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Research Article

Orthorexia And Vigorexy: A Descriptive Profile In Brazilian Crossfit Practitioners.

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Abstract

CrossFit is considered a recent sport modality involving a crescent number of practitioners looking for both performance and health. Together with if CrossFit practice, care about the body aesthetic can be related to practitioners in this new modality, resulting in disturbances such as orthorexia and vigorexia. The aim of the study was to evaluate the profile of orthorexia and vigorexia in a Brazilian sample of CrossFit practitioners. The study included 54 practitioners with a mean age of 27.5 + 6.84 years, of which 36 were female. They answered online forms include descriptive characteristics, orthorexia (Ortho-15 questionnaire), and vigorexia responses. The results showed that orthorexic behavior was found in 14.8% of practitioners, of which 87.5% were female; 40.7 % presented severe scores of vigorexia and 3.7 % were vigorexic. Analyzing by sex, 55.5% of males were classified as severe scores for vigorexia and 41.7 % of females as low scores for vigorexia. The majority of orthorexia and severe vigorexia behavior practiced CrossFit for more than one year and do not have food planning by a nutritionist. Only 2 practitioners had orthorexia and severe vigorexia behavior.

CrossFit participants demonstrated changes in eating behavior and body self-perception. Individuals with a predisposition to orthorexia engaged in regular physical activity for more than a year. Body image distortion predominated in the sample, owing to practitioners with a high risk of vigorexia having a longer period of regular physical activity practice.

Keywords : feeding behavior, body image, physical exercise.

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INTRODUCTION

To encourage the practice of physical activity new training modalities have been developed, such as CrossFit. CrossFit emerged in 2000/2001 and already has more than 14 thousand affiliated academies around the world and are located in 142 countries across all 7 continents [1].

The modality stands out as a training modality that includes Olympic lifting exercises, workout and gymnastic movements that are usually performed quickly, with successive repetitions, with short or no rest intervals, organizing in circuit form, and with an established time for execution [2]. Due to these characteristics, CrossFit can be classified as an extreme conditioning program [3] by intensity and volume, ranging from moderate to high [4].

The benefits of the practice of CrossFit are related to improving physical conditioning and body composition [5, 6] leading to a positive change in the body shape of the practitioners[7, 8]. Furthermore, the sense of community proportioned during the training in group mode can reinforce the adherence in maintaining the practice of the modality and encourages the adoption of a healthier life, taking care of food, and time of practice [9, 10]. Recently a literature review about psychological variables of CrossFit participants demonstrated a high perception of motivation, enjoyment, challenge, and affiliation that can justify the major adherence in practice on the modality [9]. However, the authors highlight that this topic remains at an initial stage and the findings should be generalized with caution.

Although the aforementioned benefits of CrossFit practice, these profiles can be considered dangerous if the practitioners overtaking too much care about it. In Dominski et al., 2021 review, the authors point out a possible problem related to the excessive practice of the modality, describing the Lichtenstein & Jensen, 2016 study in which the 5% of CrossFit practitioners presented a prevalence of exercise addiction. The excessive practice of exercise and excessive care about healthy food can be consequences or can trigger some disorders such as vigorexia and/or orthorexia.

Excessive practice of exercise can be a signal of vigorexia or also called muscular dystrophy, which can be described as a body image distortion leading to an obsessive concern with the body shape [12]. It is considered a specific type of body image distortion disorder, which mainly affects males, however; the prevalence is uncertain and complex [12]. The vigorexia also can be related to a severe modification in the food pattern.

Orthorexia is characterized as a pathological obsession with healthy eating, which can lead to significant dietary restrictions [13]. This behavior induces a long dedication in the search, selection, preparation, and adequacy of food [14, 15], and can end up becoming an extreme, excessive, psychologically and sometimes physically dangerous disorder, which can also be related to anorexia, even though they are different turning to be a qualitative disorder. In certain cases, the individual who is recovering from anorexia migrates to orthorexia, changing the focus from weight to the aspect of quality and purity of food [16].

