Association between vegetarian diets and depressive symptoms in individuals in Pernambuco

Associação entre dietas vegetarianas e sintomas de depressão em indivíduos de Pernambuco

Asociación entre dietas vegetarianas y síntomas de depresión en individuos de Pernambuco

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RESUMO

Objetivo: avaliar sintomas depressivos em pacientes vegetarianos e onívoros de Pernambuco (Brasil). **Método:** A coleta de dados foi realizada por meio de questionário online autoaplicável, contendo a Escala de Rastreamento Populacional para Depressão do Centro de Estudos Epidemiológicos (CES-D). O instrumento é composto por 20 questões, cujas respostas ajudam a detectar sintomas de depressão em populações adultas. Para análise dos dados, foram utilizados média e desvio padrão, e valores de p e teste de Student Um total de 106 indivíduos responderam o questionário, sendo destes 53 onívoros e 53 vegetarianos. **Resultados:** ambos os grupos, onívoros e vegetarianos, apresentaram um score aumentado para depressão (acima de 16 pontos). Estes escores não diferem de acordo com estilo de dieta, não havendo diferença estatística entre os grupos. Não houve associação entre dietas vegetarianas e sintomas depressivos, pelo menos no aspecto clínico e com a escala escolhida. **Conclusão:** ressalta-se a importância de avaliar o aumento dos escores em ambos os grupos. Mais estudos são necessários para elucidar esses mecanismos.

Descritores: Transtornos Mentais; Alimentação; Saúde Mental.

ABSTRACT

Objective: to evaluate depressive symptoms in vegetarian and omnivorous patients from Pernambuco (Brazil). **Method**: Data collection was performed using a self-administered online questionnaire, containing the Population Tracking Scale for Depression at the Center for Epidemiological Studies (CES-D). The instrument consists of 20 questions, whose answers help to detect symptoms of depression in adult populations. For data analysis, mean and standard deviation were used, and values of p and Student test A total of 106 individuals answered the questionnaire, of which 53 were omnivorous and 53 were vegetarians. **Results:** both groups, omnivorous and vegetarian, had an increased score for depression (above 16 points). These scores do not differ according to diet style, with no statistical difference between groups. There was no association between vegetarian diets and depressive symptoms, at least in the clinical aspect and with the chosen scale. **Conclusion:** we highlight the importance of assessing the increase in scores in both groups. Further studies are needed to elucidate these mechanisms.

Descriptors: Mental Disorders; Food; Mental health.

RESUMEN

Objetivo: evaluar los síntomas depresivos en pacientes vegetarianos y omnívoros de Pernambuco (Brasil). **Método:** La recolección de datos se realizó a través de un cuestionario en línea autoadministrado que contenía la Escala de Cribado Poblacional para la Depresión del Centro de Estudios Epidemiológicos (CES-D). El instrumento consta de 20 preguntas, cuyas respuestas ayudan a detectar síntomas de depresión en poblaciones adultas. Para el análisis de los datos, se utilizó la media y la desviación estándar, y los valores de p y de las pruebas de los estudiantes Un total de 106 individuos respondieron al cuestionario, de los cuales 53 omnívoros y 53 vegetarianos. **Resultados:** tanto los grupos omnívoros como los vegetarianos presentaron una mayor puntuación para la depresión (por encima de 16 puntos). Estas puntuaciones no difieren según el estilo de dieta, y no hay diferencia estadística entre los grupos. No hubo asociación entre las dietas vegetarianas y los síntomas depresivos, al menos en el aspecto clínico y con la escala elegida. **Conclusión:** se enfatiza la importancia de evaluar el aumento de puntajes en ambos grupos. Se necesitan más estudios para dilucidar estos mecanismos.

Descriptores: Trastornos Mentales; Alimentación; Salud mental.

ORIGINAL

Introduction

Meat consumption has been decreasing worldwide over the years, and this is a trend that also applies to Brazil. A recent survey by the Brazilian Institute of Public Opinion and Statistics (IBOPE) shows a 75% increase in the number of people who declare themselves vegetarian, from 8% in 2012 to 14% in 2018, representing 29 million individuals who adhere to this food pattern. The percentage is even higher in the city of Recife, capital of the state of Pernambuco, where there are 16% of vegetarians, and in 2012 there were only 10%.[1] The reasons for the adoption of this dietary pattern are varied, but the main ones include: health, environment and ethics.

