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Eating attitudes and physical exercise practice during the COVID-19 pandemic in adult women with overweight or obesity

Atitudes alimentares e prática de exercícios físicos durante a pandemia de COVID-19 em mulheres adultas com sobrepeso ou obesidade

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ABSTRACT

Objective

The outbreak of the coronavirus disease has led to significant social changes, affecting people's emotions, physical exercise habits, and eating behaviors. Considering the pandemic's impact on daily routines, this study has examined the dietary patterns, eating attitudes, physical exercise practices, and emotional experiences of adult women with a body mass index of 25 kg/m^2 or higher during the COVID-19 pandemic.

Methods

Participated in the study 786 women with a body mass index of 25 kg/m^2 or higher, aged between 30 and 50 years old. The participants answered a sociodemographic questionnaire (i.e. age, self-reported weight and height, family income, educational level); a questionnaire developed by the researchers to assess variables related to feelings experienced during the lockdown, physical exercise practice, and perceived changes in food intake; and the Three Factor Eating Questionnaire - R21. The data collection was conducted online, using the REDCap® platform between March and April 2021. The association between qualitative variables was evaluated using the Chi square test. One-way ANOVA was conducted to examine group differences between women who reported perceived changes in food intake during the pandemic and those who did not.

Results

Results demonstrated that the mean body mass index of participants was 35.04 kg/m2 (SD=6.32) and the mean age was 38.73 years old (SD=5.69). During the COVID-19 pandemic, there was a high prevalence of negative feelings such as anxiety (86.5%), fear (65.2%), and exhaustion (59.7%), as well as a reduction in the practice of physical exercise (χ^2=44.71, df=4,

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$p<0.001$). Regarding food intake, 85% of the sample reported perceived change. There were changes in the amount, frequency, and quality of food consumed, with an increased intake of low-nutrient-high-density food. Regarding eating attitudes, the scores for the uncontrolled eating ($F(1, 782) = 38.982$; $p<0.001$) and emotional eating ($F(1, 782) = 60.392$, $p<0.001$) subscales were high, especially among women who perceived changes in their food intake during the pandemic.

Conclusion

Throughout the COVID-19 pandemic, women with overweight or obesity reported a high prevalence of negative feelings, a decrease in physical exercise practice, and changes in food intake and eating attitudes.

Keywords: COVID-19. Eating behavior. Obesity. Physical exercise. Women.

RESUMO

Objetivo

O surgimento da doença do Coronavírus trouxe uma série de mudanças sociais, afetando as emoções, os hábitos sobre prática de exercício físico e o comportamento alimentar. Considerando o impacto da pandemia nas rotinas, o presente estudo avaliou o padrão alimentar, as atitudes alimentares, a prática de exercício físico e os sentimentos experienciados por mulheres adultas com índice de massa corporal de 25 kg/m² ou maior durante a pandemia de COVID-19.

Métodos

Participaram do estudo 786 mulheres com índice de massa corporal de 25 kg/m² ou maior e idade entre 30 e 50 anos. As participantes responderam ao questionário sociodemorático (idade, auto relato de peso e altura, relacionamento, nível educacional), a um questionário elaborado pelas pesquisadoras para acessar variáveis sobre sentimentos vivenciados durante o isolamento, prática de exercício físico e percepção de mudança na alimentação e ao Three Factor Eating Questionnaire – R21. A coleta de dados foi online via plataforma REDCap® durante os meses de Março e Abril de 2021. A associação de variáveis qualitativas foi avaliada com o teste qui-quadrado. ANOVA de uma via foi realizada para avaliar diferenças de grupo entre mulheres que reportaram perceberem mudança na alimentação durante a pandemia e aquelas que não perceberam.

Resultados

Os resultados demonstraram que, a média de índice de massa corporal das participantes foi 35,04 kg/m2 (DP=6,32) e a média de idade foi 38,73 anos (DP=5,69). Durante a pandemia de COVID-19, houve uma alta prevalência de sentimentos negativos como ansiedade (86,5%), medo (65,2%) e exaustão (59,7%), assim como redução na prática de exercício físico (χ^2=44,71, df=4, p<0,001). Sobre ingestão alimentar, 85% da amostra reportou perceberem mudança na alimentação. Houve mudança na quantidade, na frequência e na qualidade de alimento consumido, com aumento na ingestão de alimentos baixo em nutrientes e altos em calorias. Sobre as atitudes alimentares, as pontuações nas subescalas comer descontrolado (F (1, 782) = 38,982; p<0,001) e comer emocional (F (1, 782) = 60,392; p<0,001) foram altas, principalmente entre mulheres que perceberam mudanças no consume alimentar durante a pandemia.