Taken together, knowledge about the prevalence of vigorexia and orthorexia on practitioners involved in the CrossFit programs seems to be important to ensure a healthy practice and identify individuals sensitive to these disorders. Therefore, the main aim of this study was to describe the prevalence of vigorexia and orthorexia on Brazilian CrossFit practitioners. A secondary aim was to evaluate possible association with time practicing CrossFit, exercise frequency, engagement in other exercises and, food planning.

METHODS

Study design

The current study presents a descriptive characteristic with a transversal approach. It was selected three boxes from Guarapuava city, located in the south of Brazil, at the beginning of 2020. The boxes selected were the most popular in the CrossFit practice. In the first part of the study, contact was made with managers of the CrossFit boxes in order to explain the aim of the study and to obtain authorization for data collection. After the consent and Ethics approval (number 3.888.845/2020), contact was made with all participants from the selected boxes by online platform (e.g., WhatsApp and e-mail). The participants that agree to collaborate with the study received a link with an online form (via google forms) to answer questions about their characteristics, vigorexia, and orthorexia questionnaires. Finally, after the participants answer the questions on the forms a report about their profile regardings the vigorexia and orthorexia results were sent, explaining the participants' scores and classification according to each questionnaire.

Participants

A total of 54 participants (age of 27.5+6.84 years) of both sexes volunteer for the study. The criteria of inclusion were: i) belong to the CrossFit boxes selected; ii) to be over 18 years old; iii) be a CrossFit practitioner for at least 3 months, and iv) sign the Ethical Consent form. It was excluded participants that did not answer the questionnaire correctly or give up in the middle of participation.

Measures

This study is part of big research entitled: "Evaluation of the nutritional and behavioral profile of CrossFit practitioners in the city of Guarapuava". All data were collected by online forms. For participants' characterization, the profile of

vigorexia, and orthorexia were sending 3 links with the respective questions.

Practitioners' characterization

Descript data from sociodemographic profile and about the modality were obtained through open and close-ended questions regarding participants' age, biological sex, time practicing CrossFit, hours spend per week practicing exercise, engagement in other sport modalities, or exercise program and, food planning.

Eating behavior by the Orthorexia questionnaire

To analyze the participants' prevalence of orthorexic behavior, it was used the questionnaire ORTO-15, a questionnaire developed in Italian [17] and translated from English into Portuguese [14]. The questionnaire consists of 15 items about behavior towards food selection, acquisition, preparation, and consumption. Participants can answer each item from a Likert scale ranging from 1 (aways) to 4 (never). Questions 3-4-6-7-10-11-12-14 and 15 are scored as 1, 2, 3, and 4 points. Questions 2-5-8 and 9 are reversely coded and questions 1 and 13 are scored as 2, 4, 3, and 1 point. The Italian authors established a total score of <40 as an indication of ON orthorexic behavior.

Muscle dysmorphia by vigorexia questionnaire

The perception of body dysmorphia was evaluated using the Brazilian experimental questionnaire, developed by Rodrigues et al.[18] that consists in analyzing the risk of vigorexia. The questionnaire contains 10 closed items regarding body satisfaction and self-image, eating habits, training characteristics, and use of anabolic steroids. Each question has a coefficient based on its relevance and implication with the signs of vigorexy. The answers ranging from 0 to 4 points in which 0=no link with vigorexy; 1=slight predisposition to vigorexia behavior; 2= moderate predisposition to vigorexia behavior; 3=severe predisposition to vigorexia; 4= extremely vigorous vigorexia behavior. The classification was set by the authors as follow: 0 to 7 points (low) = not within the pattern considered for vigorexia; 8 to 10 points (moderate) = normal behavior, however, demands attention; 11 to 15 points (severe)= oriented to care about the well-being when it comes to the activity physical and health, seeking not to be influenced by the demands on body image; 16 to 21 points= vigorexy behavior, being advised to seek specific care (e.g., psychological help).