According to food, vegetarians can be classified as: ovolactovegetarians, which consume egg, milk and dairy products; lactovegetarians, which exclude the egg group but consume milk and dairy products; eggvegetarians, which do not ingest milk and dairy products, but include eggs in food; and strict vegetarians that exclude from the diet all products of animal origin (milk and derivatives, eggs and honey). What all groups have in common is the exclusion of the whole group of meat from animals.[2] However, there are currently other international classifications such as the term semi-vegetarian (applied to individuals who consume meat no more than once a week) and pescovegetarians (which refers to those who do not consume meat except fish).[3]

The plant-based diet, with little or no intake of cholesterol, saturated fat and animal protein, seems to bring some health benefits. Vegetarianism adherents have lower values of low-density lipoproteins (LDL cholesterol), blood pressure and body mass when compared to the general population, contributing to the reduction of the chance of developing hypertension, obesity, cardiovascular diseases, diabetes mellitus type 2 (DM2) and cancer in general.[4]

However, some nutrients deserve attention in vegetarian diets, they are: iron, calcium, zinc, omega 3 and vitamin B12. The latter is present only in products of animal origin, so it is necessary to supplement and/or use fortified foods with the micronutrient for the public of strict vegetarians, in order to prevent or treat the deficiency. But omnivores may also need these resources, not just being the vegetarian public. Supplementation is also commonly required in the case of omega-3 fatty acids, as the largest sources of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) are wild fish that are difficult to access and are not consumed by vegetarians. In vegetables, there is only alpha-linolenic acid (ALA), which can be converted into EPA and DHA in the human body, but several factors can hinder the efficiency of this process.[4-5]

Both vitamin B12 and EPA and DHA are important for brain health and there is evidence that the deficiency of these nutrients may be related to some pathologies, including depression.[6-8] The World Health Organization (WHO) points to depression and anxiety as the two most common mental disorders in the world. The number of cases of depression worldwide increased by 18.4% between 2005 and 2015, representing 322 million people this year (or 4.4% of the world's population). In Brazil, in 2015, 5.8% of the individuals had depression, that is, more than 11 million cases. Depression presents the following symptoms: "sadness, lack of interest or pleasure, feeling of guilt or low self-esteem, sleep or appetite disorder, feeling tired and low concentration".[9]

Research shows that food is a protective factor and nutritional deficiency is a risk factor for depression. Studies with vegetarian populations are still very scarce in the literature, especially in the area of neuroscience and psychiatry. Some data show that vegetarians in Europe and the United States had a higher incidence of depression symptoms when compared to omnivorous populations (which consume all food groups).[10-12]

It is important to study the relationship between vegetarian eating habits and depression, as this knowledge helps in determining dietary patterns that can prevent and/or assist in the treatment of the disease.

Thus, the present study aimed to evaluate the association between the adoption of vegetarian diets and symptoms of depression in individuals from Pernambuco, as well as to evaluate the possible interaction between income, age and sex and depressive symptoms.

Method

A descriptive, explanatory and quantitative research was carried out, with a cross-sectional approach. The study was conducted in the state of Pernambuco, Brazil, in 2019, with omnivorous and vegetarian individuals. The sample was by free demand, and the inclusion criteria were: individuals of both sexes, aged 18 years or older, living in the state of Pernambuco. Those who did not complete the questionnaire correctly, those who were under 18 years of age and those who did not live in Pernambuco were excluded.

The information was collected through an online interview with a self-assessment questionnaire composed of clinical variables involving socioeconomic responses and type of diet and another part directed to the identification of the presence of symptoms of depression, through the use of the population screening scale for depression of the Center for Epidemiological Studies (CES-D), developed in 1977, by Radolf.[14] The CES-D scale consists of 20 questions that analyze the depressive mood of the individual in the week prior to the research, and for each answer a score ranging from 0 to 3 is computed, according to the frequency that the symptom presented. Thus, the total score achieved by the interviewee ranges from 0 to 60, and the cutoff point for determining the presence of depressive symptoms is 16 points. It is noteworthy that questions 4, 8, 12 and 16 count inverse scores.

Data collection occurred after submission and approval by the Research Ethics Committee of the University of Pernambuco, through opinion no. 1,501,509. For statistical analysis, mean and standard deviation were performed in Excel 2016 and p and student t-test values in SPSS 20.0.

