

 Adriana Paula Giacomelli
Stavro

 Aline de Piano Ganen¹

¹ Centro Universitário São Camilo
ROR, Departamento de Nutrição,
Programa de Pós-Graduação. São
Paulo, SP, Brasil.

Manuscript derived from the
dissertation entitled "Relationship
between vegetarian diet,
disordered eating, and body
image in adolescents from
Adventist schools," authored by
Adriana Paula Giacomelli Stavro
and supervised by Aline de Piano
Ganen, presented in December
2020 at the Centro Universitário
São Camilo. São Paulo-SP, Brazil.

Correspondence

Aline de Piano Ganen
Aline.depiano@gmail.com

Assistant Editor

 Ana Carolina Feldenheimer da
Silva

Relation between the vegetarian diet, disordered eating, and body image in adolescents

Relation between the vegetarian diet, disordered eating, and body image in adolescents

Abstract

Objective: To assess the relationship between a vegetarian diet, disordered eating, and body image in adolescents. **Methods:** A cross-sectional study was conducted in two private schools located in the city of São Paulo, with 204 adolescents aged between 15 years and 18 years and 11 months. Body image assessment in boys was conducted using the Male Body Dissatisfaction Scale (short version), while the Body Shape Questionnaire was used for girls. Disordered eating behavior was evaluated using the Eating Attitudes Scale for Adolescents (short version) in both sexes. Individuals who reported not adhering to a vegetarian diet comprised the control group. Statistical analysis was performed according to the behavior of the variables. **Results:** 92.2% of the studied population consisted of omnivores, with only 7.8% of the sample being vegetarian. In the analysis of the mean scores for body dissatisfaction and disordered eating, no difference was found between the types of diet, although disordered eating was significantly higher among girls. A moderate correlation was observed between disordered eating and body image dissatisfaction in the entire female population and among vegetarians; in boys, the correlation between these variables was weak and only present when considering the entire male population. **Conclusions:** The frequency of vegetarianism and disordered eating behaviors did not differ between vegetarians and omnivores. However, a relationship was observed between disordered eating and body image dissatisfaction in girls, particularly among vegetarians, highlighting the importance of further investigations in this population.

Keywords: Vegetarianism. Adolescents. Disordered eating behavior. Body imagedisorder. Eatingdisorder.

Resumo

Objetivo: Avaliar a relação entre dieta vegetariana, comer transtornado e imagem corporal em adolescentes. **Métodos:** Estudo transversal realizado em duas escolas privadas, localizadas no município de São Paulo, com 204 adolescentes, idade entre 15 anos e 18 anos e 11 meses. A avaliação da imagem corporal em meninos foi realizada pelo *Male Body Dissatisfaction Scale*

versão curta, enquanto que nas meninas utilizou-se o *Body Shape Questionnaire*. Avaliou-se o comportamento alimentar transtornado pela Escala de Atitudes Alimentares Transtornadas para Adolescentes versão curta em ambos os sexos. Os indivíduos que indicaram não aderir a uma dieta vegetariana compuseram o grupo controle. Realizou-se análise estatística de acordo com comportamento das variáveis. **Resultados:** 92,2% da população estudada foi composta por onívoros, sendo apenas 7,8% da amostra vegetariana. Na análise dos escores médios de insatisfação corporal e comer transtornado, não houve diferença entre os tipos de dieta, embora o comer transtornado tenha sido significativamente maior entre meninas. Observou-se correlação moderada entre o comer transtornado e a insatisfação com a imagem corporal em toda a população feminina e entre vegetarianas; já nos meninos, a correlação foi fraca entre essas variáveis e apenas presente quando considerada toda a população masculina. **Conclusões:** A frequência de vegetarianismo e de comportamentos do comer transtornado não diferiu entre vegetarianos e onívoros. Observou-se, no entanto, relação entre o comer transtornado e insatisfação com a imagem corporal em meninas, sobretudo entre as vegetarianas, reforçando a importância de mais investigações nesta população.

Palavras-chave: Vegetarianismo. Adolescentes. Comportamento alimentar transtornado. Transtorno da imagem corporal. Transtorno alimentar

INTRODUCTION

A vegetarian diet is defined as one that excludes meat. Depending on the inclusion or exclusion of animal-derived products, it receives a specific terminology: ovolactovegetarian (includes eggs, milk, and dairy products), ovovegetarian (includes eggs), lactovegetarian (includes milk and dairy products), strict vegetarian (does not include any animal products),^{1,2} or vegan (excludes any animal products for food, clothing, or any other purpose).³

Among the most cited reasons for choosing vegetarianism are: concern for the environment, animal welfare; religious beliefs; ethics; the pursuit of a healthy lifestyle; interest in gaining knowledge about this way of life; awareness of animal abuse; health benefits,^{4,5} and aversion to the taste of meat.^{6,7} However, some studies show that individuals adopt vegetarianism with the aim of losing weight or because they are concerned with aesthetics and body image (BI).^{8,9}

Lindeman et al.¹⁰ showed that vegetarianism can be used as a socially acceptable way to legitimize food avoidance and to avoid certain eating situations. A vegetarian lifestyle may simplify the daily life of individuals with eating disorders (ED), since the exclusion of certain foods would not be associated with restrictive eating behavior, but rather with dysfunctional eating linked to disordered eating (DE).