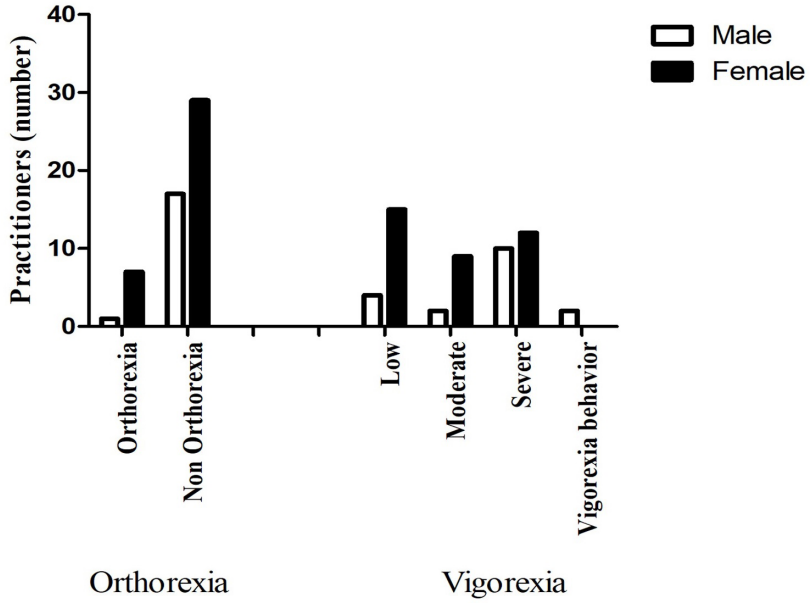
Data analysis

Preliminary analysis was focused on describing the main results by measures relative and absolute frequency and measures of central tendency and dispersion. The normality was verified by the Shapiro Wilk test. To compare quantitative variables, the independent T-test and Mann-Whitney test were used according to the data normality. Comparison between categorical variables was performed by Chi-square test. It was adopted as a significance level of $p < .05$, and the data analysis was conducted by the JAMOVI software version 1.6.12.

RESULTS

From the 54 participants selected in this study, women were prevalent (n=36). The orthorexic behavior was found in 14.8% (n=8) of participants, of which 87.5% (n=7) were female. For vigorexic behavior, 40.7 % (n=22) of participants were found with severe behavior and 3.7 % (n=2) with vigorexic behavior. Analyzing by sex, in the male group (n=18), 55.5% (n=10) were classified as a severe behavior for vigorexia. On the other way, in the female group (n=36), 41.7 % (n=15) were classified as a low behavior for vigorexia (**Figure 1**).

Figure 1. CrossFit practitioners' orthorexia and vigorexia classification.



Considering that the questionnaire of vigorexy presents items with important information isolated, the results from the practitioners were presented independently (**Figure 2**). Frequency only severe or behavior vigorexy it was possible to observe that most of the sample do not use anabolic steroids (95.8%), and do not follow any specific diet for their training (54.2%). Moreover, 87.5% felt guilty when can not go to the gym and 87.5% already exercised injured.

Figure 2. Frequency of "yes" or "no" responses for each item of questionnaire of vigorexia. A) Frequency all practitioners; B) Frequency only severe or behavior vigorexy.

