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Eating habits of Brazilian athletes during the Coronavirus pandemic

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Abstract

The aim of the present study was to evaluate the change in the eating habits of Brazilian athletes during the Coronavirus pandemic. Through a structured online questionnaire, 249 athletes with at least 10 years of practice and/or at least one call by the Brazilian team of their respective modality had their answers analyzed. There was a decrease in the frequency of consumption of vegetables considering the consumption category "5 or more days a week", with 137 athletes (55.0%) before the pandemic and 113 athletes (45.4%) during the Coronavirus pandemic ($p<0.05$). The frequency of fruit consumption also showed a reduction, from 150 athletes (60.2%) who consumed fruit "5 or more days a week" before the pandemic to 130 athletes (52.2%) during the pandemic ($p<0.05$). However, there was an increase in the number of athletes who consumed fried foods (15.3% before to 23.3% during), as well as pizza, snacks, and sandwiches, "2 to 4 days a week" (21.3% before to 31.7% during) ($p<0.05$) during the Coronavirus pandemic. There was a change in the responsibility of athletes to prepare their meals during the Coronavirus pandemic, as well as a reduction in the frequency of meals taken daily. Although there was an increase in the consumption of ready-to-eat foods during the Coronavirus pandemic ($p<0.05$), athletes did not increase their consumption of food/meals through apps ($p>0.05$). In conclusion, the study data demonstrate that Brazilian elite athletes showed changes in eating habits as a result of the Coronavirus pandemic. This fact draws attention, since if maintained for prolonged or intensified periods, the observed changes could be characterized by the worsening of the dietary profile of Brazilian athletes.

Keywords: Athletes. COVID-19. Eating habits. Pandemic.

INTRODUCTION

At the end of January 2020, given the spread of the Coronavirus, several countries adopted social isolation measures, such as lockdowns and quarantines, which affected all aspects of human life, including eating habits[1,2,3,4,5]. The change in eating habits during the Coronavirus pandemic was observed, for example, in France in 2020. When analyzing 2,422 individuals, it was observed that 50.3% of participants reported negative changes in diet during the lockdown period. According to the study, this decline in diet quality was caused by poor food choices in order to seek out comfort foods[6]. According to Wang *et al.*[7], social isolation due to the epidemiological condition, in addition to social, economic, and psychological aspects, compromised mental health, well-being, and lifestyles, with negative impacts on diet and in the practice of physical activity[7].

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On March 24, 2020, the Government of Japan, in agreement with the International Olympic Committee, announced the postponement of the Tokyo Olympic Games due to the Coronavirus pandemic. Although the new date for the games had not been set, during the announcement, it was speculated that the event would be moved to 2021[8], which in fact occurred. This postponement of the Olympic Games posed an unprecedented challenge to athletes and technical committees, who had to reorganize the entire preparation process for the competition, given the aforementioned restrictions. Among the main challenges encountered, the maintenance of the training routine is highlighted, which requires access to sports facilities, group activities, especially for team sports and contact with the technical committee (coaches, physical trainers, doctors, nutritionists, and physical therapists, etc.) that was compromised[9,10,11]. More specifically, in the field of sports nutrition, maintaining a balanced diet to meet the nutritional demands of these athletes was one of the major concerns of the technical committees, since the supply of food, in appropriate quantity and variety, is an important pillar to maximize athletic performance[9,10,11].

In this context, studies have investigated how the Coronavirus pandemic has affected the food consumption of populations in different countries[1,2,3,4,5]. However, there are still few reports on the same consequences for elite athletes. Thus, the objective of the present work was to investigate the effect of social isolation on the eating habits of Brazilian athletes, residing in Brazil, during the Coronavirus pandemic.

MATERIALS AND METHODS

2.1 Sample

The sample consisted of athletes, over 18 years old, residing in Brazil during the Coronavirus pandemic. Of the 301 athletes who responded to the virtual survey, 249 were selected. The inclusion criteria used were: a) at least 10 years of practice in their respective modality (n=175) and/or b) at least one invitation to the Brazilian team in their respective modality (n=195). The selected athletes, 129 men and 120 women, are active in their respective modalities: Basketball (n=38), Volleyball (n=36), Swimming (n=29), Judo (n=22), Sitting Volleyball (n=19), Handball (n=17), Athletics (n=17), Taekwondo (n=8), Triathlon (n=7), Paralympic Bocce (n=6), Archery (n=4), Boxing (n=4), Canoeing (n=4), Water Polo (n=4), Karate (n=4), Wrestling (n=3), Mixed Martial Arts (n=3), Table Tennis (n=2), Snow Sports (n=2), Badminton (n=2), Paralympic Athletics (n=2), Rowing (n=1), 3x3 Basketball (n=1), Beach Volleyball (n=1), Futsal (n=1), Hockey (n=1), Goalball (n=1), and other sports (n=10).

