



CLÍNICA

An assessment of anthropometric and hematological parameters and blood pressure in vegetarians

Avaliação antropométrica, pressórica e hematológica de população vegetariana

Evaluación antropométrica, de presión arterial y hematológica de la población vegetariana

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Palavras chave: Dieta vegetariana; Vegetarianismo; Deficiências nutricionais; Avaliação nutricional; Nutrição de grupos de risco; Nutrição em saúde pública.

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ABSTRACT

Objective: The study aims to access the anthropometric indices, blood pressure levels and haematological analysis results vegetarian population of the municipality of Ji-Paraná, Rondônia, Brazil.

Method: This descriptive and quantitative cross-sectional study has a sample size of 65 vegetarians.

Results: The results of this study showed that 61.6% of the sample was of normal weight, 69.2% had a waist circumference within normal parameters, 92.3% had normal blood pressure levels and 26.2% were classified as anemic. More than 60% of the vegetarians in this study evidenced normal plasma calcium and cholesterol levels (total and LDL). Normal levels were also observed in relation to triglycerides (81.4%), glucose (96.9%), total proteins (93.9%) and albumin (100%).

Conclusion: The conclusion of the study states that a diverse vegetarian diet can provide health benefits for humans.

RESUMO

Objetivo: Avaliar os índices antropométricos, valores pressóricos e resultados de análise hematológica de população vegetariana do município de Ji-Paraná, em Rondônia/Brasil.

Método: Trata-se de estudo descritivo e quantitativo, de corte transversal, com amostra composta por 65 vegetarianos.

Resultados: Identificaram-se 61,6% de eutróficos, 69,2% com circunferência abdominal dentro dos parâmetros normais, 92,3% apresentaram níveis pressóricos normais e 26,2% foram classificados como anêmicos. Mais de 60% dos vegetarianos tinham níveis plasmáticos de colesterol (Total e LDL) e cálcio dentro dos parâmetros normais. O mesmo se observou em relação a triglicérides (81,4%), glicemia (96,9%), proteínas totais (93,9%) e albumina (100%).

Conclusão: A alimentação vegetariana diversificada pode proporcionar benefícios à saúde do ser humano.

RESUMEN

Objetivo: Evaluar los índices antropométricos, los niveles de presión arterial y resultados de análisis hematológicos de la población vegetariana del municipio de Ji-Paraná, Rondônia.

Método: Se trata de un estudio descriptivo y cuantitativo, de corte transversal, con muestra compuesta por 65 personas vegetarianas.

Resultados: Se identificó 61,6% de eutróficos, 69,2% con circunferencia abdominal dentro de los parámetros normales, 92,3% presentaron niveles de presión arterial normales y 26,2% fueron clasificados como anémicos. Más del 60% de los vegetarianos presentaron niveles plasmáticos de colesterol (Total y LDL) y calcio dentro de los parámetros normales. Lo mismo se observó en relación a los triglicéridos (81,4%), glicemia (96,9%), proteínas totales (93,9%) y albúmina (100%).

Conclusión: Se concluye que la alimentación vegetariana diversificada puede proporcionar beneficios a la salud del ser humano.

INTRODUCTION

It is not known exactly the circumstances surrounding the implementation of a vegetarian diet by human kind. Creationists interpret the historical-religious story of the biblical Pentateuch books, showing that a vegetarian diet started with the progenitors of the human race. Evolutionists, however, argue that it was the inclusion of animal protein in the prehistoric human diet (*Australopithecus afarensis*) that led to the development of the human brain. They also consider that the ancestors of modern humans were carnivores - hunter-gatherers. Today, vegetarianism is characterized as a diet or philosophy of life, which influences people worldwide.^(1, 2, 3)

It is considered a vegetarian person someone who does not consume meat but may include eggs and/or dairy products in the diet. In relation to the inclusion or exclusion of eggs and dairy products, vegetarians are grouped into: ovolactovegetarians (people who consume eggs and dairy products), ovovegetarians (people who consume eggs), lactovegetarians (people who consume dairy products). Strict vegetarians or vegans are people who do not eat any animal derived product⁽⁴⁾.