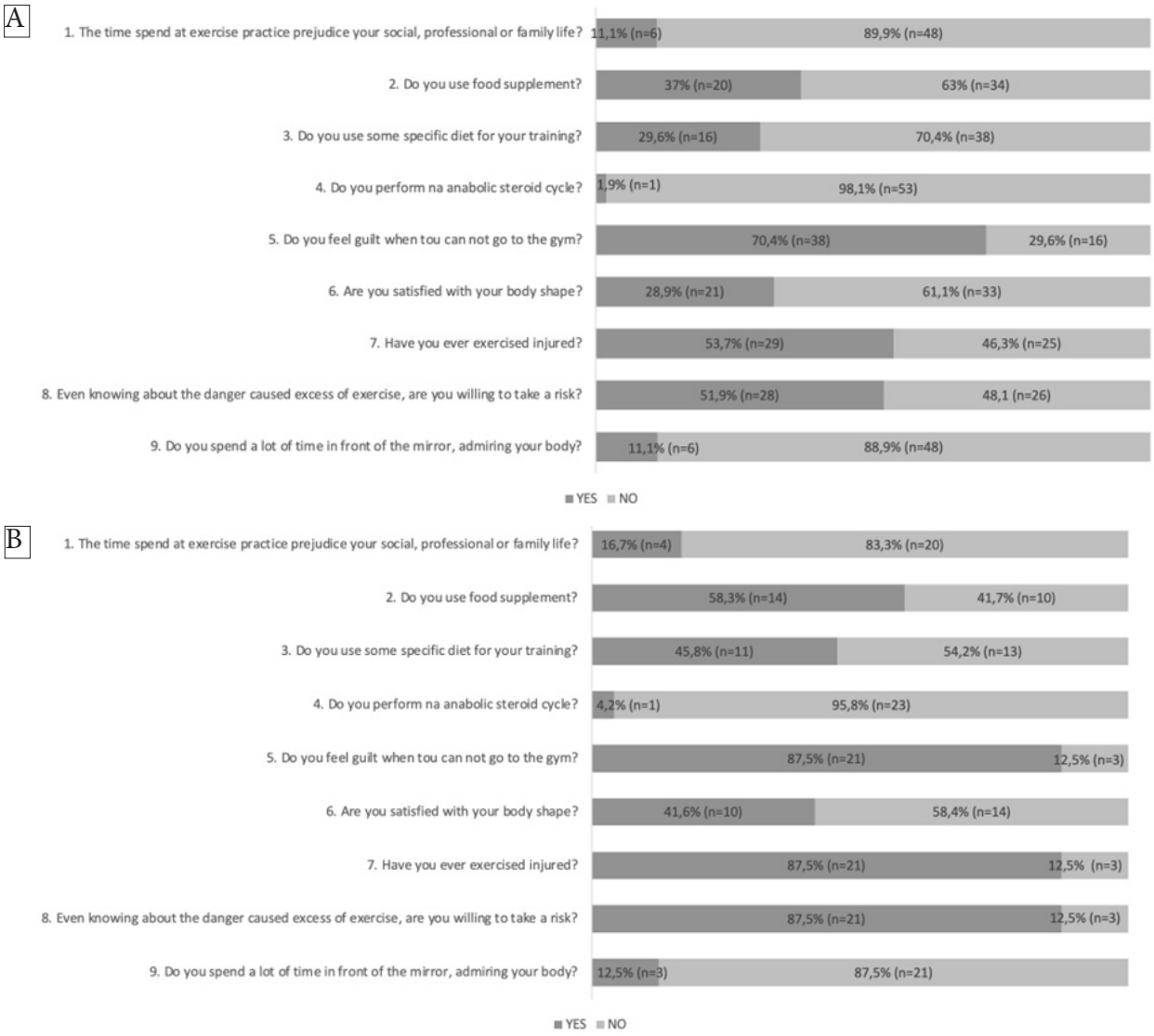


Table 1 presents the association of participants with orthorexia behavior and severe vigorexia and vigorexia behavior with characteristics such as time practicing CrossFit, hours spent per week practicing exercise, engagement in other sport modalities, or exercise program and, food planning time practicing exercise, hours per week. It was found that most of the practitioners with orthorexia behavior and severe vigorexia and vigorexia behavior were practicing CrossFit for more than one year and do not have food planning by a nutritionist. Practitioners classified as an orthorexic behavior exercise 3 to 6 hours per week (75%) and only practice CrossFit (87.5%). There was also found that only 2 practitioners have both orthorexia behavior and severe vigorexy ($p<0,001$).

Table 1. Comparison of orthorexic and vigorexy behaviors of CrossFit practitioners' characteristics (n=54).

Variables		Orthorexiabehavior (n=8)	Severe vigorexy (n=22)	Vigorexy behavior (n=2)	p
Sex	Female Male	7 (87.5%) 1 (12.5%)	12 (54.52%) 10 (45.5%)	0 (0.0%) 2 (100%)	0.018
Time practicing CrossFit	< 3 months 3 to 6 months 7 months to 1 year > 1 year	1 (12.5%) 0 (0.0%) 2 (25.0%) 5 (62.5%)	0 (0.0%) 0 (0.0%) 1 (4.5 %) 21 (95.5%)	0 (0.0%) 0 (0.0%) 0 (0.0%) 2 (100%)	0.203
Hours per week practicing exercise	< 3 hours 3 to 6 horours > 7 hours	2 (25.0%) 6 (75.0%) 0 (0.0%)	2 (9.1%) 11(50.0%) 9(40.9%)	0 (0.0%) 1(50.0%) 1 (50.0%)	0.176
Practice of exercise	CrossFit only CrossFit plus different exercise	7 (87.5%) 1 (12.5%)	10 (45.5%) 12 (54.5%)	1(50.0%) 1(50.0%)	0.208
Food planning (by nutritionist)	Yes, daily Yes, only sometimes No	2 (25.0%) 1 (12.5%) 5 (62.5%)	5 (22.7%) 6 (27.3%) 11 (50.0%)	0 (0.0%) 0 (0.0%) 2 (100%)	0.702
Orthorexia behavior	Yes No	- -	2 (9.1%) 20 (90.9 %)	0 (0.0%) 2 (100%)	<0.001