2.2 Experimental design

In the present observational study, data collection took place through an online questionnaire, self-completed through Google Forms, between 07/27/2020 and 08/27/2020. The objective was to analyze the changes in the eating habits of Brazilian athletes. The invitation to athletes was made through contact with those responsible for the team and/or the Brazilian confederation of each sport. Volunteer athletes received, through their coaches, the link to access the Informed Consent Form (ICF) and questionnaire. All participants signed the informed consent form after approval by the Ethics Committee of the

State University of Campinas (UNICAMP) (#4.213.274).

The study used a structured questionnaire, based on the questions of the virtual health survey 'ConVid, Research of Behaviors', conducted by the Fundação Instituto Oswaldo Cruz (Fiocruz) in partnership with the Federal University of Minas Gerais (UFMG) and the State University of Campinas (Unicamp) (ICICT, FIOCRUZ, 2020)[12], and in the questions contained in the questionnaire of the Food Consumption Survey of the city of Campinas (ISACamp-Nutri 2014-2016)[13].

It is worth mentioning that through the set of variables analyzed, such as frequency of food consumption (considered markers of healthy and unhealthy eating patterns and number of meals/day) and information about other food consumption habits, such as responsibility in preparing meals and frequency of consumption by food delivery apps, it was decided, in this article, to use the term "Food Habit". According to Freitas *et al.*[14] "the food *habitus* can be understood through language, attitudes and practices and is translated into rites, values, myths, beliefs, and taboos". Thus, it is understood that, by definition, the eating habit is translated by the individual's attitudes towards food[14].

2.3 Online questionnaire

The questionnaire consisted of two parts, using data referring to the first part, that is, general data and dietary habits. The questionnaire was sent by email to the participants through the Google Forms platform. The first part of the questionnaire, on eating habits, was prepared based on the questions contained in the ConVID – Fiocruz questionnaire (ICICT, FIOCRUZ, 2020)[12], which allowed for the comparison of the results herein with those obtained in these surveys. To verify that the questionnaire prepared was well structured and easy to understand, a preliminary pilot study was carried out with 75 young people and adults during the initial period of the Coronavirus pandemic.

The frequency of consumption of each food was evaluated using categorical variables, defined as: 1 = 1 day or less, 2 = 2 to 4 days, 3 = 5 days or more. For variables "who prepared the menu for the main meals (lunch and dinner) in your home?" and "who prepared or cooked the main meals (lunch and dinner) in your home?" we examined the frequency of responses given by: 1 = myself, 2 = my mother/father, 3 = other family members, 4 = housekeeper, 5 = had meals at the club or training center, 6 = others. Regarding the variable "how many meals did you eat per day?", the categories were: 1 = 1 meal, 2 = 2 meals, 3 = 3 meals, 4 = 4 meals, 5 = 5 meals, and 6 = 6 meals or more. Regarding the consumption of ready-to-eat foods, "how many days of the week did you consume ready-to-eat (ultra-processed) foods such as cookies/crackers, snacks, instant noodles, frozen food" were analyzed as: 1 = 1 to 2 days a week; 2 = 3 to 4 days a week; 3 = 5 to 6 days a week; 4 = every day (including Saturday and Sunday); 5 = every 15 days; 6 = once a month. The frequency of purchases of supermarket meals and ready meals through mobile applications, before and during the quarantine, was also analyzed according to categories 1 = 1 to 2 days a week; 2 = 3 to 4 days a week; 3 = 5 to 6 days a week; 4 = every day (including Saturday and Sunday); 5 = every 15 days; 6 = once a month. Results were presented in tables as absolute values (count by category) and percentage in relation to the total number of participants.