According to studies^(5, 6), a vegetarian lifestyle can improve the quality of life and it seems to be related to lower incidences of ischemic cardiopathies, obesity, type 2 diabetes, osteoporosis, cerebrovascular accident, Parkinson's disease, hipercolesterolemia and some types of cancer.

However, other studies indicate risks and health hazards when a vegetarian diet is unbalanced or too restrictive in foods derived from animals or even vegetables. The risks include the incidence of iron deficiency anaemia and megaloblastic anaemia, caused by iron and cobalamin (vitamin B12) deficiency, respectively^(7,3,5,8, 9).

This study aims to assess the anthropometric indices, blood pressure values and haematological analysis results of a vegetarian population from the city of Ji-Paraná, in the northern state of Rondônia, Brazil.

MATERIALS AND METHODS

This study is descriptive, cross-sectional and using quantitative approach, applied to a vegetarian population of Ji-Paraná, the second largest city in the state of Rondônia, with about 116,600 inhabitants, located in the Western Amazon, Brazil⁽¹⁰⁾. The participants were sought amongst the Adventists, since the Adventist community has about five thousand supporters distributed in thirty churches throughout the city.

Due to difficulties of access to this public, the use of a convenience sample along with the "snowball" strategy was applied. Only those individuals who did not consume any type of meat were selected and only those who attended the scheduled date for data collection were included in the study, resulting in a sample of 65 individuals.

Given the ethical rigor, the project was approved by *the Comitê de Ética em Pesquisa em Seres Humanos do Ceulji/Ulbra* (Ethics in Research in Human Beings Committee of Ceulji / Ulbra) under the protocol 040/11 and data collection was performed after the signature of a Term of Consent by the participants or their guardians, when under aged.

Data were collected between August and September 2011 in the Nursing Clinic of the institution where the research was conducted. A survey was applied as well as the collecting of 8 milliliters of blood by nurses from each participant. The volunteers were instructed to fast for 12 hours. Blood was stored in a dry test tube and a tube with EDTA (Ethylenediaminetetraacetic acid), both with 4 millilitres capacity each and were submitted for analysis to the Biochemistry Laboratory of the same institution.

The collection of anthropometric parameters was based on the standards and technical guidelines of *Vigilância Alimentar e Nutricional* (Food and Nutrition Surveillance)⁽¹¹⁾, by using a calibrated mechanical scale of the brand *Welmy*, manufactured in 2004.

Body Mass Index (BMI) was calculated through the formula $BMI = P \text{ (kg)} / \text{height (m)}^2$ and the values for adults were classified according to the World Health Organization⁽¹²⁾ standards. Also, the parameters proposed by the *Ministério da Saúde* (Brazilian Ministry of Health) was used for the BMI calculation in children and adolescents^(13,14,15).

Waist circumference (WC) was obtained by measuring the shortest curvature between the anterior-posterior iliac crest and the last thoracic rib, using an inelastic and flexible scale tape graduated to 0.1 centimeters. For adults, the cut-off points adopted were the ones established by Lean and contributors, according to the degree of risk for cardiovascular disease⁽¹⁶⁾. The American study⁽¹⁷⁾ was used as a parameter for children and adolescents.

Blood pressure (BP) was measured in accordance with the standards proposed by the Pan American Health Organization ⁽¹⁸⁾ and the parameters adopted for adults were the ones proposed by the *Sociedade Brasileira de Cardiologia* (Brazilian Society of Cardiology) ⁽¹⁹⁾. The cut-offs proposed by the *Sociedade Brasileira de Pediatria* (Brazilian Society of Pediatrics) ⁽²⁰⁾ were the parameters adopted for children and adolescents.

For haematological parameters, reliable sources were sought in order to establish the cut-off values according to age and sex, when applicable ^(21,22,23,24,25,26).