Conclusão

Durante a pandemia de COVID-19, mulheres com sobrepeso ou obesidade reportaram prevalência de sentimentos negativos, redução na prática de exercício físico e mudanças alimentares tanto na dieta quanto nas atitudes alimentares.

Palavras-chave: Comportamento Alimentar. COVID-19. Exercício Físico. Mulheres. Obesidade.

INTRODUCTION

The World Health Organization (WHO) declared COVID-19 a public health emergency due to its rapid spread since it emerged in Wuhan, China in late 2019 [1, 2]. Some individuals were more vulnerable to developing severe COVID-19, with elderly aged ≥ 65 and people with comorbidities and chronic disease consistently having the highest mortality rates. In this context, overweight and obesity were among the health conditions that increased the risk of mortality by COVID-19, in addition to being associated with the development of other chronic diseases such as type 2 diabetes, hypertension, cancer, and negative mental health outcomes [3-5].

According to the WHO, social distancing and isolation were the most effective measures to slow down transmission rates at the beginning of the pandemic [6]. Nevertheless, the repercussions of social isolation on health were enormous and negatively influenced mental health by increasing the feeling of loneliness, especially among people with a previous mental condition [7-9].

Social isolation also changed individual physical exercise practice and eating attitudes [10-13]. During the pandemic, stay-at-home orders and social distancing led to decreased physical exercise activity and increased time spent using electronic devices such as the television, computer, and smartphone. In addition, individual eating attitudes – that is, beliefs, thoughts, feelings, behaviors, and relationships with food [14] – were also affected, leading to abnormal food patterns known as disordered eating behaviors. Among these, emotional eating (eating in response to negative/aversive emotions), uncontrolled eating (tendency to eat more than normal, lose control during food intake), and cognitive restraint (constantly and deliberately controlling food intake to maintain or lose weight) [15-17] seemed to be the most common behaviors elicited by the pandemic.

Therefore, experiencing negative feelings due to the necessity of social distancing can be related to changes in eating attitudes, eating behavior, and dietary patterns. Although several studies have evaluated the impact of the pandemic and social isolation on eating behaviors among the Brazilian population [12,18-20], none focused specifically on women with overweight or obesity, which is unfortunate because they were a highly vulnerable group. For example, studies conducted in the UK [21,22] showed adults with obesity were more likely to report a decline in typically protective behaviors against weight gain (e.g., physical activity) than pre-lockdown. Moreover, Herle et al. (2021) [23] found that participants who reported being overweight were more likely to overeat consistently. Additionally, do Carmo et al. (2023) [24] showed that, during the isolation phase of the pandemic, obesity contributed to uncontrolled and emotional eating disorders, increased anxiety, and worsened sleep.

In addition, although research on eating behaviors is well established in young adults [25,26], less is known about the theme in older women, which is unfortunate because there is evidence of increased disordered eating symptoms in women in middle age and later life [27]. Thus, the present study aimed to evaluate eating attitudes and physical exercise practices in a large sample of Brazilian women between 30 and 50 years old with overweight and obesity during the period of highest mortality from COVID-19 in Brazil. More specifically, we evaluated (1) patterns of social isolation, feelings experienced during the pandemic and perceived changes in eating behavior and the type of change; (2) physical exercise practice before and during the pandemic; (3) the association between feelings of anxiety and perceived changes in food intake; (4) the group difference between women who reported perceived changes and those who reported not perceiving changes in food intake and disordered eating attitudes.

METHODS

Participants

The sample size was calculated using GPower, which established a minimum sample of 352 participants (ANOVA: fixed effects, one-way; [95% CI]; alpha=0.05; Power=80% and effect size=0.15). The inclusion criteria were being female, between the ages of 30 and 50, and having a Body Mass Index (BMI) ≥25 kg/m2. The exclusion criteria were diseases or conditions affecting appearance, such as cancer, burn scars, pregnancy (up to 12 months after giving birth) or not answering all of the items.

Demographics: The demographic information was investigated using a questionnaire developed by the researcher, which included self-reported age, gender, sexual orientation, height, body weight and educational and socioeconomic level.