Results

From the data collection performed in November 2019, we obtained original data from 416 individuals of both sexes, and n=363 (87.3%) declared themselves omnivorous and n=53 (12.7%) claimed to be vegetarians. There was an expected difference between the number of vegetarian and omnivorous interviewees, which is much higher than that of the interviewees. Thus, to better compare the groups, the technique known as assisted pairing (matching) was performed, which consists of visually selecting equal records (in the

variables chosen) in the database for treatment and control group. In the case of the study, we paired to find 53 omnivores with the same age and gender profile as the group of vegetarians, then totaling 106 individuals, which is the final sample of the research (Figure 1).

Figure 1 - Flowchart of the study sample.

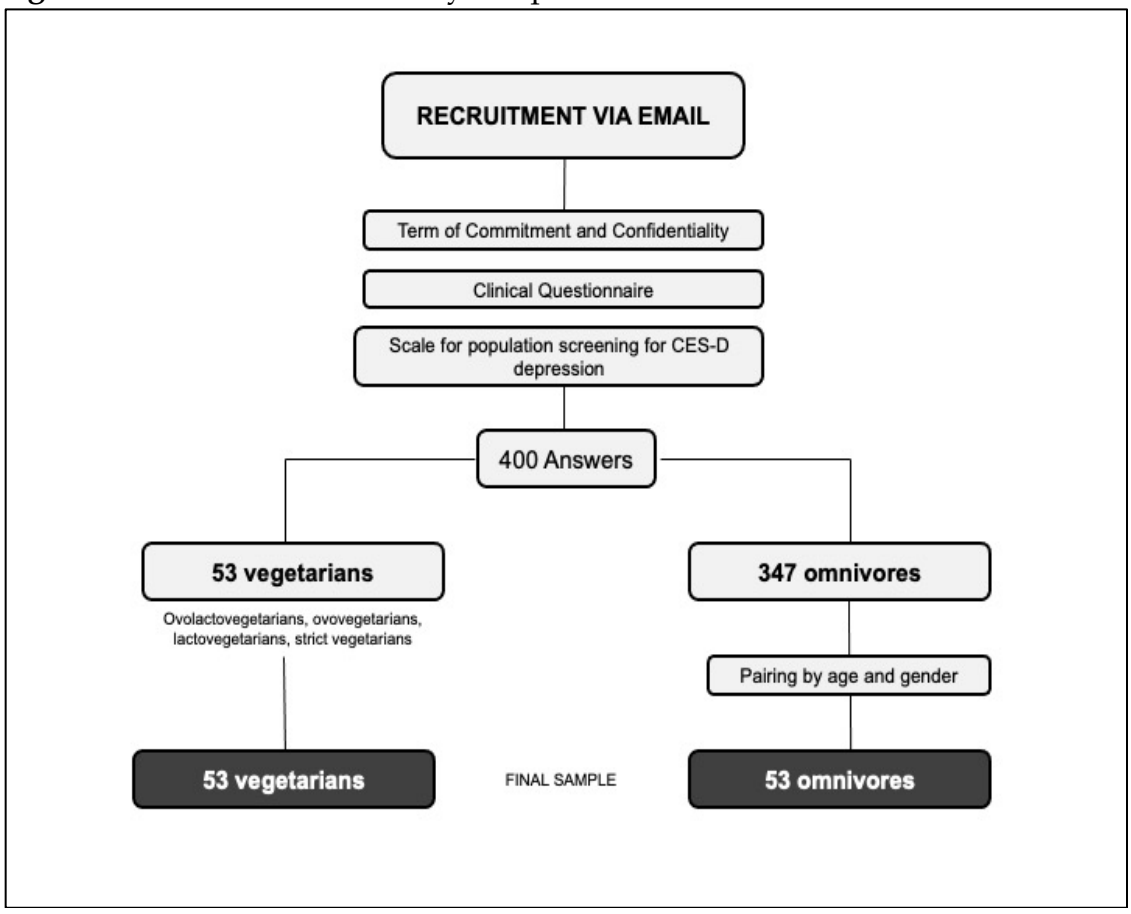

Table 1 presents the socioeconomic and clinical variables of omnivores and vegetarians living in Pernambuco. Most individuals were single. There was a prevalencia of white ethnicity in omnivorous individuals, while in the group of vegetarians, brown. The religions that stood out the most among omnivores were Catholic (45.2%) and evangelical (18.8%), while among vegetarians, 33% claim to have no religion and 20% say they are Spiritists. More than half of omnivores and vegetarians do not practice physical activity and in relation to socioeconomic conditions, around 50%, receive up to 5 minimum wages.

Table 1 - Clinical and socioeconomic variables of omnivores and vegetarians living in Pernambuco, Brazil. 2019.