The softwares Epidata 3.1 and SPSS 16.0 were used for data tabulation and application of descriptive statistics.

RESULTS

Characterization of the vegetarians

Of the 65 volunteers who took part in the survey, 50.8% were male (38.8 ± 22.1 years) and 49.2% were female (38.9 ± 17.3 years). The average time since the adoption of vegetarianism for women and men were respectively 16.3 years and 14.5 years.

As for religion, 52.3% of the individuals were Seventh-day Adventists, 44.6% Adventist from the Reform Movement and the others (3.1%) belonged to other religious denominations.

As for the vegetarian sub-group to which they belonged, 75.4% were ovo-lacto-vegetarians 9.2% were vegan, 9.2% were ovo-vegetarians and 6.2% were lacto-vegetarians.

Regarding their lifestyle, it was found that 100% of the subjects were non-smokers, 96.9% did not consume alcohol, 73.8% performed physical activities, predominantly walking (46.1%) and 72.3% of this last group reported they exercise three or more times weekly. Moreover, the majority (86.3%) reported sleeping more than 8 hours per day.

Morbidity of vegetarians - Diabetes Mellitus and Hypertension

To survey the morbidity of vegetarians, blood pressure and serum glucose were checked and morbid history investigated based on the individuals' reports. Regarding blood pressure, the vast majority (92.3%) presented levels within the normal limits. None of the volunteers reported being diagnosed with diabetes which was confirmed by the testing of their serum glucose - 96.9% presented values below 100 mg / dL and only two subjects (3.1%) presented values between 100 and 125mg / dL - (101mg / dL and 102mg / dL, which indicates glucose tolerance).

Anthropometry of vegetarians

It was confirmed that 61.6% of the vegetarians were classified as eutrophic, 29.2% were overweight or excessively overweight and only two showed obesity grade I. The WC was adequate in most of the group (69.2%) and 46.8% of women were classified as having either an increased risk or a very increased risk of heart diseases.

Table I: Anthropometry and blood pressure of vegetarians. Ji-Paraná/RO/Brazil 2011

PARAMETRES	REFERENCES	GENDER				TOTAL
		F		M		
		N	%	N	%	
	MALNUTRITION I/LOW WEIGHT/VERY LOW BMI FOR AGE	1	3,1	3	9,0	6,2
BMI	EUTROPHY	19	59,4	21	63,7	61,6
	OVERWEIGHT/WEIGHT IN EXCESS	11	34,4	8	24,3	29,2
	OBESITY CLASS I	1	3,1	1	3,0	3,0
	TOTAL	32	100,0	33	100,0	100,0
	NORMAL/BELOW 10TH PERCENTILE	17	53,2	28	84,8	69,2
WC	INCREASED RISK*	14	43,8	4	12,2	27,8
	HIGH RISK*	1	3,0	1	3,0	3,0
	TOTAL	32	100,0	33	100,0	100,0
	OPTIMUM	18	56,4	17	51,5	53,7
	NORMAL	10	31,2	09	27,3	29,2
ASP	BORDERLINE/ NORMAL BLOOD PRESSURE	3	9,3	4	12,1	10,9
	HIGH HYPERTENSION					
	STAGE I/SIGNIFICANT HYPERTENSION	1	3,1	3	9,1	6,2
	TOTAL	32	100,0	33	100,0	100,0

ADP	OPTIMUM	18	56,3	19	57,6	56,9
	NORMAL	13	40,6	11	33,4	37,0
	BORDERLINE/HIGH NORMAL					
	PRESSURE	1	3,1	2	6,0	4,6
	HYPERTENSION					
	STAGE					
	I/SIGNIFICANT	-	-	1	3,0	1,5
	HYPERTENSION					
TOTAL	32	100,0	33	100,0	100,0	
*Cardiovascular risk.						