2.4 Data analysis

The Wilcoxon sign rank test was used to compare: 1) frequency of consumption

for each food before quarantine and during quarantine; 2) frequency in the categories about meal preparation and preparation and number of meals performed per day, before and during the quarantine; and 3) the frequency of purchases of supermarket meals, ready meals through a mobile application, and the days of the week of consumption of ready foods, before and during the quarantine. A significance level of 5% ($p \leq 0.05$) was adopted. Data were analyzed using Statistica v. 13.1 (StatSoft Inc., Tulsa, OK, USA).

RESULTS

The data on the frequency of consumption of each food, before and during the quarantine, are described in table 1, with the respective results of the Wilcoxon test. Significant differences ($p<0.05$) were verified for the consumption of rice, beans, raw and cooked legumes/ vegetables, fruits, and whole foods, as well as for fried foods, pizzas, snacks, or sandwiches, comparing the moment before the quarantine with the period during the quarantine. There were no differences in consumption for the other foods or food groups analyzed.

In general, these results demonstrate that the diet of Brazilian athletes was affected during the period of the Coronavirus pandemic. For example, for the frequency of consumption of vegetables, considering the consumption category "*5 or more days a week*", a decrease was observed in the number of athletes who marked this option (55.0%) before the pandemic vs. during the Coronavirus pandemic (45.4%). A similar result was observed for the frequency of fruit consumption, which in the category "*5 or more days a week*" according to the athletes, was reduced from 60.2% before the pandemic to 52.2% during the Coronavirus pandemic. The frequency of consumption of fried foods, for the category "*2 to 4 days a week*", increased from 12.0% before the pandemic to 23.3% during the Coronavirus pandemic. Regarding the frequency of consumption of pizza, snacks, and sandwiches, in the "*2 to 4 days a week*" category, there was an increase from 21.2% before the pandemic to 31.7% (n=79) during the Coronavirus pandemic.

Another result refers to the reduction in the frequency of consumption of rice, beans, and wholegrain foods, among athletes, during the Coronavirus pandemic. Data from the present study show that 79.1% of athletes reported consuming rice in the frequency of "*5 or more days a week*", before the pandemic, reducing to 63.9% of athletes during the Coronavirus pandemic. As for the consumption of beans, in the frequency of "*5 or more days a week*", this percentage reduced from 63.9% to 51.8%, before and during the Coronavirus pandemic, respectively. Despite the reduction, it was observed that more than 50% of the athletes continued to report consuming rice and beans at a frequency of "*5 or more days a week*".

Table 2 presents the results for the categorical variables planning and preparation of meals and for the number of meals eaten per day, before and during the quarantine. Wilcoxon test results are also presented. There were significant differences for the three variables in the analyzed categories ($p < 0.05$). Before the pandemic, 87% of the athletes participating in the study had their meals at the club or training center and, during the Coronavirus pandemic, the majority (43,8%) had their meals prepared by their mother or father. Before the pandemic, 78% of athletes had five meals a day; however, during the Coronavirus pandemic, only 11% of athletes continued to eat daily meals at this

frequency. The frequency of consumption of ready-to-eat foods increased in the category of consumption "*every day (including Saturday and Sunday)*", from 32.9% to 40.6% of athletes with this practice, before and during the Coronavirus pandemic, respectively.

In table 3, the frequency of purchases of supermarket meals and ready meals through mobile applications are presented. There was no difference between the time before the quarantine and during the quarantine for any of the variables analyzed, demonstrating that the athletes, despite reporting an increase in the consumption of ready-to-eat foods, did not increase the consumption of meals/food purchased through apps.

Table 1 – Frequency of weekly consumption of food before and during the Coronavirus pandemic by Brazilian athletes (n = 249) (count in each category). Jul-Aug, Brazil 2020