Disordered eating (DE) can be defined as "the entire spectrum of food-related problems, ranging from simple dieting to clinical eating disorders".¹¹ Such problems include purging practices; compulsions; food restrictions; exclusion of food groups; long periods of fasting; constant attempts at different diets for weight loss; feelings of guilt for eating; practices such as skipping meals, eating too little, eating for comfort even when not hungry, among other inappropriate methods for losing or controlling weight that occur less frequently or less severely than required by the diagnostic criteria for eating disorders (ED).¹²

Literature highlights numerous benefits associated with the practice of vegetarianism, such as reduced blood pressure; decreased blood lipids; reduced risk of developing metabolic syndrome and type 2 diabetes; benefits in preventing and reversing atherosclerosis, and in reducing cardiovascular disease risk factors.¹³⁻¹⁶ However, the choice of this practice during adolescence may be motivated by body dissatisfaction, as a form of weight control through dysfunctional eating behaviors, such as disordered eating (DE).

Due to the growing increase in vegetarianism in the Brazilian population, particularly among adolescents, and the scarcity of data for a better understanding of the relationship between vegetarianism, disordered eating, and body image (BI), this study aims to fill this gap by adding empirical and theoretical data to the scientific literature. Thus, the objective is to assess the relationship between a vegetarian diet, disordered eating, and body image in adolescents, with the aim of identifying possible dysfunctional eating behaviors or risk factors for the early development of eating disorders in this population, to inform preventive and treatment actions.

METHODS

This was a prospective, cross-sectional field study conducted in 2020 at two private schools belonging to the Adventist Network, located in the Metropolitan Region of São Paulo. The sample consisted of adolescents of both sexes, aged between 14 years and 19 years and 11 months, who were regularly enrolled in the selected schools and agreed to participate in the study. The exclusion criteria were: age <14 and >19 years, 11 months, and 29 days.

The procedures for conducting the research adhered to the guidelines established by the National Health Council, with approval granted by the Ethics Committee of São Camilo University Center (COEP) under CAAE: 25398819.5.0000.0062 and Opinion: 3.924.867.

All students who presented a duly signed Free and Informed Consent Form (FICF) and/or a Free and Informed Assent Form (FI AF) were selected, comprising a sample of 204 adolescents of both sexes. Age, weight, and height were obtained through self-report in the student classification questionnaire, and nutritional status was assessed by calculating the body mass index ($BMI = \text{weight}/\text{height}^2$). To characterize nutritional status (NS), the z-score was used, classified through the AnthroPlus software into severe thinness, thinness, normal weight, overweight, obesity, and severe obesity, according to the criteria of the World Health Organization (WHO).¹⁷

The assessment of BI dissatisfaction in boys was conducted using the short version of the Male Body Dissatisfaction Scale (MBDS), which was validated and translated into Portuguese (Brazil). The Brazilian version of the MBDS contains 12 items rated on a 5-point scale, ranging from 1 (always / strongly agree) to 5 (never / strongly disagree). To control for false responses, the original authors formulated reversed items (reduced MBDS = items 4, 6, 9, 12, and 16). In addition to the 5-point Likert scale assessment, participants rated the importance of each item according to their individual perception on a scale from 1 to 10, where 1 = no importance and 10 = great importance. To calculate the total score, the value of each item (importance level) was divided by 10 and then multiplied by the response score given to the same item on the Likert scale (1 to 5). For example, if the response given to item 1 was Likert option = 5 (strongly disagree) and a score of 10 was assigned to the item's content (importance level), the weighted result would be: $10/10 \times 5 = 5$. Subsequently, a weighted value was obtained for each item of the MBDS, where, to calculate the score for each factor, a simple arithmetic mean was used, as described below:

- Muscle Dissatisfaction Factor (MD) = weighted value (WV) of item 4 + WV of item 6 + WV of item 9 + WV of item 12 + WV of item 16 / 5;

- General Body Appearance Dissatisfaction Factor (GBAD) = WV of item 1 + WV of item 2 + WV of item 8 + WV of item 15 + WV of item 19 + WV of item 21 + WV of item 23 / 7.

The scores for each factor range from 0.1 to 5.0 points. Based on the obtained scores, individuals were classified into four categories:¹⁸

0.1 – 1.3 = very low - MD / GBAD

1.3 – 2.6 = low - MD / GBAD

2.6 – 3.8 = moderate - MD / GBAD

3.8 – 5.0 = high - MD / GBAD

The assessment of BI dissatisfaction in girls and concerns about body shape were evaluated using the Body Shape Questionnaire (BSQ). The short version, validated for Brazilian youth, was adopted and consists of 8 items (items 5, 11, 15, 20, 21, 22, 25, and 28), answered on a 6-point Likert scale (1 – never to 6 – always), ranging from 8 to 48 points. The higher the score, the greater the body dissatisfaction¹⁹.