Haematological and biochemical profile of vegetarians

Red blood cell (RBC) count was performed to assess anaemia. The results showed that the red blood cells, haemoglobin and haematocrit were below the expected normal value - 18.5%, 26.2% and 23.1 %, respectively.

The investigation of the mean corpuscular volume (MCV) demonstrated that all the vegetarians had good ratio between haematocrit and red blood cells. The mean corpuscular haemoglobin (MCH) was within the normal levels in 98.4% of the sample. The concentration of mean corpuscular haemoglobin (MCHC) was normal in 96.8% of the group.

Table II: RBC indicators of vegetarians. Ji-Paraná / Rondônia / Brazil, 2011

INDICATORS	REFERENCES	GENDER				TOTAL
		FEMALE		MALE		
		N	%	N	%	
ERYTHROCYTE	<3,6x10 ¹² /L ^(C)					
	<3,9x10 ¹² /L ^(F)	1	3,1	11	33,3	18,5
	<4,5x10 ¹² /L ^(M)					
	3,6-5x10 ¹² /L ^(C)	29	90,7	22	66,7	78,5
	3,9-5,6x10 ¹² /L ^(F)					

HAEMOGLOBIN	4,5-6,5x10¹²/L^(M)					
	>5x10¹²/L^(C)					
	>5,6x10¹²/L^(F)	2	6,2	-	-	3,0
	>6,5x10¹²/L^(M)					
	TOTAL	32	100,0	33	100,0	100,0
	<11,5g/dL^(F)					
	<13,5g/dL^(M)	4	12,5	13	39,3	26,2
	<10,5 g/dL^(C)					
	10,5-15g/dL^(C)					
	11,5-15,5g/dL^(F)	23	71,9	20	60,7	66,2
HAEMATOCRIT	13,5-17,5g/dL^(M)					
	>15 g/dL^(C)					
	>15,5g/dL^(F)	5	15,6	-	-	7,6
	>17,5g/dL^(M)					
	TOTAL	32	100,0	33	100,0	100,0
	<31%^(C)					
	<36%^(F)	4	12,5	11	33,3	23,1
	<40%^(M)					
	31-48%^(C)					
	36-48%^(F)	23	71,9	22	66,7	69,3
40-52%^(M)						
>48%^(F ou C)	5	15,6	-	-	7,6	
>52%^(M)						
TOTAL	32	100,0	33	100,0	100,0	

MCV	74-92fL ^(C)	32	100,0	33	100,0	100,0
	80-95fL ^(FM)					
	TOTAL	32	100,0	33	100,0	100,0
MCH	<27pg ^(FM)	-	-	1	3,0	1,6
	24-31pg ^(C)	32	100,0	32	96,9	98,4
	27-34pg ^(FM)					
	TOTAL	32	100,0	33	100,0	100,0
MCHC	30-34% ^(C)	31	96,9	32	49,2	96,8
	20-35% ^(FM)					
	>35% ^(FM)	1	3,1	1	1,6	3,2
	TOTAL	32	100,0	33	100,0	100,0

(F) Parametres for females. (M) Parametres for males. (FM) Equal parametre for females and males.

(C) Parametres for children. Highlighted features are considered normal.

Lipid profile of the studied population showed that total cholesterol (67.6%) and LDL-cholesterol (69,2%) were within the normal range, and levels of HDL cholesterol (78.3 %) were high. In 81,4% of the group the triglycerides levels were normal.

Table III: Lipid profile of the vegetarian population. Ji-Paraná / Rondônia/ Brazil 2011