* Significant differences between classification (p <.05).

DISCUSSION

The present study aimed to describe the prevalence of vigorexia and orthorexia on Brazilian CrossFit practitioners and associated with time practicing CrossFit, exercise frequency, engagement in other exercises and, food planning. The main findings of this research were: i) small part of the practitioners presented orthorexia behavior, in which most were female; ii) severe scores of vigorexia and vigorexic behavior were found in almost half of the practitioners, with major prevalence in males; iii) practitioners with orthorexia and severe vigorexia behavior were engaged in CrossFit for more than one year and do not have food planning by a nutritionist; iv) only 2 practitioners had both orthorexia and severe vigorexia behavior.

The orthorexia behavior was found in 14.8% (n=8) of the practitioners, with a higher prevalence in females (87.5%; n=7); however, it is important to point out that most of the sample were also female (36 of 54 practitioners). Unlike, Donini et al., 2004 study, the authors evaluated 404 adults of both sexes, 6.9% showed orthorexia behavior and the prevalence of orthorexia is higher in males (11.3% vs 3.9%). Also, in a sample of Brazilian university athletes, 22% presented orthorexia behavior, with major prevalence in males (7 males vs 4 females) [19]. On the opposite, recently, a sample of Brazilian exercise practitioners from the city of Petrolina presented 80% of orthorexia behavior, with no difference between the sexes [20].

Regarding the vigorexia behavior, we considered the severe scores and vigorexia behavior together and, this prevalence was higher compared to orthorexia behavior (40.7% vs 14.8%). The vigorexia behavior was found in two males practitioners. Recently, Alencar et al., 2021, published a letter to the Editor of the International Journal of Social Psychiatry, highlighting the danger of vigorexy behavior. The authors described that vigorexy is the belief that the body is insufficiently muscular and thin when, in fact, patients have the normal body or are even more muscular than average. They also support that this behavior mainly affects males, "leading the individual to adopt intense and repetitive physical exercise combined with extreme diets and the use of anabolic steroids, to achieve 'muscularity'."

The finds of the present study agree in part with the statement of Alencar et al., 2021. Besides the major prevalence in males, also we found that the practitioners with severe vigorexy were engaged more than one year in the CrossFit modality, and 40.9% reported practice of exercise more than 7 hours (40.9%) per week. On the other hand, when the items from the vigorexy questionnaire were analyzed individually, most of the practitioners behavior vigorexy or severe reported not using anabolic steroids (95.8%) and not use any specific diet for the training (54.2%).

According to the findings of this study, the timing of physical activity practice may be related to the risk of orthorexia. According to Tocchetto et al., 2018, there may be a link between sports, physical activity, and low ORTO-15 scores. Brytek-Matera et al., 2015 examined different responses for people with eating disorders (orthorexia, bulimia, and anorexia) and discovered that 44.23 percent of them associated exercise with the intention of losing weight, which may be related to

orthorexia. The relationship between the risk of orthorexia and the time of physical activity is still unknown, and more research is needed to determine the possible relationship.

The majority of participants reported feeling guilty for not going to the gym; obsessive characteristics of sports activities, such as guilt for missing training when combined with other factors, represent a factor that plays an important role in the development of vigorexia. Kiss-Leizer et al., 2019, have demonstrated that people exercise regularly to stay healthy and fit, and the amount of time spent exercising is often related to the end goal. However, some attitudes are red flags and may indicate the presence of a dysmorphic self-perception, which is accompanied by dissatisfaction with one's physical shape, a trait shared by the participants in this study.