	Omnivores (n=53)		Vegetarians (n=53)	
	N (%)	**SD**	**N (%)**	**SD**
Gender				
Male	13 (24,5)	19	14 (26,4)	17,6
Female	40 (75,4)		39 (73,5)	
Age				
18 to 24 years old	21 (39,6)	7,6	20 (37,7)	6,5
25 to 34 years old	14 (26,4)		14 (26,4)	
35 to 44 years old	11 (20,7)		11 (20,7)	
45 to 59 years old	6 (11,3)		7 (13,2)	
60 years or older	1 (1,8)		1 (1,8)	
Marital status				
Single	34 (64,1)	14,4	40 (75,4)	18,2
Married	11 (20,7)		10 (18,8)	
Divorced/Separated	7 (13,2)		2 (3,7)	
Other	1 (1,8)		1 (1,88)	
Race/Color				
White	31 (58,4)	14,4	21 (39,6)	12,7
Brown	20 (37,7)		27 (50,9)	
Yellow	1 (1,8)		4 (7,5)	
Black	1 (1,8)		-	
Other			1 (1,8)	
Religion				
Catholic	24 (45,2)	14,4	10 (18,8)	18,2
Evangelical	10 (18,8)		4 (7,5)	
Atheist	2 (3,7)		2 (3,7)	
Afro-Brazilian	1 (1,8)		1 (1,8)	
Spiritist	8 (15)		11 (20,7)	
Jewish	1 (1,8)		-	
Other	1 (1,8)		7 (13,2)	
Individual income				
Up to 2 minimum wages	15 (28,3)	5,8	19 (35,8)	6,8
Above 2 to 5 minimum wages	10 (18,8)		10 (18,8)	
Over 5 to 10 minimum wages	6 (11,3)		4 (7,5)	
Above 10 minimum wages	4 (7,5)		2 (3,7)	
I'd rather not inform	18 (33,9)		15 (28,3)	

Table 2 shows the types of diet adopted by the interviewees. The most prevalent dietary pattern was ovolactovegetarian in 32% of the sample. The strict vegetarian was the second most expressive audience in the study, with 17% of the sample.

Table 2 - Data on the classification of the diet of vegetarians living in Pernambuco, Brazil. 2019.

Classification of the vegetarian diet	N (%)	DP
Ovolactovegetarian (consumes egg, milk and dairy products)	32 (60,3)	13,6
Vegetarian egg (consumes egg)	3 (5,6)	
Lactovegetarian (consumes milk and dairy products)	2 (3,7)	
Strict vegetarian (does not consume any animal products)	17 (32)	

Table 3 shows the results related to the mean score and standard deviation of the screening of depression symptoms, which was similar between the groups (omnivorous and vegetarian). The individual score on the CES-D scale can range from 0 to 60, with 16 being the cutoff point that indicates the presence of depressive symptoms. The total mean score of both groups was around 20, and can be classified as the presence of depressive symptoms. The values referring to the t-test show no difference between the groups, that is, the sample seems to be similar in the prevalence of depressive symptoms, according to the mean score score.

Table 3 - Mean scores obtained in the Population Screening Scale for Depression (CES-D) of omnivores and vegetarians living in Pernambuco. Brazil. 2019.

	Omnivores(n=53)		Vegetarians(n=53)		
	Mean	SD	Mean	SD	p
Escore	20,7	± 11,9	21,3	± 11,3	0,87

The number of individuals with scores equal to or above 16 in both groups was presented in Table 4. It was noted that most of the sample had a score above 16, 65.1% and 60.3% of omnivores and vegetarians, respectively. The p-values were not statistically significant, showing that the difference between vegetarians and omnivores was not observed.

Table 4 - Scores by cutoff point (score 16) of omnivores and vegetarians living in Pernambuco. Brazil, 2019.

	Omnivores(n=53)			Vegetarians(n=53)			
	N (%)	Mean	SD	N (%)	Mean	SD	p
Score							
< 16	19 (35,8)	9,2	± 4,4	21 (39,6)	10,8	± 9,2	0,35
≥ 16	34 (64,1)	27,23	± 9,2	32 (60,3)	28,1	± 1,9	0,68

Discussion

According to the results obtained, there was no significant difference between the groups in relation to the score score for depressive symptoms, however, most of the samples of the groups (more than 50%) presented mean scores above 16, being classified as the presence of depressive symptoms. This research differs from recent studies that point to a significant association between the adoption of a vegetarian diet and higher rates of anxiety and depression symptoms.[11-12]