To assess disordered eating behavior, the short version of the Disordered Eating Attitude Scale (DEAS) was used. The DEAS, developed for young Brazilian women and later validated for use with adolescents in Brazil, shows adequate internal consistency and reliability. It consists of 17 questions, scored on a Likert-type scale, with scores ranging from 17 to 80. The higher the score, the more dysfunctional the attitude.²⁰

For the assessment of vegetarian practice, participants answered questions regarding adherence to vegetarianism. Individuals who indicated they had not adhered to a vegetarian diet comprised the control group, matched by the same age range.

Statistical Analysis

The analyses were performed using the Statistical Package for the Social Sciences (SPSS) software version 20.0, with a significance level set at $p < 0.05$. The data distribution was verified using the Kolmogorov-Smirnov test. Descriptive analyses were detailed using absolute numbers and proportions for categorical data. Quantitative data were presented as mean, standard deviation, median, and mode.

For the comparison between the means of the BSQ and MBDS (parametric data), the Student's t-test for independent samples and one-way ANOVA followed by Bonferroni post-hoc analysis were used. For the DEAS (non-parametric data), the Mann-Whitney and Kruskal-Wallis tests were employed. The comparison between categorical data was performed using the chi-square test. The correlation between BSQ, MBDS, BMI, and DEAS was evaluated using Pearson's correlation test.

RESULTS

The study included 204 adolescents of both sexes, with 134 females (65.69%) and 70 males (34.31%), 188 omnivores (92.16%), and 147 in a state of normal weight (72.06%). The average age was 15 years ($SD = 1.12$). Among the vegetarian population, 13 were female (81.25%), and more than half were in normal weight status.

It was found that the average anthropometric values (weight, height, and BMI) from the questionnaires on body image (BSQ and MBDS) and disordered eating (DEAS) did not differ between omnivores and vegetarians (Table 1).

Table 1. Mean values of weight, height, BSQ, DEAS, and MBDS in adolescents according to diet type. São Paulo-SP, 2020.

Variables	Population Mean	Total SD	Omnivores Mean	DP	Vegetarians Média	DP
Weight	57.7	13.6	56.0	14.1	57.8	13.6
Height	164.8	9.2	162.9	8.6	164.9	9.3
BMI	21.1	4.1	20.8	3.8	21.1	4.1
BSQ	22.6	9.8	22.0	10.8	22.6	9.7
MBDS (musculature)	1.7	1.1				
MBDS (general body appearance)	1.4	0.6	1.3	0.8	1.4	0.6
DEAS	30.3	10.7	1.5	0.9	1.7	1.1

Note: BMI – Body Mass Index; BSQ – Body Shape Questionnaire; MBDS – Male Body Dissatisfaction Scale; DEAS – Disordered Eating Attitudes Scale.

The analysis of the mean BSQ scores in female adolescents showed that it was higher in the age group of 14 to 16 years and in individuals classified as underweight, but without statistical significance (Table 2).

Table 2. Mean scores of the Body Shape Questionnaire (BSQ) according to age group, vegetarianism, and nutritional status in female adolescents. São Paulo-SP, 2020.

	BSQ		
Variables	Mean	IC	p-value
Age group (years)			
14-16	23.3	21.3-25.4	0.1779 ^a
17-20	20.5	17.7-23.4	
Vegetarian			
Yes	22.1	16.1-28.0	0.7749 ^a
No	22.6	20.6-24.4	
Nutritional status			
Normal weight	23.6	21.3-25.8	0.1956 ^b
Underweight	26	20.3-31.7	
Overweight	20.8	17.4-24.2	
Obesity	19.1	14.3-24.0	

Note: BSQ – Body Shape Questionnaire; ^aMann-Whitney test $p < 0.05$ significant difference between groups. Mean and 95% confidence interval (CI). ^bANOVA test $p < 0.05$ significant difference between groups.

Regarding the mean DEAS score in adolescents, it was observed that it was higher in females and in individuals with underweight, but with a significant difference only for the variable "sex" ($p = 0.0151$) (Table 3).

Table 3. Mean DEAS scores according to sex, age group, vegetarianism, and nutritional status. São Paulo-SP, 2020.

	DEAS		
Variables	Mean	IC	p-value ¹
Sex			
Male	27.8	25.8-29.9	0.0151 ¹
Female	31.5	29.6-33.5	
Age group (years)			
14-16	30.4	28.7-32.1	0.9119
17-20	29.8	27.0-32.6	
Vegetarian			
Yes	31.9	26.6-37.2	0.3563
No	30.1	28.6-31.7	
Nutritional status			
Normal weight	29.8	28.0-31.6	0.4694
Underweight	34.1	27.7-40.5	
Overweight	31.9	28.7-35.0	
Obesity	28.4	22.4-34.4	

Note: DEAS – Disordered Eating Attitudes Scale; ^aMann-Whitney test $p < 0.05$ significant difference between groups. Mean and 95% confidence interval (CI). ^bANOVA test $p < 0.05$ significant difference between groups.

When assessing BI dissatisfaction in males regarding general body appearance (GBA), although no significant difference was found, a higher MBDS score was identified in individuals aged between 17 and 20 years, omnivores, and those with normal weight. As for musculature, although not significant, higher scores were noted among adolescents with nutritional deviations, such as underweight and obesity (Table 4).

Table 4. Mean MBDS scores for GBA and musculature according to age group, vegetarianism, and nutritional status in male adolescents. São Paulo-SP, 2020.