Variables of interest: The authors developed a questionnaire to evaluate several relevant variables: social distancing, physical exercise, feelings experienced, and dietary patterns. The questionnaire asked participants about their physical exercise habits before and during the pandemic, including the intensity and duration of their workouts ("Did you practice any physical activity before the pandemic?"; "How many minutes of moderate or vigorous activity per week did you perform before the pandemic?"; "Did you practice any physical activity during the pandemic?"; and "How many minutes of moderate or vigorous activity per week did you perform during the pandemic?"). It also asked participants, "Which ones of the feelings listed below did you experience most frequently during the pandemic?" given possible answers, the following list – loneliness, fear, happiness, sadness, hope, exhaustion, anxiety, and none of the previous. Finally, participants answered whether they noticed any changes in their food intake ("Did you perceive some change in your food intake during the pandemic?"). If so, they had to choose from a list which changes they noticed – increased frequency of consumption, decreased frequency of consumption, increased amount of consumption, decreased amount of consumption, increased consumption of fresh food, decreased consumption of fresh food, increased consumption of fast food/processed food, decreased consumption of fast food/processed food.

Three Factor Eating Questionnaire – R21 (TFEQ-R21) [28-30]. The questionnaire was used to evaluate eating behavior through 21 questions in three different subscales: Cognitive Restraint – composed of six items that assess attitudes about food prohibition to lose or control weight; Emotional Eating – also with six items that assess eating behavior as an answer to negative emotions; and Uncontrolled Eating – composed of nine items that assess the propensity to control food in the presence or absence of hunger. The items are answered on a scale from 1 (completely false) to 4 (totally true). Item 21 scores from 1 (eating whatever you want and whenever you want) to 8 (constantly limiting food intake, never "giving in"). The final score is obtained from the average of each subscale and their subsequent transformation into a scale from 0 to 100, with higher scores being associated with the presence of dysfunctional eating attitudes.

Procedures

This was an observational, cross-sectional study with primary data collection, approved by the Ethics Committee of the Hospital das Clínicas of Ribeirão Preto Medical School (HC-FMRP), process CAAE: 44122721.8.0000.5440. The volunteers were recruited through social media and email and could be from any part of Brazil. Participants were first informed about the research and then it was checked to see if they met the inclusion criteria. After the acceptance of the consent form, they were led to the questionnaires. The survey was conducted using the platform REDCap® in a totally anonymous way, and participants did not receive remuneration. Data collection took place between March and April of 2021 and the survey was terminated when the sample size was reached.

Initially, the Shapiro-Wilk test was performed to evaluate the type of distribution of quantitative variables. The descriptive analysis was performed using mean and standard deviation for the quantitative variables and percentage for the qualitative variables. The association between qualitative variables was evaluated using the Chi-square test. One-way ANOVA was conducted to examine group differences between women who reported perceived changes in food intake during

the pandemic and those who did not. Perceived change was dummy coded as Yes = 1 and No = 0 and entered as an independent variable whereas the TFEQ scores were entered as the dependent variables. A statistical significance of $p<0.05$ and the program IBM®SPSS®, version 26.0, were used.

RESULTS

The study initially enrolled 3107 participants, but 572 were not included (343 were men, 33 were outside the age range, 3 did not sign the informed consent term, 95 were outside the BMI range and 98 had typos on weight and/or height). Also, 1752 were excluded based on the established criteria (1596 left blank items and 155 had conditions affecting appearance). The final sample consisted of 784 women with BMI ≥25.00 kg/m² (M=35.04 kg/m², SD=6.32) between the ages of 30 and 50 years old (M=38.73, SD=5.69). The descriptive characteristics such as BMI categories, ethnic-racial identification, sexual orientation, relationship, and level of education are presented in Table 1.

Table 1 – Absolute (N) and relative (%) frequency of body mass index classification, ethnic-racial classification, sexual orientation, relationship status, and highest educational level of the study's sample, 2021.

Variables	N	%
Body Mass Index (kg/m2)		
≥25.00 <30.00	175	22.3
≥30.00 <35.00	253	32.3
≥35.00 <40.00	200	25.5
≥40.00	156	19.9
Ethnic-racial identification		
Withe	555	70.8
Black	57	20.0
Brown	157	7.3
Yellow	14	1.8
Indigenous	1	0.1
Sexual orientation		
Heterosexual	727	92.7
Homosexual	27	3.4
Bisexual	16	2.0
Other	14	1.8
Relationship status		
Married	375	47.8
Single	183	23.3
Living Together	145	18.5
Divorced	72	9.2
Widowed	9	1.1
Highest educational level		
High school degree	295	37.6
Graduate degree	247	31.5
Postgraduate degree	183	23.3
Completed primary education	59	7.5

The descriptive analysis of the variables of interest, such as level of social distancing/isolation, feelings experienced, and perceived changes in food intake during the COVID-19 pandemic are described in Table 2. Over 95% (n=773) of the participants only went out during the study period for essential activities, which included basic activities and work. Regarding experienced feelings, anxiety, fear, exhaustion, and sadness were the most prevalent. In contrast, less than 10% (n=57) of the sample considered happiness one of the most experienced feelings from the pandemic's beginning until data collection.