An epidemiological study, published in 2017, used existing information from the Avon Longitudinal Study of Parents and Children (ALSPAC) for 9,668 English men. The authors found that there was a higher risk of anxiety and depression symptoms among vegetarians, even taking into account aspects such as socioeconomic factors. They discussed the possibility of this relationship being caused by nutritional deficiencies such as omega 3 and vitamin B12. However, they state that there is the possibility that this result is not related to the type of diet adopted, and that a portion of the population becomes vegetarian due to psychiatric or personality problems.[11]

Forestell et al. (2018) investigated whether there was a difference between Undergraduate students from the United States, omnivores and vegetarians, regarding personality characteristics, including the presence of depression symptoms measured by the CES-D scale.[12] The authors pointed out that vegetarians and semi-vegetarians were more "neurotic" and depressed than omnivores and raised possible causes, which agree with the findings of Michalak et al (2012) – in which the timeline was also studied, and state that mental disorders may precede the adoption of vegetarian diets, whose explanation may be that depressed individuals choose one to adopt a vegetarian diet to improve their health status, because they are rich in vitamin B6, B9 and antioxidants.[14]

In the same sense, Jacka et al (2015)[15] pointed out in their study that patients with a history of depression follow healthier diets than those currently with depression. They conclude that patients diagnosed with depression tend to improve their eating habits by making them healthier. The vegetarian diet fits as a healthy dietary pattern because, as already said, it is rich in antioxidants, fibers, phytochemicals and low in cholesterol and total and saturated fat[16] because it contains fewer animal products and more fruits, vegetables, grains and seeds.

Similar to the results of this research, no relationship was found between vegetarianism and mental health in individuals surveyed from the United States of America (USA), Russia and Germany, finding only a slight increase in anxiety and depression in Chinese vegetarian students.[17] Beezhold et al (2015), in addition to pointing out that a plant-based diet does not negatively affect mood, claim that reducing the consumption of animal products can bring benefits such as better mood and mental health.[18]

Being a vegetarian in Western societies means being a minority, which possibly reduces well-being. And even more, it is possible that vegetarian diets do not have a causal link with mental disorders.[15,17]

Another study with 138 healthy Seventh-day Adventist Americans (Christian religion) showed results in which the vegetarian diet did not

negatively affect the mood of the subjects, despite the lower intake of omega-3 fatty acids. Northstone et al (2018) also found no association between food pattern (vegetarian and processed foods) and depressive symptoms in the UK.[19]

On the other hand, a meta-analysis of 21 studies from 10 western and Eastern countries concluded that a healthy diet (high consumption of fruits, vegetables, whole grains, fish, olive oil, lean dairy products and low consumption of animal products) reduces the risk for depression when compared to a Western type diet (high consumption of red/processed meat, refined grains, sweets, fatty dairy products, butter and low consumption of fruits and vegetables).[20]

Specifically addressing the vegetarian diet, research with Spanish adults has identified that adhering to the Pro-vegetarian Dietary Pattern (PDP) diet, which consists of a vegetable-based diet, is associated with reduced risk of developing depression.[21] In the same sense, a study with Asians living in the USA concluded that the vegetarian diet is inversely associated with the prevalence of depression, and the chance among vegetarians of developing depression is 43% lower. Among the reasons for this relationship, the authors point to the higher intake of grains, vegetables and legumes by vegetarians, foods that are rich in antioxidants, vitamin B9, phytochemicals and fibers, important nutrients for brain health.[22]

Limitations of study

The most significant limitation of the study was the fact that the study was a self-administered questionnaire without instruction from a health professional. Other psychological tests could be added to this, in order to further validate the results obtained. The small vegetarian sample may also have been a factor, in addition to the short time of application of the questionnaire because of the deadlines established.

In addition, it is emphasized that the evaluation of nutritional intake (through feeding and plasma) of omega-3, vitamin b12 and evaluation of homocysteine levels would contribute greatly to the manuscript.

Final Considerations

This study aimed to study the relationship between vegetarian diets and mental health, more specifically the association with symptoms of depression. The results presented in this study reinforce that there are still no significant associations between vegetarian diet style and depressive symptoms in pernambuco individuals analyzed, at least in the clinical aspect and with the chosen scale. Further studies are needed to elucidate these mechanisms.

Recent studies still differ regarding the influence of vegetarian diet and mental health, some point out that there is a negative relationship, others that there is a positive relationship and others that there is no statistically significant relationship. It is essential that more studies be produced so that it can be more clearly determined what the true impact of the vegetarian diet on depression can be determined.

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