	Weekly consumption frequency before the coronavirus pandemic						Weekly consumption frequency during the coronavirus pandemic							
	1 day of the week or less		2 to 4 days of the week		5 days of the week or more		1 day of the week or less		2 to 4 days of the week		5 days of the week or more			
Foods	n	%	n	%	n	%	n	%	n	%	n	%	z*	p
Rice	7.0	2.8	45.0	18.1	197.0	**79.1**	16.0	6.4	75.0	30.1	158.0	**63.5**	4.8	**< 0.001**
Bean	21.0	8.4	69.0	27.7	159.0	**63.9**	32.0	12.9	88.0	35.3	129.0	**51.8**	3.2	**< 0.001**
Eggs	37.0	14.9	129.0	51.8	83.0	33.3	46.0	18.5	122.0	49.0	81.0	32.5		0.30
Red meat (beef, pork, goat)	33.0	13.3	162.0	65.1	54.0	21.7	46.0	18.5	149.0	59.8	54.0	21.7	1.5	0.11
White meat (chicken)	19.0	7.6	172.0	69.1	58.0	23.3	28.0	11.2	169.0	67.9	520	20.9	1.8	0.07
Fish	198.0	79.5	49.0	19.7	2.0	0.8	192.0	77.1	53.0	21.3	4.0	1.6	1.2	0.21
Raw or cooked legumes/ vegetables	26.0	10.4	86.0	34.5	137.0	**55.0**	36.0	14.5	100.0	40.2	113.0	**45.4**	2.9	**< 0.003**
Fruits	20.0	8.0	79.0	31.7	150.0	**60.2**	35.0	14.1	84.0	33.7	130.0	**52.2**	2.5	**0.009**
Natural juice (made from the fruit)	91.0	36.5	102.0	41.0	56.0	22.5	105.0	42.2	80.0	32.1	64.0	25.7	0.5	0.6
Whole foods (breads, rice, crackers, pasta, whole grains, oatmeal, granola, flaxseeds)	65.0	26.1	87.0	34.9	97.0	39.0	80.0	32.1	93.0	37.3	76.0	30.5	2.9	**< 0.002**
Ham, salami, bologna, sausage, sausage, hamburger, or nuggets	151.0	60.6	89.0	35.7	9.0	3.6	142.0	57.0	98.0	39.4	9.0	3.6	0.8	0.38
Frozen ready-to-eat foods (lasagna, pies, etc.)	238.0	95.6	11.0	4.4	0.0	0.0	233.0	93.6	15.0	6.0	1.0	0.4	1.2	0.21
Fried foods like French fries, fried snacks, pastel	207.0	83.1	38.0	**15.3**	4.0	1.6	189.0	75.9	58.0	**23.3**	2.0	0.8	2.1	**< 0.003**
Pizzas, snacks, or sandwiches	194.0	77.9	53.0	**21.3**	2.0	0.8	168.0	67.5	79.0	**31.7**	2.0	0.8	3.0	**< 0.002**
"Packaged" snacks (Ex. Ruffles, Cheetos, Fandangos)	237.0	95.2	11.0	4.4	1.0	0.4	232.0	93.2	16.0	6.4	1.0	0.4	0.9	0.35
Chocolates, sweet cookies, pieces of pie	129.0	51.8	110.0	44.2	10.0	4.0	124.0	49.8	107.0	43.0	18.0	7.2	1.3	0.19
Soda, juice powder, juice box	161.0	64.7	74.0	29.7	14.0	5.6	162.0	65.1	74.0	29.7	13.0	5.2	0.2	0.83

* z: Wilcoxon signed-rank test. P values <0.05 indicate a significant difference between the frequency of consumption for each food before quarantine

Table 2 – Responsibility in the planning/preparation of meals, number of meals eaten daily, and weekly frequency of ready-to-eat foods by Brazilian athletes, analyzed before and during the Coronavirus pandemic (n = 249) (count in each category). Jul-Aug, Brazil 2020.

		Responsible for preparing the menu/main meals at home*		Number of meals per day**		Frequency of consumption of ready-to-eat foods#	
	Categories	n	%	n	%	n	%
Before the pandemic	1	68.0	27.3	64.0	25.7	1.0	0.4
	2	49.0	19.7	65.0	26.1	10.0	4.0
	3	14.0	5.6	19.0	7.6	42.0	16.9
	4	3.0	1.2	5.0	2.0	82.0	32.9
	5	87.0	34.9	78.0	31.3	73.0	29.3
	6	28.0	11.2	18.0	7.2	41.0	16.5
During the pandemic	1	89.0	35.7	82.0	32.9	1.0	0.4
	2	109.0	43.8	112.0	45.0	12.0	4.8
	3	24.0	9.6	33.0	13.3	50.0	20.1
	4	2.0	0.8	3.0	1.2	101.0	40.6
	5	10.0	4.0	11.0	4.4	62.0	24.9
	6	15.0	6.0	8.0	3.2	23.0	9.2
	z[&]	7.8	-	7.4	-	3.6	-
	p	< 0.001	-	< 0.001	-	< 0.001	-