Variables	MBDS (general body appearance)		
	Mean	IC	p-value ¹
Age group (years)			
14-16	1.35	1.2-1.5	0.341
17-20	1.59	1.2-2.0	
Vegetarian			
Yes	1.3	0.4-2.2	0.524
No	1.4	1.3-1.6	
Nutritional status			
Normal weight	1.5	1.3-1.6	0.735
Underweight	1.2	0.7-1.7	
Overweight	1.3	0.9-1.7	
Obesity	1.3	1.0-1.6	
	MBDS (musculature)		
	Mean	IC	p-value ¹
Age group (years)			
14-16	1.69	1.40-1.97	0.774
17-20	1.71	0.97-2.45	
Vegetarian			
Yes	1.5	0.5-2.5	0.794
No	1.7	1.4-2.0	
Nutritional status			
Normal weight	1.9	1.5-2.2	0.221
Underweight	0.9	0.03-1.9	
Overweight	1.3	0.7-1.9	
Obesity	1.8	0.9-2.6	

Note: MBDS – Male Body Dissatisfaction Scale; ^aMann-Whitney test $p < 0.05$ significant difference between groups. Mean and 95% confidence interval (CI). ^bANOVA test $p < 0.05$ significant difference between groups.

A moderate and significant correlation was found between BSQ and DEAS in the total female population ($r = 0.7607$; $p = 0.0000$). in omnivores ($r = 0.6962$; $p = 0.0082$). and in vegetarians ($r = 0.7688$; $p = 0.0000$). demonstrating a relationship between body image and disordered eating. In male individuals. the correlation between body image (general appearance and muscle) and disordered eating was weak and occurred only in the total population and vegetarians. Lastly. a positive correlation was observed between BMI and DEAS (Table 5).

Table 5. Correlation analysis between body image, BMI, and disordered eating in adolescents, São Paulo-SP, 2020.

Correlations	R	P
BSQ and DEAS (girls)	0.8	0.000
BSQ and DEAS (omnivorous girls)	0.7	0.008
BSQ and DEAS (vegetarian girls)	0.8	0.000
MBDS general body appearance and DEAS (boys)	0.3	0.004
MBDS musculature and DEAS (boys)	0.4	0.003
MBDS general body appearance and DEAS (omnivorous boys)	0.9	0.124
MBDS musculature and DEAS (omnivorous boys)	0.9	0.290
MBDS general body appearance and DEAS (vegetarian boys)	0.3	0.008
MBDS musculature and DEAS (vegetarian boys)	0.3	0.005
BMI and DEAS	0.4	0.000

Nota: IMC – Índice de massa corporal; BSQ –*Body Shape Questionnaire*; MBDS – *Male Body Dissatisfaction Scale*; EAAT – Escala de Atitudes Alimentares Transtornadas.

DISCUSSION

The main finding of the study concerns the relationship between body image dissatisfaction and disordered eating in vegetarian adolescent girls. Although body dissatisfaction and disordered eating scores did not differ by diet type, a higher correlation between disordered eating and body image dissatisfaction was observed in vegetarian girls. This highlights the importance of assessing the association between these two variables in vegetarian adolescents.

It is noteworthy that adolescents commonly experience changes in body image perception and satisfaction. The literature highlights the relationship between inaccurate body image perception and dissatisfaction, as well as diet quality.^{21,22} According to a study by Madalosso et al.,²² which evaluated 71,740 adolescents aged 12 to 17 years participating in the ERICA study (Study of Cardiovascular Risks in Adolescents), 30.3% perceived themselves as overweight, and these individuals had lower diet quality, indicating that body perception seems to influence diet quality.

Previous research on vegetarianism and its relationship with disordered eating (DE) has been inconclusive.^{23,24} In our study, despite finding a positive correlation between body image dissatisfaction and DE in both omnivores and vegetarians, it is emphasized that this correlation was stronger in the latter group.

A similar result was reported by Baş et al.²⁵ in a study that assessed vegetarianism and eating disorders (ED) in 608 women and 597 men, Turkish adolescents aged 17 to 21 years from public and private universities, with 70.7% from public institutions. This differs from our sample, in which all participants were private school students with a lower average age. The authors concluded that vegetarians were more likely to exhibit disordered eating attitudes and behaviors. The same was observed by Barthels et al.⁹, who assessed whether vegetarianism could be a risk marker for ED. The study included 143 women under the age of 19, 30 of whom were vegetarians, and these exhibited an increased risk of weight concern and disordered eating. Fatima & Ahmad²⁶ evaluated 314 adolescents aged 15 to 19 from the city of Arar, Saudi Arabia. The results indicated that, among the 21 vegetarians, 13 (61.9%) exhibited abnormal eating behavior, a significantly higher percentage compared to omnivores (23.2%).

Among male individuals, a positive correlation between body image dissatisfaction and disordered eating was also observed, though it was weak. This supports findings in the literature, which indicate that girls are considered a high-risk group for disordered eating behaviors.^{27,28}

Disordered eating (DE) in adolescents is associated with a range of adverse behaviors and negative psychological experiences.²⁹ These behaviors are variable, and little is known about the factors that sustain these disorders.³⁰ Disturbed attitudes towards weight and body image (BI) appear to be important variables that reflect risks for the development and maintenance of inappropriate eating behaviors among young people.^{21,31} confirming our findings. In addition to the moderate positive correlation between BI dissatisfaction and DE among girls, our results also indicate higher scores on the disordered eating attitudes scale in this population.