INDICATORS	REFERENCCESS	GENDER				T OTAL
		FEMALE		MALE		
		N	%	N	%	
TOTAL	NORMAL	19	59,5	25	75,9	67,6

CHOLESTEROL	BORDERLINE	6	18,7	2	6,0	12,4
	HIGH	7	21,8	6	18,1	20,0
	TOTAL	32	100,0	33	100,0	100,0
	NORMAL	22	68,8	23	69,8	69,2
	BORDERLINE	4	12,5	1	3,0	7,7
LDL CHOLESTEROL	HIGH	4	12,5	7	21,2	16,9
	VERY HIGH	2	6,2	2	6,0	6,2
	TOTAL	32	100,0	33	100,0	100,0
	LOW	6	18,8	8	24,2	21,7
HDL CHOLESTEROL	HIGH	26	81,2	25	75,8	78,3
	TOTAL	32	100,0	33	100,0	100,0
	NORMAL	28	87,6	25	75,8	81,4
TRIGLYCERIDES	BORDERLINE	2	6,2	4	12,1	9,3
	HIGH	2	6,2	4	12,1	9,3
	TOTAL	32	100,0	33	100,0	100,0

The investigation of the micronutrient calcium showed that 61.5% of the studied vegetarians had serum levels within normal parameters. Hypocalcaemia appeared in 23.1% and hypercalcaemia in 15.4% of the sample. Total proteins were within the normal parameters in 93.9% of the studied vegetarians and serum albumin was normal in 100%.

Table IV: Serum levels of calcium and protein for vegetarians. Ji-Paraná / Rondônia / Brazil, 2011

NUTRIENTS	REFERENCES	GENDER				TOTAL
		FEMALE		MALE		
		N	%	N	%	
CALCIUM	HYPOCALCAEMIA	7	21,8	8	24,2	23,1
	NORMAL	22	68,9	18	54,6	61,5
	HYPERCALCEMIA	3	9,3	7	21,2	15,4
	TOTAL	32	100,0	33	100,0	100,0
PROTEINS						
TOTAL PROTEIN (6- 8g/dL)	REDUCED LEVELS	2	6,2	1	3,0	4,6
	NORMAL	30	93,8	31	94	93,9
	INCREASED LEVELS	-	-	1		1,5
	TOTAL	32	100,0	33	100,0	100,0
ALBUMIN (3,3- 5,5g/dL)	NORMAL	32	100,0	33	100,0	100,0
	TOTAL	32	100,0	33	100,0	100,0

DISCUSSION

The present study showed limiting aspects in relation to the population selected, since it was a quite restricted group. Hence it was necessary to proceed with a convenience sampling combined with the snowball strategy.

The classification of the vegetarians according to their dietary pattern was another limiting aspect as the individuals who participated in the study expressed difficulty in defining their eating patterns, which demanded the intervention of the researchers and suggested the group had limited knowledge about nutrition.

This study also showed that the choice of vegetarianism is insufficient to achieve a qualitative change in eating patterns, since this option does not necessarily result in a healthy diet ⁽²⁷⁾. Although vegetarians restrict the consumption of meat and meat products, the propensity of these individuals to uncontrolled eating was not investigated.

The high number of Adventists in the sample is explained by the selection of the subjects predominantly from these churches. Adventists are known worldwide for disseminating concepts about healthy living in clinics, schools and hospitals and have commonly been subjects of research. This is due to their lifestyle being distinguished from the population in general which facilitates selecting vegetarian participants⁽¹⁾.

The vegetarian strands normally identified in scientific studies are ovo-lacto-vegetarians, vegans and ovo-vegetarians⁽²⁸⁾. Moreover, the study⁽²⁹⁾ found a higher frequency of ovo-lacto-vegetarian individuals, which is confirmed in this study that shows 75.4% of the vegetarians were ovo-lacto-vegetarians.

Some studies hypothesize the consumption of meat can raise blood pressure, since vegetarians have lower blood pressure levels and lower incidence of hypertension^(28,30,31). In the present study, there was a prevalence of less than 7.7% of hypertensive vegetarians, which is lower than the result of another study that identified the prevalence of 13.2% of hypertensive amongst 106 individuals⁽³²⁾. According to research studies, potassium is a nutrient that can provide vasodilatation; it is present in vegetables and fruits and has an important role in prevention or control of hypertension. Potassium is a widely consumed substance in vegetarian diets⁽³¹⁾. According to Parente⁽²⁸⁾, vegetarians usually have normal blood glucose levels and low incidence of type 2 diabetes mellitus due to a diet high in fibre, which has the potential to reduce the glycaemic index. This study reinforces this statement as it did not identify any diabetic among the vegetarians investigated.