*1 = myself, 2 – my mother/father, 3 = other family members, 4 = housekeeper, 5 = ate at the club or training center, 6 = others;
** 1 = 1 meal, 2 = 2 meals, 3 = 3 meals, 4 = 4 meals, 5 = 5 meals, and 6 = 6 meals or more per day;
# 1 = 1 to 2 days a week; 2 = 3 to 4 days a week; 3 = 5 to 6 days a week; 4 = every day (including Saturday and Sunday); 5 = every 15 days; 6 = once a month.
[&] z test: Wilcoxon signed-rank test. P values <0.05 indicate a significant difference when comparing the two moments (before and during the Coronavirus pandemic) for the variables analyzed

Table 3 – Frequency of purchases of supermarket meals and frequency of consumption of ready meals through a mobile application by Brazilian athletes before and during the Coronavirus pandemic (n = 249) (count in each category). Jul-Aug, Brazil, 2020.

		Frequency of supermarket purchase		In-app purchase frequency	
	Categories	n	%	n	%
Before the pandemic of the coronavirus	1	89.0	35.7	103.0	41.4
	2	31.0	12.4	6.0	2.4
	3	5.0	2.0	3.0	1.2
	4	1.0	0.4	1.0	0.4
	5	70.0	28.1	35.0	14.1
	6	53.0	21.3	101.0	40.6
During the Coronavirus Pandemic	1	87.0	34.9	94.0	37.8
	2	28.0	11.2	20.0	8.0
	3	6.0	2.4	2.0	0.8
	4	1.0	0.4	1.0	0.4
	5	69.0	27.7	44.0	17.7
	6	58.0	23.3	88.0	35.3
	z*	0.60	-	0.60	-
	p	0.54	-	0.54	-

Frequency of shopping for supermarket meals and ready meals through an application: 1 = 1 to 2 days a week; 2 = 3 to 4 days a week; 3 = 5 to 6 days a week; 4 = every day (including Saturday and Sunday); 5 = every 15 days; 6 = once a month.
*z test: Wilcoxon signed-rank test. P values <0.05 indicate a significant difference when comparing the two moments (before and during the Coronavirus pandemic) for the variables analyzed.

DISCUSSION

Regarding the decrease in the frequency of consumption of fruits and vegetables, the results of the present study do not allow for determining the reasons for this change. However, it should be noted that in Brazil in natura foods are widely purchased at open-air markets and grocery stores, with the possibility that in some municipalities and states, the restrictive measures of the moment may have hampered the operation and access to these places. A recent study showed that during the quarantine imposed by the Coronavirus pandemic, respondents spaced out the frequency of purchases of fruits and vegetables at street markets, as well as reduced their presence in these places of consumption[15]. Therefore, the findings of the study are worrying, which demonstrate that during the Coronavirus pandemic, the frequency of consumption of in natura foods was reduced in athletes.

Despite observing a reduction in the frequency of consumption of rice, beans, and wholegrain foods among athletes during the Coronavirus pandemic, more than 50% of the participants continued consumption on 5 or more days of the week, showing that rice and beans continued to be present in the athletes' meals[16]. The reduction can be explained by the fact that many of these athletes have meals in clubs and training centers, before the Coronavirus pandemic, which rely on the planning of the menu by nutritionists, with rice and beans being a basic dish present in institutional cafeterias. It is possible to speculate that the athletes' dietary pattern, especially for the pre-pandemic period, is (still) based on traditional Brazilian cuisine, at least with regards to the consumption of rice and beans. The possible hypothesis of a reduction in the frequency of consumption of vegetables, rice, and beans could be related to food preparation, as it requires the ability of individual cooking skills; however, this variable was not included in this study.