Although body image dissatisfaction is present in both sexes and is considered a risk factor associated with the development of disordered eating (DE), it is noted that the practice of disordered eating behaviors is more prevalent among females. These behaviors include fasting, eating very little, drinking shakes, using pills and medications for weight loss, abusing laxatives, skipping meals, smoking more cigarettes, inducing vomiting after meals, and adopting restrictive diets.³²⁻³⁴

In a study conducted with 2,123 adolescents aged 10 to 19 years, of both sexes, from public and private schools in the city of Viçosa-MG, Cecon et al.²¹ found a prevalence of eating disorders (ED) of 11.4%, with body dissatisfaction increasing the risk of ED by thirteen times. The results of the research by Fortes et al.³⁵ showed that girls dissatisfied with their own bodies were 19.44 times more likely to develop inappropriate eating behaviors. Supporting these findings, Jalali-Farahanian et al.³⁶ in a study using the Eating Attitudes Test-26 (EAT-26) and the Pediatric Quality of Life Inventory (PedsQL™ 4.0) to assess ED, found a higher prevalence in girls (26.4%) compared to boys (11.8%).

It is worth noting that body image dissatisfaction, particularly with musculature, is quite prevalent among men and well-documented in the literature. In a national study that assessed body image dissatisfaction in adolescents from the municipality of Januária-MG, a higher prevalence was found among males (63.5%) compared to females (51.7%; $p < 0.05$).³⁷

Although the psychopathology of EDs often centers around the overvaluation of thinness, early studies on body image dissatisfaction in men revealed that many desire a more muscular physique.³⁸⁻⁴² The pursuit of the ideal male body focuses on a dual aim: increasing muscle mass while maintaining low body fat.^{43,44} This distinct male ideal has consequences for behavior and attitudes related to ED. Men may be motivated to follow strict diets, engage in intense exercise routines, and even resort to drug use (such as anabolic steroids) to enhance appearance or performance. Another common behavior among boys, specifically related to concerns about muscularity, is a phenomenon known as the "cheat meal." This term refers to the consumption of a large number of calories as a periodic deviation from a diet typically focused on muscle development, often involving foods that are usually prohibited or restricted.⁴⁵ It is believed that the influx of calories from such infrequent meals boosts metabolic processes in the ongoing drive for muscular thinness.⁴⁰

Additionally, excessive protein consumption is typical and frequent, often following somewhat arbitrary guidelines regarding the quantity, timing, and type of protein consumed (most commonly, chicken).⁴⁶

A specific behavioral pattern within eating disorders related to muscularity involves what is referred to as "bulking," which describes a cycle between gaining muscle mass and achieving muscular leanness, characterized by broad shoulders, a narrow waist, and large biceps.⁴⁷

In the analysis of BI and DE according to nutritional status and diet type, no significant differences were found between the groups in our study, differing from results reported in the literature, where vegetarian girls showed significantly higher scores on the EAT-26.²⁶

National and international studies reveal a high incidence of eating disorders (ED) in adolescents,^{26,28,48} and disturbances in body image (BI) have increasingly been recognized as a public health concern, being associated with lower quality of life,^{45,49} higher risk of eating disorders, depression, and inappropriate weight control behaviors.⁵⁰⁻⁵³ Thus, analyzing the relationship between these constructs according to diet type becomes relevant for identifying risk factors associated with the development of eating disorders.

Although our study had limiting factors, such as a convenience sample and a small sample size, especially among males, which is similar to other studies in the literature,²⁵ it was possible to identify the relationship between body image dissatisfaction and disordered eating (DE) in vegetarian adolescents. Due to the sample size, it was not possible to stratify the vegetarian group according to the reasons for choosing vegetarianism (awareness of animal abuse, environmental concerns, planetary well-being, ethics, feelings of repulsion/disgust) or by diet subtype (strict vegetarianism or others). This highlights the need for future research—such as longitudinal studies—that includes these variables to better understand the practice of vegetarianism and its relationship with body image and DE in adolescents, as well as to comprehend the trajectory of eating disorder development.

The results of this study, in line with previous research, revealed an association between body image dissatisfaction and DE in vegetarian adolescents, although conflicting gaps still exist in the literature. Thus, this study emphasizes the importance of monitoring body image and possible dysfunctional eating behaviors in vegetarian adolescents to identify risk factors, as well as to promote assertive guidance, preventing the early onset of signs and symptoms of eating disorders.

CONCLUSION

The frequency of disordered eating behaviors did not differ between vegetarians and omnivores; however, a relationship between disordered eating and body image dissatisfaction was observed in girls, particularly among vegetarians, highlighting the importance of further investigations in this population.

In summary, these findings have relevant societal implications, as they emphasize the importance of preventive and intervention approaches, as well as the development of public policies and clinical practices to promote a healthy relationship with food and body image, particularly among young vegetarian girls, who may be more vulnerable to these disorders.