In several studies, it was verified that the average BMI of vegetarians was within the normal range^(29,33,34). This fact is corroborated by the present study in which individuals were predominantly eutrophic.

Dourado⁽³³⁾ raised very similar data when compared to the findings of the present study as their research identified that among ovo-lacto-vegetarians, 62% were classified as eutrophics, 31% were overweight and 6.2% showed signs of malnutrition.

Since the ovo-lacto-vegetarians - who eat eggs and dairy products high in saturated fats and cholesterol - composed the predominant group for this study, it is suggested that these foods may be related to overweight and obesity among the vegetarians studied (32, 2%), along with the fact that this group consume larger amounts of energy (carbohydrates) than non-vegetarians⁽³³⁾. In other studies, vegans showed lower BMI when compared to other vegetarian and non-vegetarian groups^(34,35). The difference may be related to the small number of vegans in the sample.

Adequate WC in most vegetarians is a positive parameter considering that visceral fat is associated with the possibility of developing hyperinsulinism, cardiopathies and hypertension, regardless of the BMI values⁽¹⁸⁾.

Anaemia is a condition commonly associated with vegetarians, especially in lacto and ovo-lacto-vegetarians due to the bioavailability of inorganic iron present in plant foods and to its interaction with other micronutrients (especially calcium and zinc) and anti-nutrients^(8,9).

A study performed with ovo-lacto-vegetarians and non-vegetarians from an Adventist institution of Minas Gerais (Brazil), submitted to ovo-lacto vegetarian diet, showed a high prevalence of anaemia in this group (56 individuals) as 70% of the group showed

signs of the condition, which affected females predominantly⁽⁸⁾. In contradiction, this study showed a higher frequency of anaemia in males (haemoglobin and haematocrit were lower than expected, respectively, 39.3% and 33.3%), a fact that was not verified in other studies with vegetarians participants.

In this study, as MCV was not lower than the expected standard, as 100% of vegetarians presented normal haematological levels, it is suggested that a vegetarian organism suffers decline in the serum concentrations of haemoglobin without compromising the physiological functions. Therefore, it is being mistakenly classified as anaemic. However, the decline in the serum concentrations of haemoglobin can be explained as a response of the vegetarian organism to the increase of iron absorption and the decrease of its excretion⁽⁹⁾.

The amount and composition of fats in the diet can influence the lipid profile of individuals, although this hypothesis raises disagreement among researchers⁽³⁵⁾. For the *Conselho Federal de Nutrição* (Federal Nutrition Association)⁽³⁶⁾, saturated fat is essential for the functioning of the human organism if not over consumed. Moreover, the Association considers saturated fat from coconut oil, meat and dairy products dangerous to health.

For researchers in the field of nutrition, scientific evidence shows a weak association between the restrictions in egg consumption and the possible reduction of cardiovascular issues. Therefore, restricting such food in the diet is not necessary⁽³⁷⁾. Nevertheless, questions about consumption of eggs still divide opinions in the scientific community⁽³⁸⁾.

In the present study, it was verified that 78.3% of vegetarians had high HDL (High Density Lipoprotein). This suggests that HDL particles are actually taking the cholesterol attached to them to be degraded in the liver⁽³⁴⁾. This occurrence can lead to the prevalence of normal and borderline results in relation to the total cholesterol, LDL (Low Density Lipoprotein) and triglycerides, therefore resulting in a good lipid profile in vegetarians.