Table 2 – Sample characterization in absolute (N) and relative (%) frequency regarding social distancing/isolation, feelings experienced, and changes in eating, 2021.

Variables	N	%
Social isolation		
Went out just for basic activities	335	42.7
Went out just for basic activities and to work	438	55.9
Went out just for basic activities, to work and/or for social life	11	1.4
Feelings experienced		
Anxiety	678	86.5
Fear	511	65.2
Exhaustion	468	59.7
Sadness	410	52.3
Loneliness	205	26.1
Hope	130	16.6
Happiness	57	7.3
None of the previous	14	1.8
Perceived changes in food intake		
Yes	667	85.1
No	117	14.9
Which change		
Increased frequency of consumption	447	57.0
Increased amount of consumption	320	40.8
Decreased frequency of consumption	47	6.0
Decreased amount of consumption	39	5.0
Increased consumption of fast-food/processed food	331	42.2
Decreased consumption of fresh food	140	17.9
Increased consumption of fresh food	118	15.1
Decrease consumption of fast-food/processed food	74	9.4

Regarding food intake, 85% (n=667) of the sample reported perceived changes with an increased amount and frequency of food consumption. About the nutritional aspect, there was a significant increase (42.2%; n=331) in the consumption of fast-food/processed food products as opposed to 9.4% (n=74) of the sample that reported reduced consumption of these types of food in the same period.

A Chi-square test was carried out to evaluate changes in physical activity before and after the pandemic (Table 3). Results demonstrated a significant association, χ^2=44.71, df=4, p<0.001, showing a tendency in the sample to maintain sedentary behaviors (44.3%; n=347). While only 10.5% of the sample (n=82) initiated a physical activity routine (moderate or intense) during the pandemic, 28.4% (n=223) of the women abandoned the habit during this period.

Table 3 – Table of contingency in absolute (N) and relative (%) frequency of physical exercise practice before and during the pandemic (n=786), 2021.

Before	During				p-value
	None	Moderate	Intense	Total	
None	347 (44.3)	80 (10.2)	2 (0.3)	429 (54.7)	
Moderate	204 (26.0)	106 (13.5)	6 (0.8)	316 (40.3)	<0.001
Intense	19 (2.4)	17 (2.2)	3 (0.4)	39 (5.0)	
Total	570 (72.7)	203 (25.9)	11 (1.4)	784 (100)	

Note: χ^2=44.71, df=4.

A second Chi-square test analyzed the relationship between feelings of anxiety and perceived changes in food intake during the pandemic period. Results demonstrated a significant association, χ^2=19.80, df=1, p<0.001 (Table 4), with a high prevalence of perceived changes in food intake associated with anxiety (75.5%; n=592).

Table 4 – Table of contingency in absolute (N) and relative (%) frequency regarding the relationship between perceived changes in food intake and feelings of anxiety during the pandemic (n=786), 2021.

Perceived changes in food intake	Experienced anxiety			p-value
	No	Yes	Total	
Yes	75 (9.6)	592 (75.5)	667 (85.1)	<0.001
No	31 (4.0)	86 (11.0)	117 (14.9)	
Total	106 (13.5)	681 (86.5)	786 (100.0)	

Note: χ^2 = 19.80, df=1.

A One-Way ANOVA was conducted to test group differences between women who reported perceived changes in food intake during the pandemic and those who did not regarding disordered eating attitudes. Results demonstrated a significant difference in emotional eating, F (1, 782)=60.392, p<0.001, and in uncontrolled eating, F (1, 782)=38.982; p<0.001 (Table 5). Notably, the highest scores of each subscale were among women who perceived changes in food intake during the pandemic.

Table 5 – Mean (Standard Deviation) of the Three Factor Eating Questionnaire (TFEQ- 21) scores according to the perception or not of change in the participant's food intake, 2021.