In the present study, the frequency of consumption of fried foods increased during the Coronavirus pandemic, as well as the frequency of consumption of pizza, snacks, and sandwiches. Thus, Brazilian athletes increased in one or more aspects considered to be negative in relation to their dietary pattern. Investigations carried out with Brazilian non-athletes suggest some possible factors that may have contributed to this worsening; factors ranging from changes in psychological status to increased time devoted to unhealthy behaviors[16,17,18,19]. It has been reported that Brazilians who spent more time watching television during the Coronavirus pandemic also had a higher incidence of unhealthy eating behaviors[18]. In turn, Malta and collaborators[19] evaluated the effects of social distancing and its repercussions on the mood and lifestyle change of Brazilians during the Coronavirus pandemic. As for food, a decrease in the regular consumption of fresh foods, such as vegetables (from 37.3% to 33.0%) and an increase in the consumption of processed foods, such as frozen meals (from 10.0% to 14 .6%) and snacks (from 9.5% to 13.2%). The results of Malta *et al.*[19] corroborate the pattern observed in the present study, in relation to vegetables and fruits. However, in the present study, no increase was observed for frozen foods, sausages, snacks, soft drinks, boxed juices, and sweets. Despite the deleterious changes observed in food consumption, curiously, the consumption of ultra-processed foods did not show a significant change in the

present study. A large part of the sample of the present study consisted of professional athletes, who generally have access to nutritional monitoring, and access to a balanced diet, through clubs, training centers, and sports confederations. This nutritional monitoring, combined with the concern with physical shape, possibly promotes awareness about the consumption of these foods by this sample. In fact, the frequency of weekly consumption of frozen ready-to-eat foods among athletes was low, with 238 athletes reporting a consumption frequency of "1 day or less" before and then 233 during the Coronavirus pandemic.

According to the present study, athletes or family members were primarily responsible for preparing meals. In addition, the results also indicated that there was no change in the frequency of shopping at the supermarket or through apps during the Coronavirus pandemic. In a study of more than 45,000 Brazilian citizens, it was observed that about 75% of the participants adhered to social restriction measures, decreasing contact with people, and going out only for essential activities[17,19]. Despite the high rate of adherence to social isolation measures, it is possible that shopping for food and other essential items was concentrated in supermarkets. A limitation of the questionnaire applied was that it did not investigate the frequency of purchases at street markets and grocery stores, which could help to understand what happened in relation to vegetables and fruits. Supermarkets generally have areas for fruit and vegetables, but, as mentioned earlier, street markets are very popular in Brazil.

Regarding the eating habits of athletes from other countries, significant changes were also detected. New Zealand Rugby Union players showed changes in food consumption due to restrictive measures to combat COVID-19[4]. In agreement with the results of the present study, 17% of the participants responded that they had reduced their consumption of fruits and vegetables, suggesting a trend towards a reduction in the quality of the diet[4]. In addition, 36% of the participants had higher food consumption, and 26% of them responded that they had also increased their consumption of ready-to-eat foods (ultra-processed)[4]. Interestingly, the consumption of ultra-processed foods, in the present study, did not change from the pre-pandemic period compared to the period during the Coronavirus pandemic. In another investigation, elite and sub-elite South African athletes reported changes in food consumption due to the Coronavirus pandemic[3]. Most athletes consumed excessive amounts of carbohydrates (including sweets, chocolates, rice, bread, etc.) during the research period. Moreover, even though this same majority remained active, the moderate-intensity exercise routine for 30 to 60 minutes, was lower than usual. Furthermore, in their free time, most of them had implemented a sedentary form of leisure rather than spends this time in an active way. In Italian university athletes[2], it was observed that the practice of exercises was positively correlated with the consumption of fruits, vegetables, and fish, when analyzed during the Coronavirus pandemic, and that exercise influenced the mood states that influence food choices. Additionally, those who scored higher for symptoms of depression were those who consumed more foods rich in carbohydrates (e.g. from cereals) suggesting a need to compensate for the negative psychological symptoms. Taken together, these results confirm that the eating habits of athletes were modified, however, with some inconsistency

in relation to the observed "patterns". It is important to highlight the scarcity of studies with athletes, especially at the competitive level that was evaluated in the present study.

Briefly, the data from the present study demonstrate that Brazilian elite athletes had their food intake changed during the period analyzed in the present study. This fact calls attention, because if maintained for prolonged or intensified periods, the observed changes may have deleterious consequences for the health status and performance of Brazilian athletes.

CONCLUSION

The data from the present study showed that elite Brazilian athletes had their eating habits modified when compared to the moments before and during the pandemic caused by the Coronavirus. This fact calls attention, because in adverse situations, such as the pandemic caused by the Coronavirus, prolonged changes in eating habits can harm the health and performance of Brazilian athletes.

Author statement CRediT

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