As 81.4% of vegetarians showed triglycerides within normal standards, it is remarkable to note that energy in excess is not being stored in these organisms (in the form of triglycerides), which might be a result of the anthropometric indicators and the low-saturated fat diet⁽³⁴⁾. In addition, triglycerides within the expected limits decrease the probability of cardiovascular events, since they are related to an independent risk for coronary heart disease when found in amounts greater than the acceptable limits⁽²⁵⁾. A study⁽³⁵⁾ shows there was a decrease in serum levels of total cholesterol and LDL as a result of dietary restriction in vegetarians.

Vegetarian diets can provide adequate intake of calcium by the human body. The lacto and ovo-lacto-vegetarians consume this nutrient in similar ways to the non-vegetarians. However, animal proteins promote urinary loss of calcium as they are rich in sulphur amino acids^(3,31). In this study, 61.4% of vegetarians showed normal levels of calcium in the blood plasma, which is expected from ovo-lacto-vegetarians. A European study which compared serum calcium and other nutrients between vegetarians and non-vegetarians found out both groups had similar levels of serum calcium, since vegetarians showed averages of $8.8 \times 10^3 / \text{mm}^3$ and non-vegetarian, $9,0 \times 10^3 / \text{mm}^3$. This study diverges from others because it was carried out with an elderly population which is more prone to nutritional deficiency (especially in

micronutrients such as calcium, iron and B12), although it was not verified for calcium variable, regardless of the food choice ⁽³⁹⁾.

Hypocalcaemia may be caused by malabsorption due to chelation by phytic acid, oxalates, phosphates and fibres (abundant components in the vegetarian diet) ^(1, 9). This condition was observed in 23.1% of the vegetarians in this study. Hypercalcaemia, however, may be related to inadequate calcium excretion, caused by adrenal glands failure and in kidney diseases. The excessive intake of this mineral and some medications may also increase plasma levels ⁽²⁵⁾, variables that were not verified in this study.

The present study indicates, through the analysis of the total protein and fractions, that vegetarian diet is able to supply the protein needs of an individual, ensuring the retention of nitrogen in the human body. Soya is a good source of protein for vegetarians and it is similar to the protein from meat. The ovo-vegetarians and ovo-lacto-vegetarians consume protein of high biological value present in egg white ⁽¹⁾. It is acknowledged that consuming a combination of various food groups (particularly legumes and oilseeds) is required in order to obtain an adequate daily protein intake ⁽⁴⁾.

Serum albumin was normal in all volunteers studied, which is an indicator of good nutrition practiced by vegetarians ⁽¹²⁾- a fact confirmed by the BMI of most vegetarians, classified as eutrophic. Regarding serum albumin, the study found similarities between vegetarians and non-vegetarians, who showed levels of 3.9 g / dl and 3.7 g / dL respectively, which are within normal standards considered by researchers ⁽³⁹⁾.

CONCLUSIONS

Through this study, it is possible to note that, even with the presence of overweight individuals, as well as individuals with enlarged waist circumference, high levels of cholesterol (total and LDL) and triglycerides in the sample, some beneficial results were found such as low blood glucose levels and blood pressure levels, findings not present in studies with non-vegetarians. In such individuals, as the first variables increases there is a rise of the peripheral insulin resistance as well as blood pressure levels.

Moreover, there was no evidence of significant nutritional deficiency in relation to macronutrients and micronutrients. However, it is necessary to emphasize the importance of health professionals to prescribe or indicate the use of potassium by vegetarians as a preventive measure, as well as the correct association between different foods in order to reduce the possibility of chelation. In addition, these professionals may guide this group in terms of planning a balanced diet based on the endorsements of a nutritionist whenever possible.

The study also suggests that a predominantly vegetarian diet, combined with a healthy lifestyle, can result in a greater standard of health, reflected in anthropometric and biochemical indicators. These are relevant findings for professionals and policy makers who should implement health programmes for groups at high risk for obesity, heart disease, dyslipidaemia, diabetes and hypertension, by focusing on disease prevention and health promotion and encouraging changing unhealthy lifestyles.

Performing further studies within the Brazilian vegetarian population is essential as it could contribute to challenge or validate the results presented in this study.

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