Subscale of TFEQ-21	Total (n=784)	Perceived changes in food intake		F	*df*	*p*-value
		Yes (n=667)	No (n=117)			
Cognitive restraint	45.51 (17.67)	45.55 (17.9)	45.29 (16.1)	0.020	1	0.886
Emotional eating	64.69 (27.53)	67.78 (26.1)	47.10 (28.6)	60.982	1	<0.001
Uncontrolled eating	54.33 (22.98)	56.43 (22.4)	42.38 (22.3)	38.982	1	<0.001

Note: One-way ANOVA.

DISCUSSION

The present study aimed to evaluate eating attitudes and physical exercise practices during the COVID-19 pandemic in adult women with overweight or obesity. Results about social isolation and distancing prove that, during the data collection, less than 2% of the sample went out for activities that were not essential. It was in this same collection period that Brazilians lived through the pandemic's most lethal months, reaching values of 4000 deaths

daily [31]. This context can explain the mental health results. The prevalence of negative feelings in this sample was similar to the literature, where general people presented lower scores on well-being scales [32] and used more words associated with stress and anxiety [33].

Regarding changes in food intake, 85% of the sample reported an increase in the amount and frequency of food consumption, including fast food and processed food products. Furthermore, the results demonstrated a significant association between perceived changes in food intake and feelings of anxiety. These data show a previously known relationship, that is the use of food, especially those higher in calories and sugar, oil or/and salt, as a coping strategy for negative emotions [34,35]. A study [36] of women's eating choices while experiencing emotions evoked by life events demonstrated that women's eating behaviors tend to change in the presence of negative feelings, even in their daily routines, as an attempt to feel better. As eating is influenced by homeostatic, hedonic and learned processes, this consumption is a result of the sensation of relief/pleasure caused by the activation of the limbic system (dopamine action) as a positive reinforcement [37,38].

As for physical exercise practice, the results showed a tendency in the sample to maintain sedentary behaviors. Almost a third of the sample reported having abandoned the practice. We can hypothesize that the unfolding of the pandemic, uncertainties, and increased fear may have led individuals not to consider exercise a priority, and it is worth highlighting that the data collection occurred during the worst moment of the pandemic in Brazil. This result was consistently found worldwide in all age groups [13]. Even though we did not investigate the motivations for this result given the level of social isolation imposed by the pandemic, it is plausible to suppose that going out to practice physical exercise might have been seen as a risk. Moreover, implementing a practice at home was a distant or complicated reality.

We finally found a significant difference between women who reported perceived changes in food intake and those who did not on emotional eating and uncontrolled eating, with higher scores among women who perceived changes during the pandemic period. It is worth noting that the present sample reported high scores for dysfunctional eating attitudes: cognitive restraint, emotional eating, and uncontrolled eating compared to those found by other authors with Brazilian women [i.e. 39-41]. Considering that eating is a psychosocial aspect [42,43], it was expected that during the COVID-19 pandemic, the psychological role of food gained prominence, especially emotional eating.

Past and recent research suggests [44-46] that some people resort to "unhealthy" eating patterns as a way to cope with stress and negative emotions, which may include overeating or consuming foods high in calories but low in nutrients. Such behavior may be driven by feelings of loneliness, anxiety, or a desire to fill an emotional void, and might explain why emotional and uncontrolled eating were higher among women who perceived changes in food intake during the pandemic, but cognitive restraint was not. Emotional eating refers to the tendency to eat as a response to emotional stress and negative mood states. In contrast, uncontrolled eating reflects the tendency to lose control when feeling hungry or exposed to external cues. Finally, cognitive restraint is characterized by the conscious limitation of food intake to control body weight [47,39]. It is plausible to assume that the pandemic period aroused negative feelings that impacted the eating behavior of these women.

This study has some limitations that need to be considered. Firstly, the results cannot be generalized, as the participants were mostly white and heterosexual, whereas minorities experienced the pandemic differently. They had higher stress, fear, food insecurity, and less support. Secondly, the data was collected during the COVID-19 pandemic using a cross-sectional design; however, the

behaviors were not evaluated longitudinally. Therefore, the conclusions presented in this study are only applicable to this specific moment and it is not possible to establish causality.

CONCLUSION

The research indicates that older women with obesity or overweight faced more negative emotions and reduced physical activity during the COVID-19 pandemic. The pandemic also affected food intake regarding the amount, frequency, and quality of food consumed. Specifically, there was an increase in the consumption of low-nutrient-density food. These findings are concerning because all participants had overweight or obesity at the time of data collection, which increases the risk of high mortality and comorbidities.

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