In the literature, the results contribute to the growing body of research on dysfunctional eating and eating disorders, highlighting the need to consider psychological and social factors, in addition to dietary choices, for a better understanding of these complex phenomena.

REFERENCES

1. Sociedade Vegetariana Brasileira. Pesquisa IBOPE Inteligência de abril de 2018 [acesso em 01 abr 2020]. Disponível em: https://www.svb.org.br/images/Documentos/JOB_0416_VEGETARIANISMO.pdf
2. Campos FAAC, Cheavegatti D. Conocimiento de vegetarianos en relación a la dieta sana. *Rev UrugEnferm*. 2017 [Citado 2020 maio 15];12(2):44-54. Available from: <https://scholar.google.com.br/scholar?oi=bibs&cluster=7168262193419459807&btnI=1&hl=pt-BR>

3. Vegan Society. Definition of veganism. 2020 [cited 2020 out. 7]. Available from: <https://www.vegansociety.com/go-vegan/definition-veganism>
4. Mathieu S. Dorard G. Végétarisme, végétalisme, véganisme: aspects motivationnels et psychologiques associés à l'alimentation sélective. *La Presse Medicale*. 2016 [citado 2020 abr. 5];45(9):726-733. <https://doi.org/10.1016/j.lpm.2016.06.031>
5. Müller P. Vegan Diet in Young Children. In: Michaelsen KF. Neufeld LM. Prentice AM (eds.): *Global Landscape of Nutrition Challenges in Infants and Children*. Nestlé NutrInst Workshop Ser. 2020;93:103-110. <https://doi.org/10.1159/000503348>
6. de Boer J. Schösler H. Aiking H. Towards a reduced meat diet: Mindset and motivation of young vegetarians. low, medium and high meat-eaters. *Appetite*. 2017;113:387-397. <http://doi.org/10.1016/j.appet.2017.03.007>
7. Rosenfeld DL. A comparison of dietarian identity profiles between vegetarians and vegans. *FoodQual Prefer*. 2019;72:40-44. <http://doi.org/10.1016/j.foodqual.2018.09.008>
8. Costa I. Gill PR. Morda R. Ali L. "More than a diet": A qualitative investigation of young vegan Women's relationship to food. *Appetite*. 2019;143:104418. <http://doi.org/10.1016/j.appet.2019.104418>
9. Barthels F. Meyer F. Pietrowsky R. Orthorexic and restrained eating behaviour in vegans, vegetarians, and individuals on a diet. *Eat Weight Disord*. 2018;23(2):159-166. <http://doi.org/10.1007/s40519-018-0479-0>
10. Lindeman M. Stark K. Latvala K. Vegetarianism and Eating-Disordered Thinking. *EatDisord*. 2000;8(2):157-165. <http://doi.org/10.1080/10640260008251222>
11. Leal GVS. Philippi ST. Polacow VO. Cordás TA. Alvarenga MS. O que é comportamento de risco para transtornos alimentares em adolescentes? *J Bras Psiquiatr*. 2013;62(1):62-75. <https://doi.org/10.1590/S0047-20852013000100009>
12. Alvarenga MS. Lourenço BH. Philippi ST. Scagliusi FB. Disordered eating among Brazilian female college students. *Cad Saúde Pública*. 2013;29(5):879-888. <https://doi.org/10.1590/S0102-311X2013000500006>
13. Benatar JR. Stewart RAH. Cardiometabolic risk factors in vegans: A meta-analysis of observational studies. *PLoSOne*. 2018;13(12):e0209086. <http://doi.org/10.1371/journal.pone.0209086>
14. Rocha JP. Laster J. Parag B. Shah NU. Multiple Health Benefits and Minimal Risks Associated with Vegetarian Diets. *CurrNutr Rep*. 2019 [citado 2020 maio 11];8(4):374-381. <http://doi.org/10.1007/s13668-019-00298-w>
15. Kahleova H. Levin S. Barnard ND. Vegetarian Dietary Patterns and Cardiovascular Disease. *ProgCardiovascDis*. 2018;61(1):54-61. <http://doi.org/10.1016/j.pcad.2018.05.002>
16. Satija A. Hu FB. Plant-based diets and cardiovascular health. *TrendsCardiovasc Med*. 2018 [citado 2020 maio 11];28(7):437-441. <http://doi.org/10.1016/j.tcm.2018.02.004>
17. Onis M. Onyango AW. Borghi E. Siyam A. Nishida C. Siekmann J. Development of a WHO growth reference for school-aged children and adolescents. *Bull WHO*. 2007;85(9):660-667. <http://doi.org/10.2471/blt.07.043497>
18. Silva WR. Marôco J. Ochner CN. Duarte Bonini Campos JA. Male body dissatisfaction scale (MBDS): proposal for a reduced model. *Eat Weight Disord*. 2017;22:515-525. <http://doi.org/10.1007/s40519-017-0420-y>
19. Silva WR. Costa D. Pimenta F. Maroco J. Campos JADB. Psychometric evaluation of a unified Portuguese-language version of the Body Shape Questionnaire in female university students. *Cad Saúde Pública*. 2016;32(7):e00133715. <http://doi.org/10.1590/0102-311x00133715>
20. Alvarenga MS. Santos TSS. Andrade D. Item Response Theory-based validation of a short form of the Disordered Eating Attitude Scale (DEAS-s) to a Brazilian sample. *Cad Saúde Pública*. 2020;36(2):e00169919. <http://doi.org/10.1590/0102-311X00169919>
21. Cecon RS. Franceschini SDCC. Peluzio MDCG. Hermsdorff HHM. Priore SE. Overweight and Body Image Perception in Adolescents with Triage of Eating Disorders. *Scientific World Journal*. 2017;8257329. <http://doi.org/10.1155/2017/8257329>

