)</sup>, which may be associated with decreased consumption of healthy or traditional foods due to negative emotions and situations, such as those experienced during the period of social isolation.

Our findings should be seen with some limitations. As this is a cross-sectional study, it is not possible to infer causality. In addition, the assessment of food intake is associated with measurement errors, despite the identification of dietary patterns by a consolidated statistical technique described in the literature. Despite that, this study contributes with substantial results to health promotion: 1) the identification of the three dietary patterns allowed to assess the quality of the diet of the women analyzed and, as a result, it was observed that the “energy-dense” pattern was the one that most contributed to food intake, consisting of a low quality diet, and 2) the low adherence to the “traditional” pattern may indicate that women consume less foods that make up this pattern at the expense of other, possibly ultra-processed foods. Thus, it raises the question that more studies should be conducted, especially studies with larger samples, as such studies will allow better direction in promoting the health of this population.

## CONCLUSION

It is concluded that this study appears as a potential multiplier in the assessment of emotional appetite as it performed an analysis of dietary patterns. As a contribution, it provided the identification of three dietary patterns that characterized the food intake of the women analyzed in addition to finding an inverse association, although weak, between the “traditional” dietary pattern and the emotional appetite in negative situations.

## CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest.

## CONTRIBUTIONS

**Yanna Letícia Menezes Paiva** and **Leandro Teixeira Cacau** contributed to the acquisition, analysis and interpretation of data, and the writing of the manuscript. **Antônio Augusto Ferreira Carioca**, **Lia Silveira Adriano** and **Soraia Pinheiro Machado Arruda** contributed to the analysis and interpretation of data. **Helena Alves de Carvalho Sampaio** and **Sabrina Dantas Sabry** contributed to the study conception and design; and the analysis and interpretation of data. All the authors reviewed and approved the final version of the article.



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**How to cite:** Paiva YLM, Cacau LT, Sampaio HAC, Adriano LS, Carioca AAF, Arruda SPM, et al. Emotional appetite in negative situations and dietary patterns of adult women. Rev Bras Promoç Saúde. 2021;34:10829.

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