Despite being aware of the illnesses that can result from overtraining, more than half of the participants were willing to take the risk. In their study Schlegel, 2020, noted that previous injuries increase the risk of future injuries. This behavior could be a reflection of the frustrations caused by dysmorphic self-perception, which is often associated with excessive concern with achieving the idealized body, which is supplied by the demanding commitment to physical exercise.

Freire et al., 2020, seems that body dissatisfaction to be a determinant factor for risk behavior for eating disorders and addiction to exercise among fitness and crossfit particpants. On the other hand, in the present study only two people were classified as having associated vigorexia and orthorexia. This condition is understandable in light of the findings of Dominski et al., 2021, who aimed to review the existing literature on the psychological variables of CrossFit participants. This audience had a positive attitude toward effort, intrinsic motivation, and reasons for practicing such as enjoyment, challenge, and affiliation. It is worth noting, however, that the classification of orthorexia ignores nutritional goals, and Pearson & Jenkins, 2022 stated that nutritional goals are underlying factors that affect eating behaviors in non-competitive CrossFit® participants.

There are some limitations to this study. For starters, this study only included five CrossFit affiliates. The questionnaires were administered virtually. Because of the small number of Crossfit practitioners included, the sample size may reduce the statistical power of some analyses. Another limitation was the high proportion of females in the study group. This condition may have an impact on orthorexia and vigorexy interpretation behavior. Males, on the other hand, had a higher risk classification for vigorexy behavior. The study's strength was its prospective design, which evaluated behavioral changes in an activity modality that has grown globally and for which there has been little characterization of these individuals in relation to behavioral changes thus far.

CONCLUSION

CrossFit participants demonstrated changes in eating behavior and body self-perception. Individuals with a predisposition to orthorexia engaged in regular physical activity for more than a year. Only CrossFit practitioners had more characteristics related to the risk of orthorexia when it came to the modality. Body image distortion predominated in the sample, owing to practitioners with a high risk of vigorexia having a longer period of regular physical activity practice. Individuals who were identified as having a high risk of vigorexia did not have a high risk of orthorexia. In practice, the findings suggest that health professionals, particularly physical education professionals and nutritionists, examine the motivation for physical activity and distorted perceptions of eating habits, and intervene as soon as possible in cases where an association with suggestive behaviors is observed.

Declaration of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Authors contributions

Conceptualization - MAVC, GDB, CEM; Data curation - MAVC, GDB, TAL, EFCJ, LMC, RMM, MM; Formal analysis - MAVC, GDB, CEM; Investigation - MAVC, GDB, CEM, TAL, EFCJ, LMC, RMM, MM; Methodology - MAVC, GDB, CEM; Project administration - MAVC, GDB; Supervision- MAVC, GDB; Writing – original draft - MAVC, GDB, CEM, TAL, EFCJ, ACP, SJME, DLS; Writing – review and editing - MAVC, GDB, CEM, ACP, SJME, DLS

Evidence–Based Medicine

Level II: Evidence obtained from well-designed controlled trials without randomization.

Strength And Limits

What Is Already Known On This Subject?

The term "orthorexia nervosa" is considered an eating disorder characterized by the extreme value attributed to supposedly healthy nutrition and the establishment of arbitrary dietary rules not only regarding the quantity of food consumed, but also its quality. Vigorexia occurs when there is a psychological illness characterized by constant dissatisfaction with the body, which may be associated with a distortion of self-image. Healthy diet and physical exercise have a positive effect on health. However, the pathological dimension of both behaviors, namely exercise dependence and orthorexia nervosa, can lead to negative results. Studies observe a noticeable phenomenon in which dependence on mandatory exercises is more evident in CrossFit participants compared to gym athletes and may be accompanied by orthorexic symptoms.

What This Study Adds?

- Individuals who were identified as having a high risk of vigorexia did not have a high risk of orthorexia.
- Individuals with a predisposition to orthorexia engaged in regular physical activity for more than a year.
- Body image distortion predominated in the sample, owing to practitioners with a high risk of vigorexia having a longer period of regular physical activity practice.

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