22. Madalosso MM. Schaana B. Vogt Cureaua F. Associação da percepção do peso corporal com a qualidade da dieta de adolescentes brasileiros. *Rev. paul. pediatri.* 2020;38:e2020057. <https://doi.org/10.1590/1984-0462/2020/38/2020057>.
23. Barrack MT. West J. Christopher M. Pham-Vera AM. Disordered Eating Among a Diverse Sample of First-Year College Students. *J Am Coll Nutr.* 2019;38(2):141-148. <http://doi.org/10.1080/07315724.2018.1487345>
24. Heiss S. Coffino JA. Hormes JM. Eating and health behaviors in vegans compared to omnivores: Dispelling common myths. *Appetite.* 2017 [citado 2020;118:129-135.<http://doi.org/10.1016/j.appet.2017.08.001>
25. Baş M. Karabudak E. Kiziltan G. Vegetarianism and eating disorders: association between eating attitudes and other psychological factors among Turkish adolescents. *Appetite.* 2005;44(3):309-315. <http://doi.org/10.1016/j.appet.2005.02.002>.
26. Fatima W. Ahmad LM. Prevalence of disordered eating attitudes among adolescent girls in Arar City. Kingdom of Saudi Arabia. *Health Psychol Res.* 2018;6(1):31-35. <http://doi.org/10.4081/hpr.2018.7444>
27. Jankauskiene R. Baceviciene M. Trinkuniene L. Examining Body Appreciation and Disordered Eating in Adolescents of Different Sports Practice: Cross-Sectional Study. *Int J Environ Res Public Health.* 2020;(11):4044. <http://doi.org/10.3390/ijerph17114044>
28. Al-Kloub MI. Al-Khawaldeh OA. ALBashtawy M. Batiha AM. Al-Haliq M. Disordered eating in Jordanian adolescents. *Int J Nurs Pract.* 2019;25:e12694. <http://doi.org/10.1111/ijn.12694>
29. Mairs R. Nicholls D. Assessment and treatment of eating disorders in children and adolescents. *ArchDisChild.* 2016;101(12):1168-1175. <http://doi.org/10.1136/archdischild-2015-309481>
30. Batista M. Žigić Antić L. Žaja O. Jakovina T. Begovac I. Predictors of eating disorder risk in anorexia nervosa adolescents. *Acta Clin Croat.* 2018;57(3):399-410. <http://doi.org/10.20471/acc.2018.57.03.01>.
31. Treasure J. Duarte TA. Schmidt U. Eating disorders. *Lancet.* 2020;395:899-911. [https://doi.org/10.1016/S0140-6736\(20\)30059-3](https://doi.org/10.1016/S0140-6736(20)30059-3)
32. Verschueren M. Claes L. Palmeroni N. Bogaerts A. Gandhi A. Moons P. et al. Eating Disorder Symptomatology in Adolescent Boys and Girls: Identifying Distinct Developmental Trajectory Classes. *J Youth Adolesc.* 2020;49(2):410-426. <http://doi.org/10.1007/s10964-019-01174-0>.
33. Leal Greisse VS. Philippi ST. Alvarenga MS. Unhealthy weight control behaviors, disordered eating, and body image dissatisfaction in adolescents from São Paulo, Brazil. *Braz J Psychiatry.* 2020;42(3):264-270. <http://doi.org/10.1590/1516-4446-2019-0437>
34. Lee Y. Lee KS. Relationship between unhealthy weight control behaviors and substance use patterns among Korean adolescents: results from the 2017 national youth risk behavior survey. *Public Health.* 2019;174:56-64. <http://doi.org/10.1016/j.puhe.2019.06.005>
35. Fortes LS. Morgado FFR. Ferreira MEC. Fatores associados ao comportamento alimentar inadequado em adolescentes escolares. *Arch Clin Psychiatry.* 2013;40(2):59-64. <http://doi.org/10.1590/s0101-60832013000200002>.
36. Jalali-Farahani S. Chin YS. Mohd Nasir MT. Amiri P. JALALI-FARAHANI. Saraet al. Disordered Eating and its Association with Overweight and Health-Related Quality of Life Among Adolescents in Selected High Schools of Tehran. *Child Psychiatry Hum Dev.* 2015;46(3):485-492. <http://doi.org/10.1007/s10578-014-0489-8>.
37. Fidelix YL. Silva DAS. Pelegrini A. Silva AF. Petroski EL. Insatisfação com a imagem corporal em adolescentes de uma cidade de pequeno porte: associação com sexo, idade e zona de domicílio. *Rev Bras Cineantropom Desempenho Hum.* 2011;13(3):202-207. <http://doi.org/10.5007/1980-0037.2011v13n3p202>
38. Calzo JP. Masyn KE. Corliss HL. Scherer EA. Field AE. Austin SB. Patterns of body image concerns and disordered weight- and shape-related behaviors in heterosexual and sexual minority adolescent males. *Dev Psychol.* 2015;51(9):1216-25. <http://doi.org/10.1037/dev0000027>
39. Dion J. Hains J. Vachon P. Plouffe J. Laberge L. Perron M. McDuff P. Kalinova E. Leone M. Correlates of Body Dissatisfaction in Children. *J Pediatr.* 2016;171:202-7. <http://doi.org/10.1016/j.jpeds.2015.12.045>

40. Murray SB, Griffiths S, Mond JM. Evolving eating disorder psychopathology: conceptualising muscularity-oriented disordered eating. *Br J Psychiatry*. 2016;208(5):414-5. <http://doi.org/10.1192/bjp.bp.115.168427>
41. Pila E, Mond JM, Griffiths S, Mitchison D, Murray SB. A thematic content analysis of #cheatmeal images on social media: Characterizing an emerging dietary trend. *Int J Eat Disord*. 2017;50(6):698-706. <http://doi.org/10.1002/eat.22671>
42. Kneube D, Teixeira PC, Carvalho PHB, Alvarenga MS, Ganen AP. Body checking, drive for muscularity, and commitment to exercise in Brazilian Air Force entrants. *Rev Bras PsicolEsporte*. 2020 [cited 2020 Nov 16];10(2):165-183. Available from: <https://portalrevistas.ucb.br/index.php/RBPE/article/download/11341/7021>
43. Klimek P, Murray SB, Brown T, Gonzales IVM, Blashill AJ. Thinness and muscularity internalization: Associations with disordered eating and muscle dysmorphia in men. *Int J Eat Disord*. 2018;51(4):352-357. <http://doi.org/10.1002/eat.22844>
44. Frayon S, Cavaloc Y, Wattelez G, Cherrier S, Touitou A, Zongo P, et al. Body image, body dissatisfaction and weight status of Pacific adolescents from different ethnic communities: a cross-sectional study in New Caledonia. *Ethn Health*. 2020;25(2):289-304. <http://doi.org/10.1080/13557858.2017.1398818>
45. Lavender JM, Brown TA, Murray SB. Men, Muscles, and Eating Disorders: an Overview of Traditional and Muscularity-Oriented Disordered Eating. *CurrPsychiatry Rep*. 2017;19(6):32-38. <http://doi.org/10.1007/s11920-017-0787-5>
46. Baker JH, Higgins Neyland MK, Thornton LM, Runfola CD, Larsson H, Lichtenstein P, Bulik C. Body dissatisfaction in adolescent boys. *DevPsychol*. 2019;55(7):1566-1578. <http://doi.org/10.1037/dev0000724>
47. Choi E, Choi I. The associations between body dissatisfaction, body figure, self-esteem, and depressed mood in adolescents in the United States and Korea: A moderated mediation analysis. *J Adolesc*. 2016;53:249-259. <http://doi.org/10.1016/j.adolescence.2016.10.007>
48. Liu, W., Lin, R., Guo, C. et al. Prevalence of body dissatisfaction and its effects on health-related quality of life among primary school students in Guangzhou, China. *BMC Public Health*. 2019;19(213):1-8. <https://doi.org/10.1186/s12889-019-6519-5>
49. Batista M, ŽigićAntić L, Žaja O, Jakovina T, Begovac I. Predictors of eating disorder risk in anorexia nervosa adolescents. *Acta ClinCroat (Tisak)*. 2018;57(3):399-410. <http://doi.org/10.20471/acc.2018.57.03.01>
50. Triches RM, Giugliani ERJ. Insatisfação corporal em escolares de dois municípios da região Sul do Brasil. *Rev Nutr*. 2007;20(2):119-128. <http://doi.org/10.1590/s1415-52732007000200001>
51. Gomes JP, Legnani E, Legnani RFS, Gregório NP, Souza RK. Associação entre comportamento alimentar, consumo de cigarro, drogas e episódios depressivos em adolescentes. *Rev Nutr*. 2010;23(5):755-762. <http://doi.org/10.1590/s1415-52732010000500006>
52. Sonnevile KR, Grilo CM, Richmond TK, Thurston IB, Jernigan M, Gianini L, et al. Prospective association between overvaluation of weight and binge eating among overweight adolescent girls. *J Adolesc Health*. 2015;56(1):25-9. <http://doi.org/10.1016/j.jadohealth.2014.08.017>
53. Calzo JP, Austin SB, Micali N. Sexual orientation disparities in eating disorder symptoms among adolescent boys and girls in the UK. *Eur Child Adolesc Psychiatry*. 2018;27(11):1483-1490. <http://doi.org/10.1007/s00787-018-1145-9>

Contributors

Ganen AP contributed through the conception and design, data analysis and interpretation, and the review and approval of the final version of the article; Stavro APG contributed through the conception and design, data analysis and interpretation, and the review and approval of the final version of the manuscript.

Conflict of Interest: The authors declare no conflict of interest.

Received: June 27, 2022

Accepted: June 6, 2024